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Use of *Beauveria tenella* (Delacr.) Siem. as a microbial control agent against termites in Uzbekistan

Abstract: The fungus *Beauveria tenella* (Delacroix) Siemaschko was investigated as a microbial control agent against an insect pest species, the Turkestan termite, *Anacanthotermes turkestanicus* (Isoptera: Hodotermitidae). *B. tenella* was found to cause 100 % mortality of *A. turkestanicus* in 7 days as a wet preparation and 8 days as a dry preparation.

The tests showed that the biological effectiveness of propagules of *B. tenella* in experimental nests was 79.2, 78.5 and 96.5 % at concentration of 0.3, 0.5 and 1.0 g. per nest respectively.

Keywords: fungal pathogen, insect pest, microbial control.

Introduction

Termites are one of the most ancient groups of insects. They actively participate in the recycling of cellulosic material and in soil formation. There are approximately 2900 termite species nearly 160 of which are known to destroy wooden structures [7, 238]. Two of these termite species *A. turkestanicus* and *A. ahngerianus,* belonging to the genus *Anacanthotermes* (Isoptera: Hodotermitidae) inhabit Uzbekistan. Wood structures such as buildings, monuments of architecture and culture as well as wood in hydroelectric dams are subject to the destructive activity of termites [4, 60–64]. This problem is particularly serius in the southern Aral region of Uzbekistan.

Available methods of termite control, such as liquid termiticides and impregnation of wood with chemicals have not provided reliable long-term protection from termites in areas where *Anacanthotermes* species are found [8, 57–61; 11, 28–30]. A promising, but little studied, approach is the use of entomopathogenic microorganisms for the control of termite populations. This necessitates investigation of termites in this geographic region and development of control measures incorporating microbiological agents. Microorganisms and products of their metabolism are used against other insect pests; however, their use as control agents against termites is poorly developed [10, 419–428]. The interrelations between termites and microscopic fungi are multilateral, from symbiotic to antagonistic [12, 443–448].

The goal of this study was to evaluate selected potential microbial control agents for effectiveness against *A. turkestanicus*. The objectives included a determination of mortality of termites by individual fungal species, comparison of materials on which the candidate fungus can be efficiently harvested, and determining whether incubation time affects the potential of the fungus to kill termites.

Material and methods

Approximately 2000 termites were collected from Khoresm, Bukhara and Samarkand region of Uzbekistan and analyzed to determine the mycobiota harbored by the termites. Whereas majority of the termites examined were workers. Other castes (nymphs, soldiers and alates) were also analyzed. The mycobiota of termites was obtained by placing dead termites into humidified chambers on agar plates. The termites selected for the analysis were washed with alcohol for 1 min and rinsed in sterile water prior to incubation. Following incubation at 24 °C for 10 days, the bacterial and fungal colonies that grew from the termites were replated onto Czapek's medium for further identification [5, 5–9; 14, 187].

The cultivation of *B. tenella* was conducted as follows: cellophane disks 12–15 cm. in diameter were boiled in distilled water for 15 min. and placed onto the surface of PDA. Inoculation was conducted by spraying 0.2 ml. of *B. tenella* water suspension onto the surface of the medium in one Petri dish. The fungus was incubated at 24 °C for 15–20 days. The fungus-covered disks were removed and air-dried. After a careful grinding of the fungus mass a powder-like fungal preparation was obtained, which was packed into 1 g capsules and sealed using a vacuum collector for storage of the fungus and application of the fungus as a dry preparation.

The concentration of water suspensions of fungal spores was calculated using a counting chamber and Goryaev's method [2, 293]. Calculations were made according to the formula: $T_s = A \times 250 \times 10^3$, where T_s is the titer of the suspension, and A is the average value of the number of spores in one large square. The inoculation of termites as a wet preparation was carried out by placing 10–20 individuals into a Petri dish which contained a disk of filter paper soaked with a 1 ml. suspension of 5×10^8 spores/ml in water. Filter paper disks soaked in water alone were used as the control. The experiment was replicated three times. The percent mortality of termites was calculated by Abbot's formula: $X = (M_o - M_к)/(10 - M_к) \times 100$, where M_o is the number of dead termites in the experiment, and $M_к$ is the number of dead termites in the control.

A strain of *B. tenella,* BD 85, had been isolated from the Moroccan locust and evaluated for virulence against termites in 1987. In preliminary tests this strain appeared to be more effective against the Turkestan termite, consequently we used this strain for all the bioassays.

The effect of the fungus on termites in the field was determined in four termite nests sufficiently apart. One of these nests was used as control. Six containers containing the dry fungal mass mixed with chopped sunflower stems were placed into the soil around each of the other three nests. Each of these nests received the fungus at one of the following concentrations; 0.3, 0.5 and 1.0 g. per nest. Six months after the treatment all the four nest were opened and the termites counted.

Data were analyzed using analysis of variance (ANOVA) and least significant difference (LSD) at $P \leq 0.05$ [3, 113]. All analyses were run using the SAS System Software.

Results

Termites of all castes, except alates, were found to harbor fungal pathogens. The most frequent cause of mycosis in the termites was the entomopathogen *B. tenella*. The occurrence of this entomopathogen in various lots of insects selected for the analysis ranged from 0.5 to 24%. Among other entomopathogens, we noted *Aspergillus* (*A. flavus*, *A. oryzae* and *A. niger*), the occurrence of which in different lots of insects reached 11.5%. Species of the genus *Penicillium* were recorded on termites less frequently (0.9–5.9%). Single cases of isolation of the genera *Fusarium*, *Alternaria* and *Cladosporium* were also recorded. On a number of individuals we recorded a mixed infection, as we isolated *B. tenella* with *Mucor sp.*; *B. tenella* with *Penicillium sp.*; and, *B. tenella* with *Alternaria sp*. The mixed infection of termites with *B. tenella* and *A. flavus* was most frequent. Only sole representatives of the genus Penicillium were isolated from the homogenate of termites, which suggests a poor mycobiota of the gut of termites and susceptibility of the fungal species to the food enzymes of termites [13, 13–20]. Thus, the pathogenic mycobiota of these termites was represented by a relatively small number of species.

For the selection of the optimal nutrient medium for the growth of *B. tenella* we tested the medium from a natural substrate – potato agar (PDA) and the medium of a certain mineral composition – Czapek's agar (Table 1).

Table 1. – The growth of biomass of fungus *B. tenella* in different nutrient media

Duration of cultivation (days)	Biomass (mg.) of *B. tenella* from three Petri dishes	
	On PDA	Czapek's medium
5	0.3	0.3
15	0.7	0.4
20	0.8	0.4
25	0.8	0.5
30	0.8	0.5

It was determined that PDA was preferable for obtaining a high fungal mass, the yield of which was 1.5–2.0 times as high as on other agarized media (Czapek's medium) therefore, PDA was used in further experiments both for the cultivation of the entomopathogen and for long-term storage of fungal cultures.

Growth of *B.tenella* on the food film resulted in a biomaterial yield of 0%. The smallest amount of the fungal biomass was obtained at the use of the food filter. When we used different types of the filter paper, the obtained biomass was much lower than at the use of cellophane: 1.55 g., 1.70 g., 2.00 g. and 2.05 g., for dark-blue, white, blue filter paper and tracing paper, respectively, against 7.35 g. for the cellophane. The yield of the dry fungal mass (1.25 g.) during the growth on cellophane also exceeded other variants (Table 2).

Table 2. – The fungal weight of *B. tenella* and percent fungus yielded from separating membranes

Membrane	Crude fungal weight (g.)	Dry fungal weight (g.)	Yield of biomaterial (%)**
Food film, non-porous	0.00	0.00	00.0 C
Food filter	0.75	0.14	20.7 A
Filter paper (dark blue)	1.55	0.45	33.5 A
Filter paper (white)	1.70	0.45	28.3 A
Filter paper (blue)*	2.00	0.32	15.5 A
Tracing paper	2.05	0.32	15.0 A
Cellophane	7.35	1.25	17.3 A

Note:* — *The blue, white and dark blue filter paper differed in pore size* (n = 5); ** — *Values with the same letter are not significantly different* ($P \leq 0.05$).

It was also important to determine if the time of incubation affected the yield of biomaterial. When grown for 10 days the yield of dry fungal weight was 1.25 g., while at 15 days the yield was 1.30 g. (Table 3). The values were not significantly different, so these times of incubation did not affect the yield of biomaterial.

The amount of fungal spores from 1 sq. cm. of culture constitutes, on average, 5.0×10^6; from the surface of one Petri dish it is possible to obtain 0.3 g. of preparation, which contains 7.5×10^8 spores.

Table 3. – Yield of *B. tenella* as a function of the time of incubation

Period of incubation (d.)	Crude fungal weight (g.)	Dry fungal weight (g.)	Yield of biomaterial (%)
10	7.35	1.25	17.4 A*
15	8.35	1.30	15.7 A

Note:* — *Values with the same letter are not significantly different* ($P \leq 0.05$) (n = 10).

The development of mycoses in insects depends on the susceptibility of insects and the virulent traits of a fungus. It was experimentally established that the death of all experimental insects occurred within seven days after infection by the fungus *B. tenella* as a wet preparation; the highest number of dead termites was noted on days 6 and 7. In comparison, inoculation with *A. flavus* caused death in 76.6 % of termites in 10 days. *Penicillium* sp. caused 13.0 %; and *Fusarium sp.* caused 11.7 % mortality. Species of the genera *Cladosporium* and *Alternaria* caused death in only 7 and 4 % of termites, respectively. In the control group, 0–2 termites died each day.

The first signs of mycosis and death of termites in all variants were recorded on the third day of inoculation. With *Mucor sp.*, the death of termites in experimental variants did not exceed the values of the control. This fungal species does not appear to have a pathogenic effect on the termites.

B. tenella was selected for further investigation based on the high rate of mortality it caused among termites. To obtain a dry fungal preparation we conducted a number of experiments on the identification of the composition of a nutrient medium, the type of the separating membrane, and the optimal incubation time for the entomopathogen. The entomopathogen *B. tenella*, like many other fungal species, grew well on various artificial nutrient media [9, 536–538].

The mortality of termites when exposed to the dry powder in comparison with water suspension of *B. tenella* spores was determined. The experimental data were recorded when death began on day 3. Both the dry preparation and the spores in water caused 100 % mortality of termites, but the dry fungal preparation took 24 hours longer, 8 days vs. 7 days (Table 4). The pathogen *B. tenella* was reisolated during the mycological analysis of the dead termites.

Table 4. – Effect of the dry and wet preparations of *B. tenella* on termite mortality

	Days					
	3	**4**	**5**	**6**	**7**	**8**
Dry	10.0 A*	10.0 A	23.3 A	63.3 B	76.7 B	100.0 B
Wet	3.3 A	16.7 A	50.0 A	80.0 B	100.0 C	100.0 B
Control	3.3 A	3.3 A	3.3 A	6.7 A	6.7 A	10.0 A

*Note: *— Mortality is expressed as mean percent. Values with the same letter are not significantly different ($P \leq 0.05$). Preparations were applied at a concentration of 5×10^6 spores/ml. (n = 3).*

A test of baits containing *B. tenella*, which was placed into the soil around the termite nest, showed a sharp decline of termite numbers in the experimental nests six months later. In the control nest, the average number of termites was 17,200. In the treated nests the corresponding numbers were 5000, 3700 and 200 for 0.3, 0.5 and 1.0 g. *B. tenella* doses respectively. These results indicate a mortality of 79.2, 78.5 and 96.5 %, respectively for the three treatment doses.

The mycological analysis of baits, which were subsequently removed from the soil, showed viable propagules of *B. tenella*, as the pieces of baits were overgrown by the test fungus. The propagules of *B. tenella* were recorded in the termite nests, and 2 % of the soil samples analyzed were infested with this fungus. A decline in the number of termites from neighboring nests where we did not place the fungus was also observed. This fact indicates that the fungus could have been distributed between colonies by termites.

Discussion

Microorganisms have been effectively applied for the microbial control of insect pests. However, the application of microorganisms for the specific control of termites has been poorly utilized [17, 1–13; 10, 419–428]. Successful microbial control agents must compete with resident microbes and infection may result from stimulation of endemic pathogens or opportunists [12, 443–448]. Virulent isolates can be derived from a target insect infected in the field [6, 547–612]. Termites live in association with pathogenic microbes [12, 443–448]. Chemical termiticides may allow synergistic effects [15, 495–524].

The study of the mycobiota of termites inhabiting Khoresm and Samarkand provinces of Uzbekistan and the development of a method of reducing termite numbers with microbes was enabled by the determination of several factors. The mycological analysis of approximately 2000 individual termites from various castes showed that the most commonly observed fungal species were of the genera *Beauveria* and *Aspergillus*. In addition, species of the genera *Penicillium*, *Fusarium*, *Alternaria* and *Cladosporium* were recorded. *Beauveria* isolates have been previously shown to cause mortality to other species of termites [1, 538–543; 16; 18, 208–215].

Once a potential entomopathogen is isolated it is important to have an efficient method to propagate the microbe. An evaluation of materials on which to obtain fungal preparations without media contamination revealed that the optimal nutrient medium for the growth and storage of the fungal culture was PDA. Cellophane yielded the greatest dry fungal weight when used as a separating membrane. Both were porous materials that allowed the nutrients from the solid media surface to reach the fungal mass. The non-porous food film completely blocked the supply of nutrients which resulted in the inhibition of fungal growth, and proved unsuitable for this purpose. The cultivation of a fungus in controlled conditions on an appropriate separating membrane can allow harvesting of a media-free biomass of the pathogen. The material used as a separating membrane between the culture and the nutrient medium ideally provides a supply of nutrients from the substrate to the culture, and also prevents the medium from combining with the biopreparation when harvesting the fungal mass. Cellophane proved to have the most suitable qualities of the materials testes. The yield of fungal biomaterial did not vary significantly from 10 to 15 days incubation. Thus, it was preferable to cultivate *B. tenella* on PDA, cellophane can be used as a separating membrane between the fungal mycelium and the agar, and times of incubation of 10 and 15 days were equally effective. This method of cultivation of *B. tenella* provides approximately 18.1 % of the dry powder. In various lots this value ranged from 15.3 to 19.8 %. *B. tenella* caused 100 % mortality of termites in this study. Both dry and wet preparations were effective. The level of mortality caused by other fungal species, all isolated from termites in the course of this study, was significantly lower and did not exceed 40 %.

The use of baits containing 1 g. of *B. tenella* propagules under field conditions showed their high effectiveness in termite mortality six months after treatment. The ability of *B. tenella* to cause mortality of termites in both wet and dry compositions and to be harvested on membranes free of the growth medium makes it a prospective microbial control agent for *A. turkestanicus*.

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Agro technologies increasing the productivity of irrigated soils in the desert zone of Uzbekistan

Abstract: The results of research aimed to improving soil fertility and crop yields in the system "cotton-winter wheat" in accordance with the agricultural technologies developed by our institute, related to soils of the desert zone are given. The ways of increasing the amount of humus, nutrients in the soil and productivity of cotton and winter wheat are demonstrated.

Keywords: soil fertility; fertilizer; enrichment of the soil; organic substances; crop yields; the carbon content of humus.

In recent years in the country's major irrigated areas there is a tendency of reducing the content of humus, the nutrients available to plants, occurrence of negative phenomena as degradation, dehumidification, erosion, salinization, compaction, etc., which ultimately leads to poor land quality and reduction of soil fertility. A prevention of these negative phenomena is possible by land reclamation and the introduction of agricultural technologies to improve all the basic properties of the soil, enriching it with organic matter and the elements of plant nutrition.

On the basis of studies at period of 2003–2010, we developed agricultural technologies applicable to soils of serozem zone, aimed to enriching the soil with organic matter, increasing soil fertility and yield of crops.

This agrotechnology includes a cultivation of major crops in system "cotton-winter wheat" and their consequent alternation with repeated crops — corn combined with bean (mung bean, soybean) and intermediate crops (oats, canola) with obligatory introduction of high amounts of organic fertilizers-manure from different origin, organo-mineral fertilizers, composts from local raw materials on the basis of manure. This reduces the rate of applied mineral fertilizers 1.5–2 times.

The same agrotechnology, with some modifications, developed in relation to takyr-meadow and serozem-meadow soils of the desert zone in several farms of Surkhandarya and Kashkadarya regions of the republic in 2008–2011.

The paper presents the results of research on the effect of applied agricultural technology on selected fertility indicators of irrigated takyr-meadow soils and productivity of crops (cotton, winter wheat), conducted in 2009–2011 on the territory of the farm of Angor district of Surkhandarya region.

Research methodology

Field experiments with the cultivation of major, repetitive and intermediate crops conducted by Soyuz NIHI (All-union research institute of cotton science) methodology. Soil analyzes were performed according to standard methods described in the manuals of Soyuz NIHI (1977) and E. V. Arinushkina (1970).

Experiments with cotton, winter wheat and other crops were placed in 5 cases, repeated 3 times. The size of the plot — 72 m², the total area — 1080 m².

Results

The results of the soil analysis on change the content of total humus in three years of experiments in cotton cultivation (Spring–Fall 2009), winter wheat (fall 2009–summer 2010), sowing repeated crops (Summer–Fall 2010), intermediate (Fall 2010–Spring 2011) and re-cotton (spring–fall 2011) showed a significant increase of its content in the variants, which used the proposed agro technology with the introduction of various norms of manure with reduced 1.5–2 times the norm of mineral fertilizers, as well as microbiological preparation (MERS).

Thus, in the control variant without fertilizers from spring 2009 to the autumn 2011 there is decrease in the carbon content of humus in the upper arable (0–30 cm.) and subsurface (30–50 cm.) soil horizons at 0.095 %, which is equal to 7.64 t/ha. In variant with introduction only complete the norms of mineral fertilizers during this period was an increase in these layers of soil carbon content of organic substances in the 0.097 % and 0.050 %, respectively. This is for the 0–50 cm. soil layer is 5.88 t/ha. Such an increase in the carbon content of organic matter was due to the better development of the plants due mineral fertilizers and more decayed root and crop debris.

The variants of the experiment, which used the proposed agricultural technology with application of organic fertilizer (manure) at the rate of 20 and 40 t/ha annually for three years and at a low of 1.5 and 2 times the rate of mineral fertilizers, in the 0–50 cm. soil layer was an increase amounts of organic substance on the 0.177 % and 0.239 %, which is equal to 7.08 and 9.56 t/ha, respectively (Fig. 1). These values are higher than the control group with mineral fertilizers by 1.2 and 3.68 t/ha. In variant of the experiment which used a microbiological preparation at rate 100 ml/ha with 1.5 times the low rate of fertilizers, increasing the amount of organic matter in the 0–50 cm. layer was 0.132 % or 5.28 t/ha, which is close to control variant which used the full rate of fertilizer.
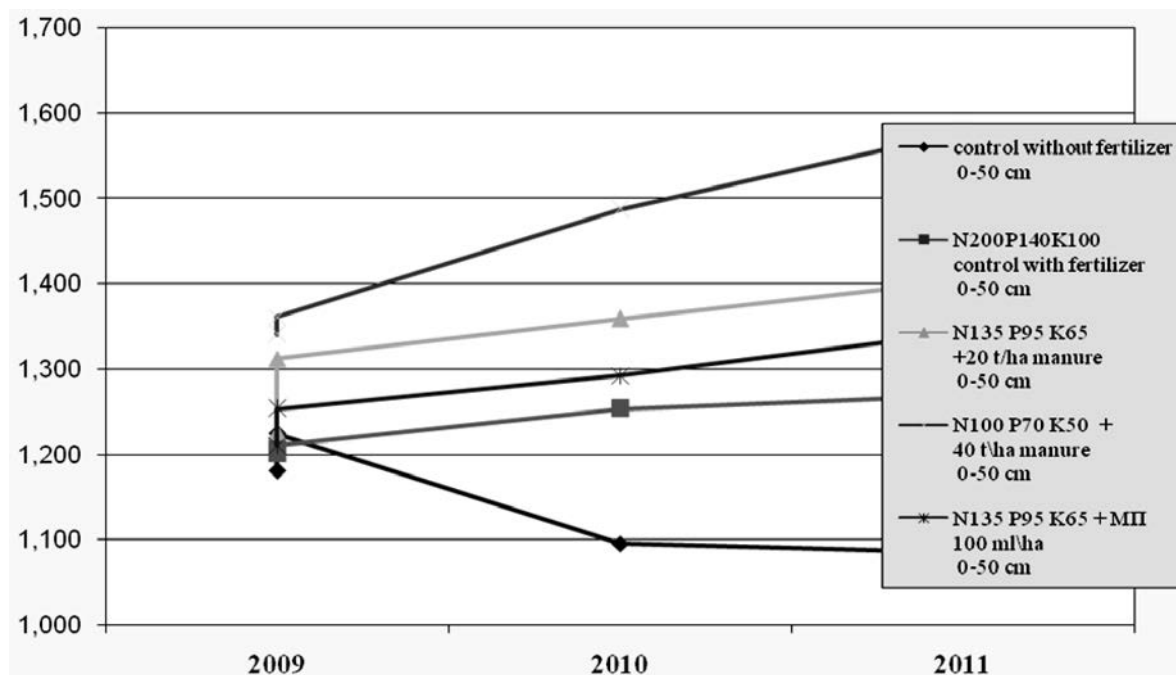
Fig. 1. Dynamic of changes in the humus content of the soil in cultivation system "cotton-winter wheat", repeated and intermediate crops, 2009–2011 (% of the soil weight)

Similar positive results were obtained in variants where the applied agro-technologies with respect to the dynamics of content of phosphorus and potassium available to plants in 0–30 and 30–50 cm. soil layers.

The obtained data present, for the 3 years of application of agricultural technology, including a succession of major crops with repeated and intermediate crops and annual application of high amounts of organic fertilizers, the possibility of reducing the norms of mineral fertilizers in 1.5–2 times. Thus, in experimental variants with organic fertilizer, a significant increase in organic matter content of the first half-meter layer of soil and the amount of phosphorus and potassium in forms available to plants are observed at the level of the control variant where full norms of fertilizers applied. Thus, in these variants, the 0–30 cm. layer of soil contains 26–35 mg/kg transfer phosphorus, and 200–300 mg/kg exchangeable potassium, which belongs to the average level of supply.

These positive aspects of applied agricultural technology on soil fertility indicators are affected in relation to the productivity of cultivated major crops — cotton and winter wheat.

Derived data show that in variants 3–4 which applied agricultural technology and introduced different norms of organic fertilizers together with reduced 1.5–2 times of mineral fertilizer, cotton yield was 3.60 and 3.79 t/ha. At the same time gain from the control variant 2, which used the full rate of mineral fertilizers amounted to 0.43 and 0.56 t/ha. In variant 5, which the microbial preparation is used with a low rate of 1.5 times of mineral fertilizer yield over the control variant was slightly reduced — 0.07 t/ha.

Positive effects of organic fertilizers on cotton productivity also marked in the first 2009 year of the study. However, this year, with cotton yield in the variant-2 with a full rate of mineral fertilizers 3.18 t/ha, in variants with organic fertilizers at rates of 20 and 40 t/ha, increase was 0.38 and 0.52 t/ha respectively. In variant — 5 with microbiological preparations yield decreased by 0.16 t/ha.

Conclusions

These results point out that the proposed agro-technology, including the succession of major crops with repeated and the intermediate crops with the introduction of mandatory annual high rates of organic fertilizers at 20 and 40 t/ha, together with reduced 1.5–2 times of mineral fertilizers, both in terms of serozem zone and the desert, in the short term (2.5–3 years) can increase soil organic matter content and thus increased cotton yield by 0.4–0.5 t/ha.

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Variability and speciation in the Central Asian land mollusks kind *Psendonapeus* (*Gastropoda*, *Pulmonata*, *Bulminidae*)

Abstract: A study of intraspecific variation Central Buliminidae, types of Ps. albiplicatus, Ps. Sogdianus, the study of variability and clarify their taxonomy using molecular genetic techniques, as well as possible options for the speciation of these molluscs.

Keywords: Molecular genetic, marker, poltitpicheskie, genetic, landscape, Adyrna, konhological, matrix, amplification, primer elongation, denaturation, Sange, nucleotide.

Among the Central Asian Bulinidae race Psendonapeus provide an example of an amazing diversity of species, from the 64 species found in the region of 40 species or 62.5% belong to this genus. Species diversity is undoubtedly a result of intense speciation, which in some cases can be observed currently. For example, over the past 20–25 years (Uvalieva, 1990, Kuznetsov, 1999, Pazilov, Asimov, 2003, Shileiko, Rymzhanov 2013) genus Pseudonapaeus refilled more than 10 new species for science.

The rapid completion of this kind of new species for science shows that the genus Pseudonapaeus in Central Asia is still poorly understood — taxonomy, biology, ecology, variability, and others.

It should be noted that the nature of the variability of the Central Asian Buliminidae analyzed a number of researchers [4; 9; 6; 7], but most of the researchers were limited to a statement of facts and a description of the variability of devices each form to the conditions of specific habitats, and why path and new forms practically unable attention.

In the last decade, along with traditional research methods to identify species used not only morphological and anatomical features, but also the data of biochemical and genetic studies. The increasing use of obtained molecular genetic techniques, with which, now established a DNA bank of valuable, rare and endangered species of animals and plants. Research on the intraspecific variability of stored objects, clarify contentious issues of taxonomy and classification, the development of techniques of genetic certification populations and study the genetic stability of stored ex situ taxa.

Intraspecific variation Central Buliminidae using molecular genetic markers is not yet known. Available works kind regards Chondrula common within Europe [8; 1]and others.

Carrying out the molecular genetic studies poltitpicheskih species is very important, as it allows to evaluate how intraspecific polymorphism and create a typical "genetic passport" for the animal species in order to maintain and preserve biodiversity.

The aim of this work is an example of widespread species of Ps. albiplicatus, Ps. sogdianus study variability and clarify their taxonomy using molecular genetic techniques, as well as possible options for the speciation of these molluscs.

Material and methods

The material for this study were the charges authors conducted from 2007 to 2015 in Ugam, Chatkal, Fergana and Pskem, mountain ranges. Collection of material produced by the method of A. Shileiko (1978, 1984). Material collected by hand in order to maximize tight and uniform research area, with a maximum coverage of the diversity of landscapes and habitats. To determine the number of types of

quantitative surveys conducted. This large species, larger than 10 mm. were counted with an area of 1 to 3 m., smaller species from the area were taken into account 0.25 sq. m. Live shellfish harvested in wet weather in adyr areas early in the morning until the dew has dried (at that time the majority of shellfish leads an active life, and they are easier to observe). In mountainous areas, most snails are active all day, so the material can be collected at any time of the day.

Determination of species belonging conducted by konhologicheskim signs and reproductive system [9].

The isolated DNA was used as template for PCR amplification. Separately in each individual leg muscles clam isolated DNA using the DNA Tissue kit (Macherey-Nagel, Germany). DNA was dissolved in buffer were stored at — 20 °C. Fragments (18S) ribosomal DNA were obtained in the polymerase chain reaction (PCR) using primers and 18Sd6 28Sr2. PCR was performed as follows: Step 1 — DNA denaturation at 95 °C for 3 minutes; Step 2 — DNA denaturation at 93 °C — 20 seconds;Step 3 — Annealing of primers at 55 °C — 30 seconds; Stage 4 — elongation at 72 °C — 2 min.; 5 stage — the chain elongation at 72 °C — 10 min. Steps 2 through 4 were repeated cyclically 35 times.

PCR — products were purified from impurities using gel electrophoresis and used to determine the nucleotide sequences of the Sanger method.

DNA sequencing was performed at the center of collective use "Genome" reagent kit using ABI PRISM® BigDye ™ Terminator v. 3.1 reaction products followed by analysis on an automatic sequencer ABI PRISM 3100-Avant (Applied Biosystems) (Moscow, Russia).

Analysis of the nucleotide sequences was performed using the software package MEGA5, alignment and comparison of sequences — using the method and Clustal W. Bioedit.

Research results and discussion

Both studied species are very widespread in Central Asia. It is found in the foothills and mountainous areas at an altitude of 1200–2500 m. above sea level. m. It lives among the thickets of grass, in coarse scree, among thickets of bushes, it prefers areas with loose soil.

Pseudonapaeus albiplicatus extremely variable species, variability konhologichesih signs of shell are as follows. For example, on the left bank of the river. Ugam, the neighborhood with. Khumsan, southern slopes of the hills of loose scree, basal parts of herbs in mollusks shell height of 13.5 mm., conical-cylindrical shape, a thick-walled (Fig. 1, A) p. Turns 7, well-convex. The last turnover of the mouth is raised very slightly. The height of the last whorl 2 times less than the height of the shell. Coating consists of horny background

and light radial Motley, developed to varying degrees. The sculpture consists of massive blunt sharp edges. Mouth slightly oblique,

oval usecheno-, places to attach it connected well developed corn, equipped with a wide brim lip and moderate turn away.
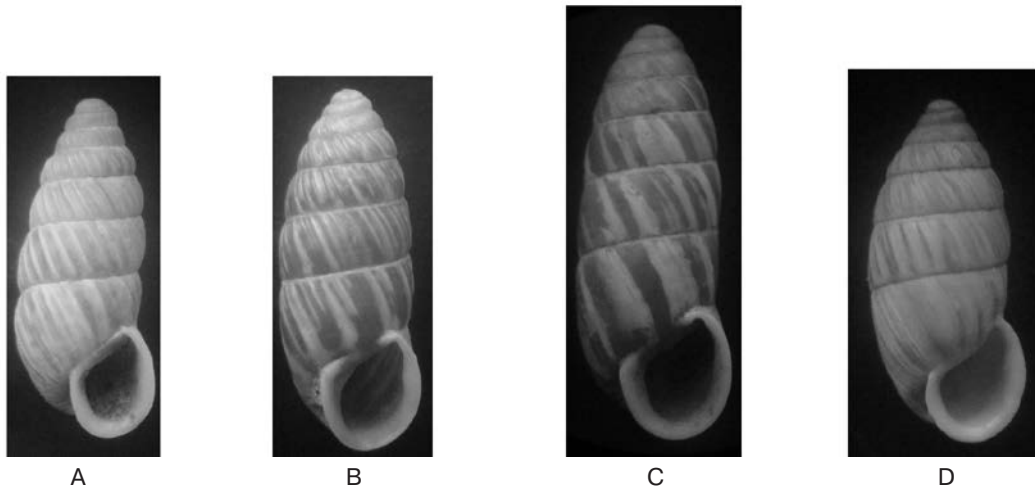

Fig. 1. Psendonapeus albiplicatus. A neighborhood of a. Humana (on the left bank of the river Ugam.);
B- surroundings with. Hazratishah (Chartak district of Namangan region); B T- gorge. Piyazdy-sai (Chatkal range)
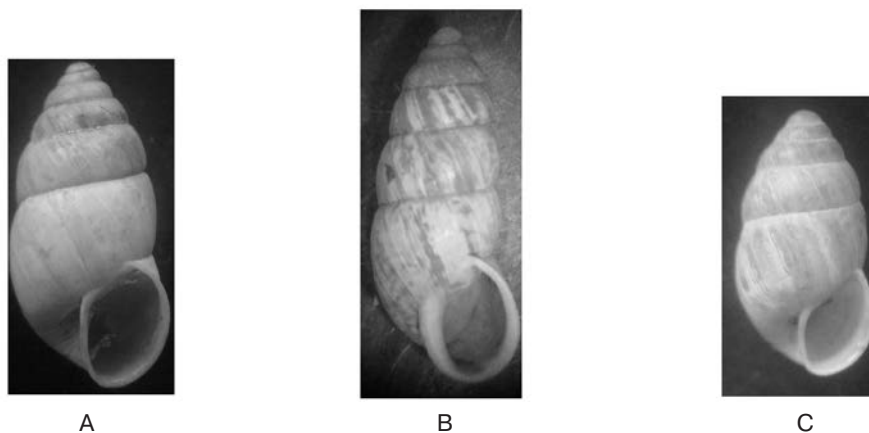

Fig. 2. Variability shell Psendonapaeus sogdiana: A tract of Urta-Chuck (Nuratau hr.); B, near-c. Vodul (Alai Mts.)

Shellfish inhabiting the southern slopes of the hills of the lower parts of the plant suffrutescent, neighborhood s. Hazratishah (Chartak district of Namangan region) has the following differences from the first population: shell height of 10 mm., oval-conical shape, shiny; coloration is brown background and developed in varying degrees of light radial Motley; the mouth of the attachment points are not connected; on the palatal wall are slightly prominent tubercle development of the tooth, which, when the shell is rotated to the left clearly visible (Fig. 1, B).

In Chatkal Ridge, Gorge. Piyazdy-say, the southern slope of the hills, among the bushes, live two forms, one large sink (height 17–18 mm.), thick-walled, oval-cylindrical shape; coloration is brown background and developed radial streaks; the mouth of the truncated-oval, his place of attachment is not connected (Fig. 1, B), another shell of medium size (height 10–12 mm.), fusiform shape, the color, light radial streaks developed so much that you can probably talk about the white shell (Fig. 1, D).

Psendonapaeus sogdianus upholstered in coarse scree, often in the steppe areas of the foothills, among herbaceous vegetation, sink very volatile as the Ps. albiplicatus. For example, living in coarse scree (Fig. 2, A) on the northern slope of the tract Urta-Chuck (Nurata Ridge), in mollusk shells oval-cylindrical shape, shiny, speed 6, convex, the last turnover of the mouth of the lift height of his 1.5 times the height of the half shells. Height 13 mm. shells. Painting horn (three embryonic turn light brown). Sculpture — embryonic turns smooth, and the rest with irregular radial wrinkles.

Mouth slightly skewed, the place of its attachment close together and connected to the thin corn, edge much to turn away.

On the Alai Range, not far from the. Vodul, southern slopes, on the lower parts of the stems subshrub among dwarf shrubs are found under rocks form two Ps. sogdianus of the first large shell (shell height 15 mm.) with a conical-cylindrical shape, speed 7 Painting, top 3 turns brown, the rest of turns on a white background are radial streaks. Mouth slightly skewed, the place of its attachment moderately close together, but not connected (Fig. 2 B). And at the second sink small (8–9 mm. height of the shell), thin-walled, with oblong-oval, 5 speed, color of light horn, the insertion of the mouth does not close together (Fig. 2).

As can be seen from the above data konhologicheskyh variability of the species studied are shown in color, shape and size of the shell.

Clams live on the southern slopes of the hills, on the stems of shrubs and dwarf shrubs characterized by the alternation on the sink white stripes of varying widths. Apparently, a striped coloration is associated with periodic changes in temperature and humidity during the shell growth. Regarding the development of stripes or streaks our views converge [5], during periods of low temperatures and moderate humidity sink is growing rapidly due to intensive work roll mantle, with the share of carbonates in secret in this case is relatively small and the sink in the end formed streaks.

It should be noted that the shellfish that live under rocks embryonic shell turns light brown, the other horn or light horn. This is due to the fact that shellfish inhabits shaded habitats, where climate con-

ditions there is no need in the reflection of the bright rays of the sun.

It should be noted that transitions linked differences in the color of the shell, the species studied, perhaps, above all, reflect the geochemical and climatic features of habitats. But at the same time, they are adaptive. The emergence of adaptation to the environment — the main result of evolution.

It should be noted that the nature of the variability of the Central Asian Buliminidae refer to the [4; 9].

P. V. Matekin (1959), setting an extremely wide range of variation konhologicheskih signs, brought all Buliminidae in 4 types (Jaminia potaniniana, J. labiella, J. fedtschenkoi, J. kasnakowi). The remaining 22 "kind of" united into one, an extremely volatile and widespread within the Central Asian appearance J. potaniniana.

A. A. Shileyko (1984) study of Central Asia Buliminidae found 29 species, of which the genus Psendonapaeus represented by 13 species, one of which Ps. albiplicatus composed with 8 forms

(Ps (P.) albiplicatus f. albiplicata, Ps. (P.) albiplicatus f. sogdiana, Ps. (P.) albiplicatus f. secalina Ps. (P.) albiplicatus f. subobscura, Ps. (P.) albiplicatus f. asiatica, Ps. (P.) albiplicatus f. aptycha, Ps. (P.) albiplicatus f. retrodens, Ps. (P.) albiplicatus f. dissimilis) intraspecific variation.

In the first, with the help of molecular genetic methods we investigated intraspecific variation Central Buliminidae the example of the widespread species Psendonapaeus.

Using polymerase chain reaction (PCR) using primers amplified 18S DNA region studied variability Ps (P.) albiplicatus f. albiplicata of two populations (1 populyatsiya neighborhood with Khumsan, Tashkent region; 2 population of a neighborhood with Hazratshah Namangan region). The size of the amplificate were analyzed by gel electrophoresis in 1.5 % agarose gel. The results showed that the nucleotide sequence of 18S rDNA partial areas of the two clam populations were identical (Fig. 3).
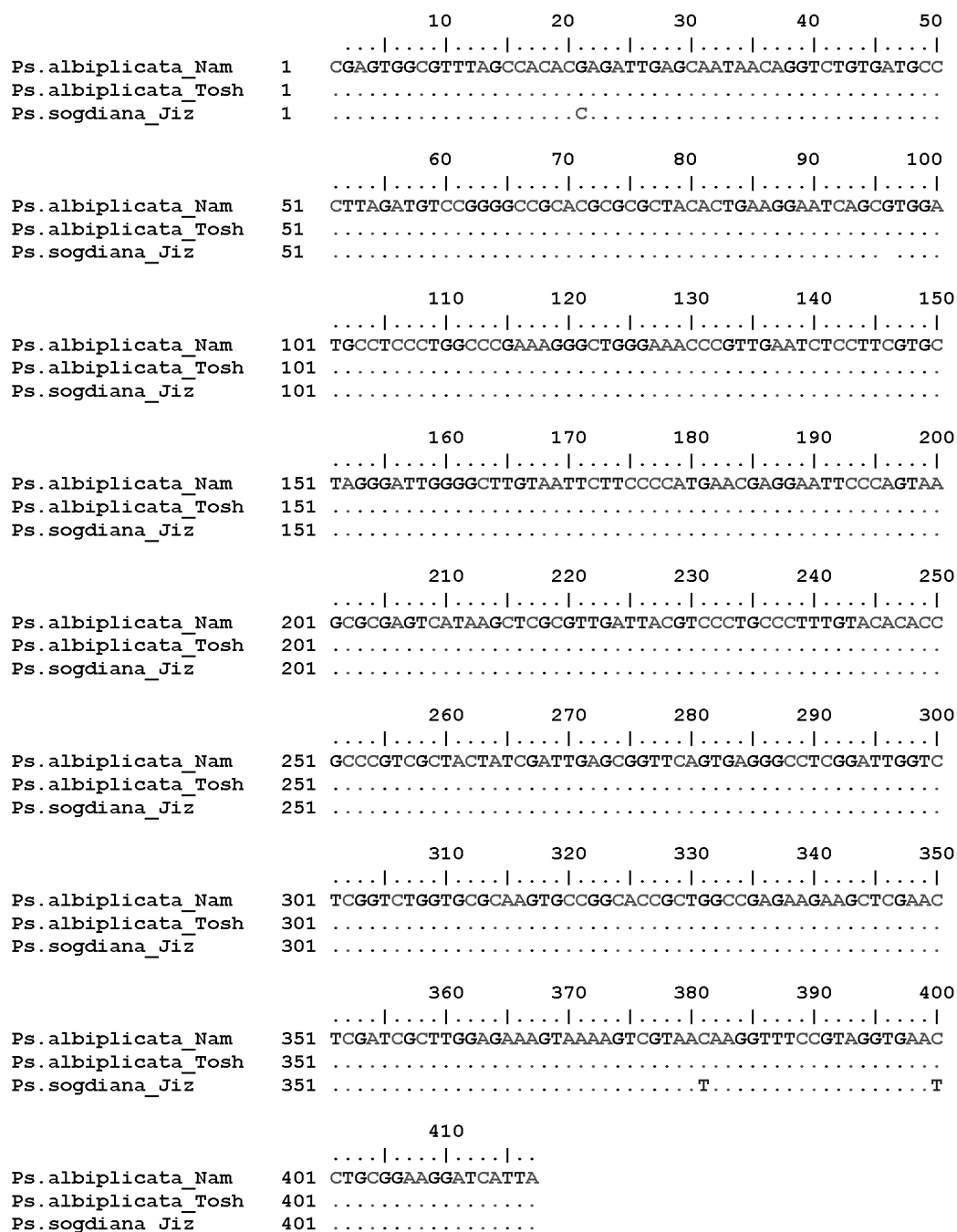
```
                              10        20        30        40        50
                         ....|....|....|....|....|....|....|....|....|....|
Ps.albiplicata_Nam     1 CGAGTGGCGTTTAGCCACACGAGATTGAGCAATAACAGGTCTGTGATGCC
Ps.albiplicata_Tosh    1 ..................................................
Ps.sogdiana_Jiz        1 .....................C............................

                              60        70        80        90        100
                         ....|....|....|....|....|....|....|....|....|....|
Ps.albiplicata_Nam    51 CTTAGATGTCCGGGGCCGCACGCGCGCTACACTGAAGGAATCAGCGTGGA
Ps.albiplicata_Tosh   51 ..............................................  ...
Ps.sogdiana_Jiz       51 ..............................................  ....

                              110       120       130       140       150
                         ....|....|....|....|....|....|....|....|....|....|
Ps.albiplicata_Nam   101 TGCCTCCCTGGCCCGAAAGGGCTGGGAAACCCGTTGAATCTCCTTCGTGC
Ps.albiplicata_Tosh  101 ..............................................  ...
Ps.sogdiana_Jiz      101 ..............................................  ...

                              160       170       180       190       200
                         ....|....|....|....|....|....|....|....|....|....|
Ps.albiplicata_Nam   151 TAGGGATTGGGGCTTGTAATTCTTCCCCATGAACGAGGAATTCCCAGTAA
Ps.albiplicata_Tosh  151 ..............................................  ...
Ps.sogdiana_Jiz      151 ..............................................  ...

                              210       220       230       240       250
                         ....|....|....|....|....|....|....|....|....|....|
Ps.albiplicata_Nam   201 GCGCGAGTCATAAGCTCGCGTTGATTACGTCCCTGCCCTTTGTACACACC
Ps.albiplicata_Tosh  201 ..............................................  ...
Ps.sogdiana_Jiz      201 ..............................................  ...

                              260       270       280       290       300
                         ....|....|....|....|....|....|....|....|....|....|
Ps.albiplicata_Nam   251 GCCCGTCGCTACTATCGATTGAGCGGTTCAGTGAGGGCCTCGGATTGGTC
Ps.albiplicata_Tosh  251 ..............................................  ...
Ps.sogdiana_Jiz      251 ..............................................  ...

                              310       320       330       340       350
                         ....|....|....|....|....|....|....|....|....|....|
Ps.albiplicata_Nam   301 TCGGTCTGGTGCGCAAGTGCCGGCACCGCTGGCCGAGAAGAAGCTCGAAC
Ps.albiplicata_Tosh  301 ..............................................  ...
Ps.sogdiana_Jiz      301 ..............................................  ...

                              360       370       380       390       400
                         ....|....|....|....|....|....|....|....|....|....|
Ps.albiplicata_Nam   351 TCGATCGCTTGGAGAAAGTAAAAGTCGTAACAAGGTTTCCGTAGGTGAAC
Ps.albiplicata_Tosh  351 ..............................................  ...
Ps.sogdiana_Jiz      351 ...............................T...............T

                              410
                         ....|....|....|..
Ps.albiplicata_Nam   401 CTGCGGAAGGATCATTA
Ps.albiplicata_Tosh  401 ................
Ps.sogdiana_Jiz      401 ................
```

Fig. 3. Comparison of the nucleotide sequences Ps (P.) albiplicatus f. albiplicata and Ps. (P.) albiplicatus f. sogdiana (direction 5 'to 3' end, a point designated nucleobases)

And also with the help of molecular genetic methods we investigated intraspecific variation in two forms Ps (P.) albiplicatus f. albiplicata and Ps. (P.) albiplicatus f. sogdiana.

When comparing the nucleotide sequences of these regions (18S DNA region) of these forms have found differences in the two nucleotide positions. The percentage differences between the studied areas of shellfish accounted for 2.0 %. When comparing the differences between sequencers Ps (P.) albiplicatus f. albiplicata and Ps. (P.) albiplicatus f. 2 sogdiana mentioned nucleotide positions are represented by a transition between pyrimidines (C + T) (Fig. 3 at pos. 382 and 400).

It may be noted that the detection of signs of these types are clearly distinguished.

These data show that these types of both morphologically and genetically different levels with each other and are both these types Ps (P.) albiplicatus and Ps. (P.) sogdianus.

We phylogenetic analysis was also conducted using the method of nearest neighbors (Neighbor-joining, NJ) obtained on the basis of sequences 18S two species of mollusks and their intraspecific forms (Fig. 4). The phylogenetic tree indicated two well-isolated species Ps. albiplicatus and Ps. sogdianus.
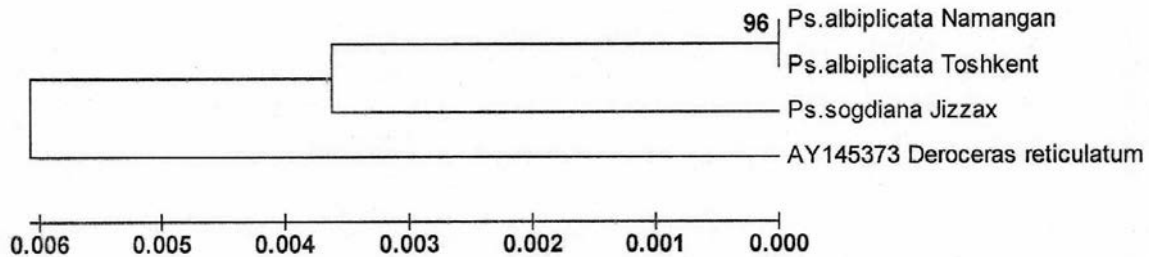

Fig. 4. The phylogenetic tree depicting obtained on the basis of sequences 18S region Psendonapeus two types based on their own research and GenBank database (AY 145373)

Referring seen from the materials that within these types there are several konhologicheskih forms, in the simplest cases associated with smooth transitions. However, while collecting the material we found in one biotope two forms without transitions between them. These data allow us to consider one of the possible options for speciation in terrestrial mollusk species Psendonapaeus.

It should be noted that if in the Crimea, the Caucasus and in Central Europe for a long time the main ecological niches are filled, where each species is clearly separated from the next species, and we can say that the speciation process has been completed. In Central Asia, the speciation process is currently being intense.

As we know, any population of these species is characterized by the wide dimensional variability. In foothill areas on scree inhabits shallow molluscs from horn color, indicating that life mikroubezhischah under stones. In mountain areas in the open areas among dwarf shrubs mainly inhabit large mollusks developed with varying degrees of light radial pestrennoy.

If between the foothill and mountain populations there are enough strong bond, the foothills of the population, "merge" with the mountain and in this case, a relatively small area (the Alai Range, not far from the. Vodul) or biotope is possible to meet all possible transitions from small horn to large light shells.

However, if the shellfish semi-population for a long time were in isolation, then, going to the rocky slopes, they do not immediately "merge" with the mountain, and then on the same slope you can find a very small and very large clams, with virtually no

transitions between them, considering only this case, we can formally speak of two "real" types [5].

If the molluscs are long time in isolation, therefore, there is a weakening of contacts between individuals of the population, which stabilizes the direction of variation, together with the process variation adaptive shells, lead to the formation of a new species.

For example, near the village. Sherabad (Surhandarinskaya region) on the right bank of the river. Maidan in coarse scree, among thickets of bushes inhabits real Ps. sogdianus, however, is not far from this place (or rather 25 km.) to the north-eastern part, is the elevation of the place Independence, that all Stronach isolated deserts.

During the collection of material on the northern slopes of the hill in a melkooblomochnyh (debris) talus we found the view, which is very similar to Ps. sogdianus. In the study konhologicheskih characteristics and structure of the sexual apparatus, it was found that this particular kind of new to science.

As follows from the data obtained, the formation of new species occurs by targeting the source of the form of environmental conditions certain forms of adaptive variability of the environment, dwelling which requires a radical restructuring of the biology of reproduction and strong changes in the forms of protection against evaporation.

Thus, for long-term isolation of populations as a result of the constant elimination of medium-sized mollusks, can lead to the formation of new species, both on the basis of large forms in the interior of the original species, its population, standing at the threshold of habitats, which is now home to new species

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The possible role of the Na^+/Ca^{2+} exchanger in the vasorelaxant effect of 1-O- benzoylkarakoline, a diterpenoid alkaloid, in rat aortic rings

Abstract: The aim of this study was to examine the role of the Na^+/Ca^{2+} exchanger in the vasorelaxation induced by 1-O-benzoylkarakoline (1-O-BK), a diterpenoid alkaloid, in rat aortic rings. We found that 1-O-BK potently and in a concentration-dependent manner inhibited the aortic rings contraction induced by low-Na^+ solution and ouabaine. The comparison of our results showed that 1-O-BK inhibited the aortic rings contraction induced by these two procedures almost to the same extent and with nearly equal IC_{50} values. Since the contractions induced by low Na^+ solution and ouabaine were mainly due to increased Ca^{2+} influx mediated by the reverse mode of the Na^+/Ca^{2+} exchanger, these findings indicate that the inhibitory effect of 1-O-BK is a result of direct blockage of Ca^{2+} influx via this exchanger. Taken together, the present results provide the clear evidence that 1-O-BK potently inhibited the Ca^{2+} influx via Na^+/Ca^{2+}-cexchanger, suggesting that this effect of alkaloid also may be involved in its vasorelaxant activity. The finding that 1-O-BK exhibits significant potency to block Ca^{2+}- influx via Na^+/Ca^{2+} exchanger may be important under some pathological conditions where the exchanger, operating in the reverse mode, induces Ca^{2+} overload and, hence, may exacerbate overall vasoconstriction.

Keywords: rat aorta; vasorelaxation; diterpenoid alkaloid 1-O-benzoylkarakoline; Na^+/Ca^{2+} exchanger.

Introduction

Diterpenoid alkaloids produced by the plants of the genera Aconitum and Delphinium comprise a large group of natural compounds, still continue to deliver a great variety of structural templates for drug discovery and development [1, 620–624; 2, 209–221]. 1-O-benzoylkarakoline (1-O-BK), a derivative of diterpenoid alkaloid karakoline, isolated from *Aconitum karakolicum*, has been reported to possess diverse pharmacological properties, including spasmolytic, antiarrhythmic and anesthetic activities [3, 390–392; 4, 254–269]. Recently, we found that 1-O-BK exhibited marked vasorelaxant activity and significantly inhibited the contraction of rat aortic rings induced by KCl and phenylephrine (PE) [5, 8–11]. The relaxant effect of 1-O-BK was not significantly different in either the presence or absence of functional endothelium and was not influenced by inhibition of nitric oxide synthase by *L*-NAME or cyclooxygenase by indomethacin. At the same time, the relaxant effect of 1-0-BK on KCl- and PE-induced contractions was significantly attenuated in the presence of verapamil, a voltage-dependent Ca^{2+} channels (VDCCs) blocker, and phentolamine which inhibits receptor-operated Ca^{2+} channels (ROCCs) activation associated with α-adrenoreceptor stimulation [6,163–165; 7, 606–718]. These data suggested that relaxant effect of 1-O-BK is probably due to the inhibition of the Ca^{2+} influx through both VDCCs and ROCCs, resulting in decreased intracellular Ca^{2+} concentration ($[Ca^{2+}]_{in}$), and consequently, in reduced contractility. Furthermore, 1-O-BK also effectively reduced the contraction induced by PE in a Ca^{2+} — free medium, suggesting that the inhibition Ca^{2+} release from sarcoplasmic reticulum (SR), in addition to the blockage of VDCCs and ROCCs, also may be involved in the relaxant effect of 1-O-BK. In smooth muscle cells the amount of Ca^{2+} available for release, as well as the Ca^{2+} content in SR is modulated by Na^+/Ca^{2+} exchanger, that operating in reverse mode provides a source of Ca^{2+} for refilling this store [8, 657–660; 9, 763–854; 10, 519–529]. Considering this, we suggested that the reduction of PE-induced contraction in a Ca^{2+}-free medium by 1-O-BK may probably be due to the inhibition of the Ca^{2+} influx mediated by reverse mode of Na^+/Ca^{2+} exchanger. Therefore, to address this possibility, we examined the effects of 1-O-BK on the contractions of rat aortic rings induced by low-Na^+ solution and ouabaine, which mainly are mediated by Ca^{2+} entry via Na^+/Ca^{2+}- exchanger.

Material and methods

Adult male Wistar rats (200–250 g.) were used according to a protocol of the Institute of Bioorganic Chemistry Animal Care and Use Committee. After brief anesthesia with sodium pentobarbital, rat was decapitated and the thoracic aorta was isolated. The connective tissue was removed and rings 3 mm long were mounted vertically under isometric conditions in a 5 ml organ bath perfused with Krebs solution containing (in mM): NaCl 118.3, KCl 4.7, $CaCl_2$ 2.5, $MgSO_4$ 1.2, NaH_2PO_4 1.2, $NaHCO_3$ 25.0, EGTA 1.0 and glucose 11.1 (pH 7.35). Krebs solution was maintained at $37 \pm 0.5\,°C$ and continuously bubbled with O_2/CO_2 mixture (95 %/5 %). An initial load of 1 g. was applied and maintained throughout a 60 min. equilibration period. During equilibration the bathing solution was changed every 15 min. with readjustment of baseline tension, when necessary. Tension was recorded on a pen recorder (Endim 621,02, Germany) via force-displacement transducers (FT03, Grass Instrument, Ma, USA). To assess the involvement of Na^+/Ca^{2+} exchanger in the relaxant action of 1-O-BK, we investigated its effect on contractions of rat aortic rings induced by low-Na^+ Krebs solution and ouabaine. The low-Na^+ Krebs solution was obtained by replacing 118 mM. of NaCl with iso-osmolar amount of choline chloride. In these experiments after equilibration period in normal Krebs solution the viability of aortic rings was tested by KCl (50 mM.) or phenylephrine (1 μM.). After this procedure, the aortic rings were repeatedly washed with normal Krebs solution, and when the baseline tension was re-established the aortic rings were exposed to low-Na^+ Krebs solution containing 10 μM. verapamil, and steady contraction was obtained. To test the effect of 1-O-BK on ouabaine-induced contraction, the aortic rings after incubation for 30 min. in normal Krebs solution, containing 10 μM of verapamil, were exposed to ouabaine. The concentration-response curves for 1-O-BK were obtained by incubation of aortic rings for 30 min. in Krebs solution with concentrations of the alkaloid increasing from 0.1 to 30 μM., prior to exposure to low-Na^+ Krebs solution or ouabaine. The functional state of the Na^+/Ca^{2+} exchanger, as well as its contribution to 1-O-BK-induced vasorelaxation, was verified by KB-R7943, a selective blocker of reverse mode of exchanger. KB-R7943 was dissolved in dimethyl sulfoxide; the final concentration of vehicle was no more than 0.1 % v/v, which did not affect aortic rings tension. All experiments were performed on endothelium-denuded aortic rings, the endothelium was removed by gently rubbing the lumen with a stainless steel rod and its absence was confirmed by the inability of acetylcholine (10 μM.) to induce relaxation. We used acetylcholine, phenylephrine, ouabaine, verapamil, and KB-R7943. All reagents were of analytical grade and were obtained from Sigma Chemical Co (St Louis, Mo, USA). All values are expressed as mean ± standard error of mean (S. E. M.). Student's t test was used for unpaired variants. P < 0.05 was considered statistically significant.

Results and discussion

In order to examine the effect of 1-O-BK on the Na^+/Ca^{2+} exchanger function its action on the contractions of rat aortic rings induced by low-Na^+ Krebs solution was studied first. The reduction of extracellular Na^+ ($[Na^+]_o$) is a common experimental procedure to test function of Na^+/Ca^{2+} exchanger, that exchanges Na^+ and Ca^{2+} in either a Ca^{2+} efflux or influx mode, depending on the net electrochemical gradients for Na^+ and Ca^{2+} [11, 421–427; 12, 617–635; 13, 486–493]. In our study the exposure of aortic rings to low-Na^+ solution induced contraction, the rate of which corresponds to 53.4 ± 3.6 % of the contraction induced by 1 μM. of PE, taken as 100 %. Since, during these experiments the VDCCs were blocked by verapamil, the low-Na^+-induced contraction is most likely a result of the influx of Ca^{2+} through Na^+/Ca^{2+} exchanger, as reducing the Na^+ gradient across the membrane makes the exchanger operate in reverse mode [14, 167–173; 15, 35–42]. Indeed, as shown in Table 1, the contraction induced by low-Na^+ was significantly attenuated in the presence of KB-R7943, a selective inhibitor of the reverse mode of the Na^+/Ca^{2+} exchanger [10, 519–529; 16, 555–563]. This effect of KB-R7943 was concentration-dependent, and maximal inhibition of low-Na^+-induced contraction to 20.4 ± 4.2 % of the control, was obtained at 25 μM. The half-maximal inhibitory concentration (IC_{50}) for KB-R7943 calculated from concentration-response curves was 9.1 μM. The marked inhibition of low-Na^+ induced contraction by KB-R7943 indicated that this contraction is mainly due to elevation in $[Ca^{2+}]_{in}$, resulting from Ca^{2+} influx mediated by reverse mode of Na^+/Ca^{2+} exchanger.

Table 1. – Effect of KB-R7943 on low-Na^+ and ouabaine-induced contractions in rat aortic rings

Treatment	KB-R7943 (μM)					IC_{50} (μM)
	5	10	15	20	25	
Low-Na^+	55.2 ± 4.2	47.8 ± 4.1	39.2 ± 4.5	24.6 ± 4.3	20.4 ± 4.2	9.1
Ouabaine	65.9 ± 4.3	52.6 ± 4.2	37.6 ± 4.2	24.7 ± 3.8	18.4 ± 4.1	11.3

Note: The aortic rings were preincubated for 30 min. with KB-R7943 prior to exposure to low-Na^+ solution or ouabaine (20 μM). Values (mean ± S. E. M. n = 5–7) are expressed as a percentage of contraction induced by phenylephrine (1 μM), taken as 100 %. P < 0.05 vs. control.

To examine the effect of 1-O-BK on contraction induced by low-Na^+ solution, the aortic rings were preincubated for 30 min. in normal Krebs solution with increasing concentrations of the alkaloid from 0.1 to 30 μM. prior to their exposure to low-Na^+ solution. As shown in Fig. 1a, 1-O-BK effectively inhibits the contraction of aortic rings induced by low-Na^+ solution in concentration-dependent manner. The maximal reduction in low-Na^+ induced contraction to 23.2 ± 4.1 % by 1-O-BK was obtained at 30 μM., providing IC_{50} value of 11.1 μM. These results indicated that 1-O-BK also effectively inhibited the low Na^+ induced contraction similarly to KB-R-7943, suggesting that this effect of the alkaloid may be due to blockage of Ca^{2+} influx through Na^+/Ca^{2+} exchanger. Indeed, analysis of obtained results showed that 1-O-BK and KB-R7943 at nearly equal concentrations (30 μM. and 25 μM., respectively) maximally reduced the low-Na^+ induced contractions to almost a similar extent (76.8 % and 79.6 %, respectively).

Furthermore, the inhibitory potency (IC_{50} values) of 1-O-BK and KB-R7943 (11.1 μM and 9.1 μM, respectively) on low-Na^+-induced contraction showed no significant difference either, suggesting similar action. To further verify similarities of action between 1-O-BK and KB-R7943, we compared the inhibitory effects produced by 1-O-BK alone and in combination with KB-R7943. The results summarized in Fig. 1b. demonstrate that the simultaneous incubation of aortic rings with KB-R7943 and 1-O-BK resulted in slight additional inhibition of low-Na^+ induced contraction to 17.1 ± 4.4 %, which was not significantly different from that produced by KB-R7943 or 1-O-BK separately. These results indicated that the effects of 1-O-BK and KB-R7943 were not additive in their combined presence; the low-Na^+ — induced contraction was decreased to a level not significantly greater than that elicited by each of these agents alone. These results again support the suggestion that

the inhibitory effect of 1-O-BK on low-Na$^+$-induced contraction is due to blockage of the Ca^{2+} influx via Na$^+$/Ca^{2+} exchanger.

To further investigate the involvement of Na+/Ca^{2+} exchanger in the relaxant effect of 1-O-BK, we studied its action on aortic rings contraction induced by ouabaine. Ouabaine is a potent inhibitor of Na$^+$, K$^+$-ATPase, which induces aortic rings contraction associated with an increase of intracellular Na$^+$ concentration ([Na$^+$]$_i$), which in its turn reverses the operating mode of Na$^+$/Ca^{2+} exchanger, thus promoting Ca^{2+} influx [17, 87–94; 8, 129–149; 19, 1367–1387]. In our study in aortic rings ouabaine induced the concentration-dependent contraction with peak amplitude of 76.4 ± 3.4 %, obtained at 20 μM., which corresponds to that induced by PE (1 μM). The contraction induced by ouabaine was significantly attenuated by KB-R7943 which maximally reduced it to 18.4 ± 4.3 %, at 25 μM. with IC$_{50}$ value of 11.3 μM. (Table 1). The significant inhibition of ouabaine-induced contraction by KB-R7943 indicated that this contraction is mainly due to elevation in [Ca^{2+}]$_I$ resulting from Ca^{2+} influx mediated by reverse mode of Na$^+$/Ca^{2+} exchanger. Therefore, to further verify the involvement of Na$^+$/Ca^{2+} exchanger in relaxant effect of 1-O-BK, we studied its action on aortic rings contraction induced by ouabaine. As shown in Fig. 2a, 1-O-BK also effectively and in concentration-dependent manner inhibited the contraction of aortic rings induced by ouabaine. In these experimental conditions 1-O-BK maximally reduced ouabaine-induced contraction to 22.3 ± 4.1 %, at 30 μM., providing a IC$_{50}$ value of 10.5 μM. These results indicated that 1-O-BK also effectively inhibited the ouabaine — induced contractions similarly to that produced by KB-R7943. A comparison of the effects of 1-O-BK and KB-R7943 showed that these drugs at nearly equal concentration (30 μM and 25 μM, respectively) maximally reduced the ouabaine-induced contraction to almost a similar extent (77.7 ± 4.4 % and 81.6 ± 4.1 %, respectively) and with almost similar potency (IC$_{50}$ values, 10.5 μM and 11.3 μM, respectively). These data suggested that 1-O-BK inhibited the ouabaine-induced contraction by mechanism similar to that of KB-R-7943, involving the blockage of Ca^{2+} influx via Na$^+$/Ca^{2+} exchanger. This suggestion was further confirmed when the inhibitory effect of 1-O-BK was compared to those produced by alkaloid alone and in combination with KB-R7943.

As illustrated in Fig. 2b, the combined application of maximally effective concentrations of KB-R7943 and 1-O-BK resulted in small additional inhibition of ouabaine-induced contraction to 16.6 ± 4.6, a reduction not significantly greater than that produced by 1-O-BK alone. These results indicated that the effects of 1-O-BK and KB-R7943 on ouabaine-induced contraction were not additive, suggesting that these agents probably were acting at a common site, i. e. via the Na$^+$/Ca^{2+} exchanger. Furthermore, the comparison of results showed that 1-O-BK inhibited the ouabaine- and low-Na$^+$ induced contractions almost to the same extent (77.7 ± 4.4 % and 76.8 ± 4.1 %, respectively) and with nearly equal IC$_{50}$ values (10.5 μM. and 11.1 μM, respectively). Thus, a similar inhibitory action of 1-O-BK on aortic rings contractions induced by two different procedures which induced Ca^{2+} influx via Na$^+$/Ca^{2+} exchanger indicates that these effects of the alkaloid are a result of direct blockage of Ca^{2+} influx through this exchange mechanism. Taken together, the present results provide the clear evidence that 1-O-BK potently inhibited the Ca^{2+} influx via Na$^+$/Ca^{2+}- exchanger, suggesting that this effect of the alkaloid also may be involved in its vasorelaxant activity.
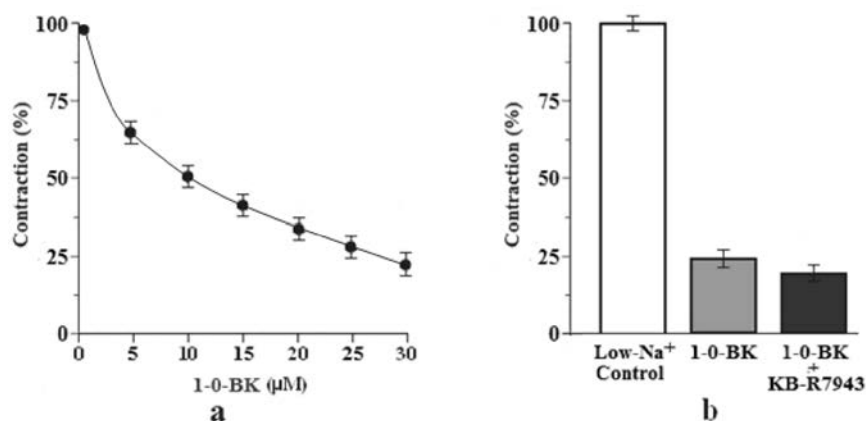

Fig. 1. (a) Effect of 1-O-BK on low-Na$^+$ induced contraction in rat aortic rings; (b) Effect of 1-O-BK (30 μM) on low-Na$^+$ induced contraction alone and in combination with KB-R7943 (25 μM). Results (mean ± S. E.M. n = 5) are expressed as a percentage of contraction induced by low-Na$^+$ solution, taken as 100 %. P < 0.05 *vs.* control
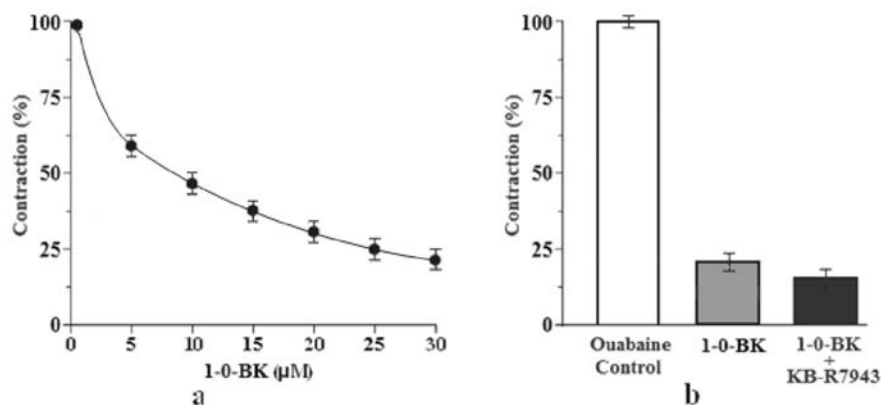

Fig. 2. (a) Effect of 1-0-BK on ouabaine-induced contraction in rat aortic rigs; (b) Effect of 1-0-BK (30 μM) on ouabaine-induced contraction alone and in combination with KB-R7943 (25 μM). Results (mean ± s. e.m.) are expressed as a percentage of contraction induced by ouabaine (20 μM), taken as 100 %. P < 0.05 *vs.* control

Conclusion

In this work, the possible role of the Na^+/Ca^{2+} exchanger in the vasorelaxantion produced by 1-O-BK, a diterpenoid alkaloid, in rat aortic rings was elucidated for the first time. The present results support the idea that the 1-O-BK may relax vascular smooth muscle by a mechanism related to a decrease in $[Ca^{2+}]_i$ not only by inhibiting Ca^{2+}-influx through VDCCs or ROCCs, but also by blocking Ca^{2+}-entry via Na^+/Ca^{2+} exchanger. The finding that 1-O-BK exhibits significant potency to block Ca^{2+}-influx via Na^+/Ca^{2+} exchanger may be important under pathological conditions where the exchanger, operating in reverse mode, induced Ca^{2+} overload and, hence, may exacerbate overall vasoconstriction. Taken together, these data suggest that 1-O-BK is a promising compound for further development of novel approaches in the treatment of conditions associated with vascular smooth muscle disorders, such as hypertension or ischemia.

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Particular structure of fruits and seeds ephemers in the arid zone of Central Asia

Abstract: We describe the morphology and structure of the integuments of fruits and seeds 23 species from 18 genera, 5 families of ephemers from the most common (dominant) in the Kyzylkum desert. The next adaptive features were allocated: sclerification, slimy structure, water-carring tissue which promote the conservation of species in arid conditions. That was a negative correlation between the complexity of the pericarp and seed-coat structure.

Keywords: morphology, anatomy, adaptive sign, diaspore, Kyzylkum.

Introduction

Ephemere plants are an important component of the vegetation in Central Asia deserts. In Kyzylkum 250 species from 20 families can be attributed to the ephemeral plants. The species of the families *Asteraceae* Dumort., *Brassicaceae* Burnett., *Boraginaceae* Juss. are most common [1, 336]. Ephemere plants are forming of ecological and biological diversity and occupied at the different ecological niches. Biomorphic of ephemere has several unique biological features.

Ephemere plants have a short-lived vegetation (1.5–2 months), but his latent period in the form of various diaspores (compound fruits, seeds) is longer and dependent on the external environment. They concentrated a considerable variety of adaptive traits [2, 160; 3, 35–38; 4, 36; 5, 29–30]. Diaspore (fruits and seeds) are carriers of the plant genome. They focused adaptive strategy taxon [6, 376]. The study of the fruit and seeds of a necessary part in the knowledge of the ontogeny and adaptive strategy of plants.

Material and methods

Material collected in the natural habitat types in the southwestern Kyzylkum. The morphology, methods of dissemination and the anatomical structure of species of ephemere plants from the families *Asteraceae* Juss, *Brassicaceae* Burrneft, *Boraginaceae* Juss, *Fabaceae* Lindl., *Lamiaceae* Lindl. was studied.

The type of diasporas, their morphological parameters, the anatomical structure of the integument (pericarp, seed-coat) was described and reflected in the figures and micro photos. The stiff fruit was in mixture Strasburger: alcohol — glycerol — water (1:1:1). The structure of the fruit sketched drawing apparatus RA-6 and photographed. Description of the structure carried out by the usual method carpological studies on sections prepared manually [2, 160].

Results and discussion

Ephemer fruits are of different types in accordance with belonging to a particular family. For the family. *Asteraceae* is characterized achene with a tuft (pappus), with a rostellum and without (fig. 1a-c), a silicle is characters of the family *Brassicaceae*: indehiscent one-seeded (species *Isatis*), dispermous (*Lachnoloma lechmannii, Goldbachia laevigata*) (fig. 1 e-f), two-four seeds (species of the genus *Alyssum*) (fig. 1 g). Fruits of ephemeral *Fabaceae* (*Astragalus, Onobrichis*) (fig. 1 j-k) are one or a few seeds bean. Polyspermos pod at the different forms (round like, pear like) charactered for family Caryophyllaceae (*Arenaria serpyllifolia, Spergularia microsperma*) (fig. 1 h-i). The cenobium of the species family *Lamiaceae* are schizocarp fractional pod consisting of 3–4 fruits (*Lallemantia royleana, Ziziphora tenuior*) (fig. 1 L-m). Achene-shaped fruits with various appendages: small pricle, trichomes, eilaiosome, tulf (pappus) are the most widespread.

The dry fruits indeniscent oligospermous streamlined with alar and other appendages prevailed in desert conditions.

Reduction of the size and weight of fruits and seeds was promoted dominance in the desert of different forms of anemohorous dissemination. The fruit size of 1–20 mm. and a weight of 0.2–3.0 g. are dominating, seeds — 0.1–10 mm. and 0.05–20 g. (Table 1). The following forms dissemination is extended: anemochorous (evonemohorous and geohorous), ballisto-anemohorous, barohorous, antitelahorous [7, 301–311; 8, 675]. The combination of 2 or more methods of dissemination often is observing (Table 1).

Table 1. – The size of the diaspora ephemera (mm.)

| Family, species	Fruit		Seed	
	Length	**Width**	**Length**	**Width**
Asteraceae				
Epilasia hemilasia (Bunge) Clark.	7.0 ± 0.6	1.8 ± 0.9	–	–
Garhadiolus paposus Boiss. & Buhse	4.0 ± 0.3	1.5 ± 0.8	–	–
Heteracia szovitsii Fish. &Mey.	2.9 ± 0.2	1.9 ± 0.9	–	–
	2.9 ± 0.2	0.7 ± 0.06	–	–
Microcephala lamellata (Bunge) Polad.	4.0 ± 0.35	0.6 ± 0.05	–	–
Senecio subdentatus Ledeb.	3.4 ± 0.3	0.4 ± 0.03	–	–
Pullicaria gnaphalodus (Vent.) Boiss.	2.2 ± 0.2	0.5 ± 0.04	–	–
Brassicaceae				
Alyssum dasycarpum (Steph.) CAM	3.1 ± 0.3	3.0 ± 0.25	1.2 ± 0.1	0.9 ± 0.07
A. turkestanicum Regel & Shmalh.	3.6 ± 0.3	3.7 ± 0.3	1.6 ± 0.1	1.3 ± 0.1
A. szovitsianum Fish. & Mey	4.0 ± 0.35	3.6 ± 0.27	1.9 ± 0.1	1.5 ± 0.1
Goldbachia laevigata (Bieb.) DC.	8.4 ± 0.4	4.4 ± 0.4	2.7 ± 0.1	1.7 ± 0.1
Hymenolobus procumbens (L.) Fourr.	4.1 ± 0.2	2.1 ± 0.2	0.6 ± 0.02	0.4 ± 0.03
Isatis minima Bunge	10.3 ± 1.3	2.8 ± 0.3	2.6 ± 0.2	1.0 ± 0.01
I. viollascens Bunge	10.6 ± 1.6	5.5 ± 0.4	3.4 ± 0.3	1.5 ± 0.01
Lachnoloma lechannii Bunge	5,6 ± 0.5	4.0 ± 0.4	3.5 ± 0.3	2.1 ± 0.02
Fabaceae				
Astragalus ammophilus Kar. et Kiz	8.0 ± 0.75	2.5 ± 0.2	2.0 ± 0.1	1.0 ± 0.01
A. harpilobus Kar. & Kiz	20.5 ± 2.1	2.5 ± 0.25	2.2 ± 0.2	2.0 ± 0.02
A. cinarescens M. Pop.	7.0 ± 0.65	3.0 ± 0.27	1.6 ± 0.1	1.2 ± 0.01
Onobrichis tavernifolia Stocks & Boiss	11.7 ± 1.2	11.7 ± 1.25		
Lamiaceae				
Ziziphora tenuior L.	calyx 6.9	1.8 ± 0.1	–	–
	ereme 1.7	0.6 ± 0.05	–	–
Lallemantia royleana Benth.	calyx 6.5	2.0 ± 0.15	–	–
	ereme 1.6	–	–	–
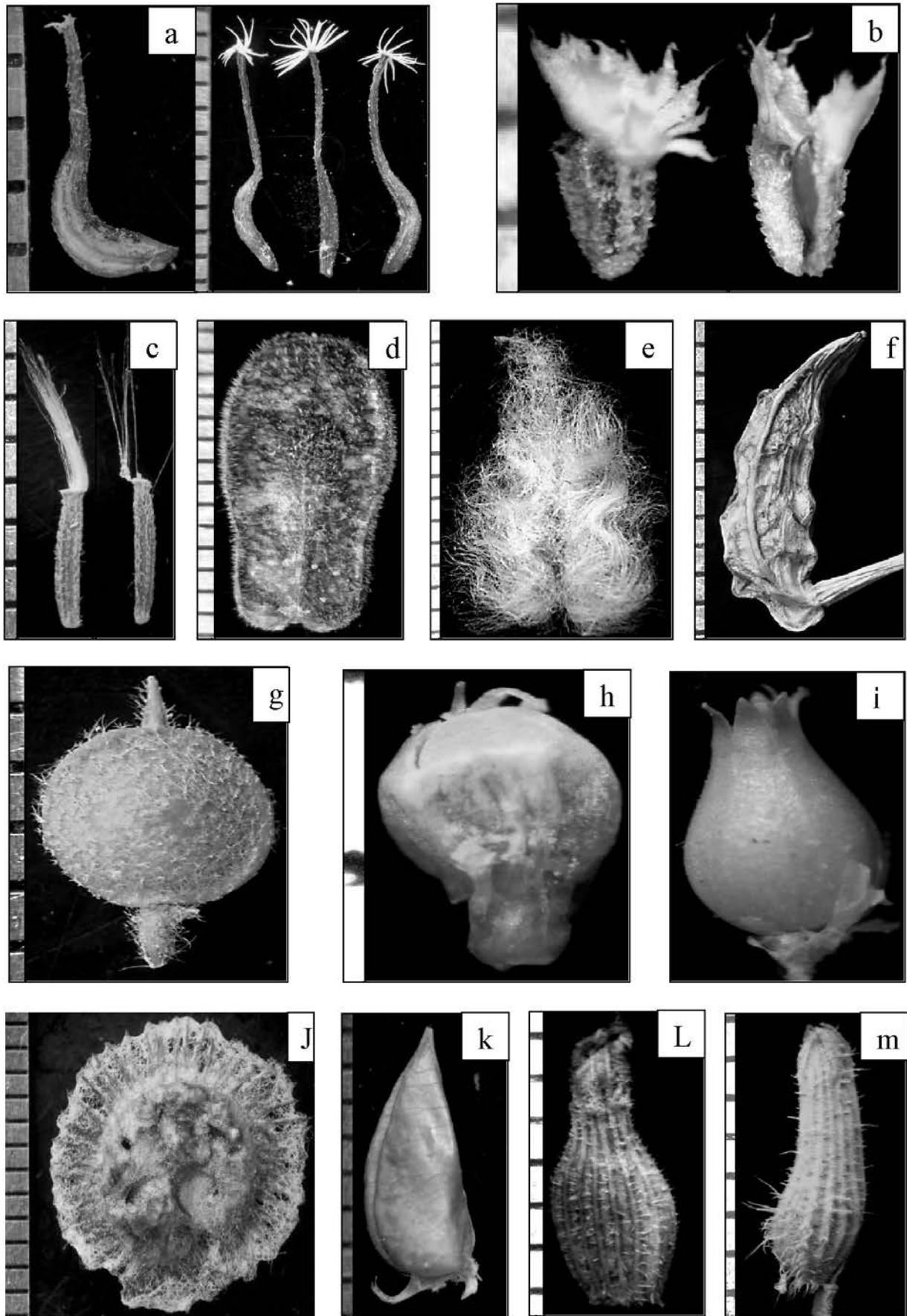
Fig. 1. Morphological types of fruit ephemera: **achene** — a — *Heteracia szovitsii* (outdoor and indoor); b — *Microcephala lamellate*; c — *Senecio subdentatus*; silicle: **dry-seeded indehiscent box** — d — *Isatis violascens*; e — **bispermous** — *Lachnoloma lehmanii*; f — *Goldbachia laevigata*, **2–4 seeded dehiscent** g — *Alyssum dasycarpium*; **polyspermous box**: h — *Spergularia microsperma*; i — *Arenaria serpyllifolia*, **monospermous seed bean**: J- *Onobrychis tavernifolia*; k — *Astragalus ammophilus*; **cenobia**: **skhizokarpnaya fractional box**. L — *Ziziphora tenuior*; m — *Lallemantia royleana*
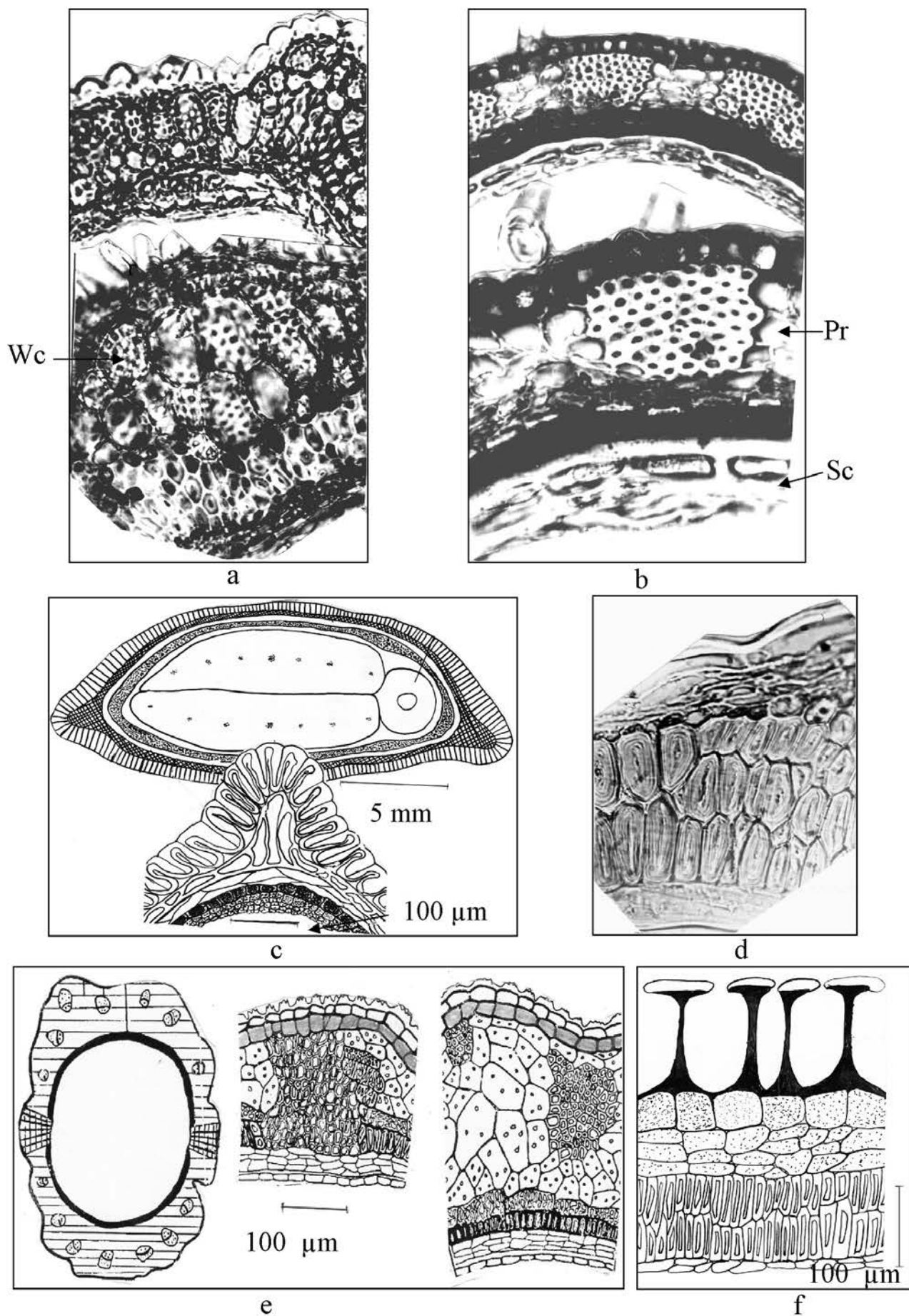
Fig. 2. The structure of pericarp and seed-coat of the fruits on the transverse section: a — *Heteracia shovitsii*; b — *Senecio subdentata;* c — *Allysum szovitsianum;* d — *Euclidium syriacum;* e — *Isatis minima;* f — *Lallemanthia royleana*. Abbreviation: Pr — pericarp, Sc — seed-coat, Wc — water-carring cell

Family *Asteraceae*. Fruit *Amberboa turatica* is ribbed achenes without rostellum, but multiserial pappus and elaiosome in the root part. Pericarp consists of a thick-walled parenchyma cells. Seed-coat thicker of pericarp at 2 times: 1 layer from 1–3 row sclerenchyma, 2-layer — 5–7 row parenchyma. Water-carring cells with spiral pore are located in the radical part.

Fruit *Epilasia hemilasia* is strongly pubescent ribbed achene without roustellum, but with pappus and collous ring in trichomes bases. Pericarp is sclerophyllous between the ribs and with water-carring cells in the ribs. A seed-coat is thin, with 2–3 rows of parenchyma.

Fruit *Yarphadiolus papossum* is achene in a head. Two morpho-types of fruits are allocated, i. e. expressed heterocarpous.

Next signs characterize the pericarp outer achenes: small prickle on the epidermis, 2–5 order water-carring cell with spiral-netted, liber-cells layer of 4–5 and 10–12 rows of cells. Seed-coat is thin with any parenchymal layers.

Fruit *Heteracia szovitsii* is heteromorphic achene with pappus and without it. In pericarp developed water-carring tissue, in mesocarp — sclerenchyma. Seed-coat is thin, parenchymal, pigmented (fig. 2 a).

Fruit *Microcephala lamellate* is heteromorphic achene in a head, pubescent, slightly ribbed on the dorsal side. The epidermis of the pericarp pigmented, wall cells is thicken with slimy fingerlike excrescence. The water-carring cells with spiral thickening walls disposed in mesocarp. Seed-coat is thicker pericarp, pigmented, parenchymal (fig. 2 a).

Fruit *Pulicaria gnaphalodes* is achene with pappus, downy. Pericarp in the top is parenchymal, at the lower part (mesocarp) — sclerenchymatous with 4–6 row layers. Seed-coat is 2 parenchymal rows.

Fruit *Senecio subdentatus* is densely planted ribbed achene with a round disk on top, tufted and rostellum. Epicarp is parenchymal, mesocarp consists of parenchyma between the ribs and the sclerenchyma in ribs. Seed-coat is thin and parenchymal (Fig. 2b).

Thus, achenes of *Asteraceae* species have such adaptive signs as pubescens, water-carring cells, sclerenchyma and parenchyma in the pericarp, simplified parenchymal seed-coat (except *Amberboa turanica*). Remains of the endosperm provides additional protection.

Family *Boraginaceae*. Fruit of the species p. *Heliotropium* (*H. lasiocarpum* and *H. biannulatiforme*) is dry cenobia — dehiscing regma. The ereme is tetramospermous located in recesses of carpobasis. Pericarp of ereme is composed: exocarp with pubescences of simple trichomes; mesocarp with 2–3-row parenchyma; pigmented and sclerotized endocarp. Seed-coat is thin, parenhymatous.

Family *Brassicaceae*. Fruit of species *Alyssum* (*A. dasycarpum*, *A. szovitsianum*, *A. turkestanicum*) is rounded, wide-septale silicle, with fruit style. Silicle is 2–4 locular, dehiscent. The pericarp is sclerotized, but the seed-coat fulfils function of the protection and consisting of mucous parenchyma, epidermal layer, pigmental layer and the adjacent 2-layer endosperm (starchy and protein) (Fig. 2c).

Multiple-row seed-coat, including thicked sclerenchyma cells, protects the embryo *Euclidium syriacum*. This is complicating the germination of seeds (Fig. 2d).

Fruit *Goldbachia laevigata* is dry, indehiscent, bilocular, hearless silicle. Pericarp is composed of different arangement sclerenchyma fibers. The walls sclerenchyma cells are very thick and alternating with multilayer parenchyma. Seed-coat is 5–6 cell rows and from it 2–3 rows of tangential elongated parenchymal cells, pigment and aleurone layers.

Fruit *Hymenolobus procumbens* is angustiseptate dehiscent, multi-seeded silicle. Seed-coat is thin and consists of mucous and pigmentary layers.

Fruit *Lachnoloma lehmanii* is indehiscent dilocular 2 tomentose pubescent silicle. Pericarp is composed of epidermal cells with thickened walls, 4–5 parenchymal layers, sclerenchyma layers and inner too sclerotized epidermis. Seed-coat is 5 layers: wavilike epidermal cells, 2–3 rows of compressed parenchymal cells, pigment and aleuronue layers.

The fruit of the species *Isatis* (*I. minima, I. viollascens*) is indehiscent dry pubescent silicle with teroid outgrowths. Pericarp includes pigmental layer under the epidermis, water-carring cells with netted and round-chinked pores and sclerenchyma. Seed-coat is thin, consisting of 2–3 rows of parenchymal cells (Fig. 2e).

Fruit *Tausheria lasiocarpa* is nutlike indehiscent bilocular downy silicle. Pericarp is composed of the pigment epidermal layer with a thick outer wall; 3–4 rows of small cell pigmented parenchyma, mechanical (sclerenchyma) strands surrounded water-carring cells. Vascular bandes (2) are surrounded by sclerotized fibres. Seed-coat consists 5 layers: the epidermis, parenchymal cells, sclerenchymal and aleuronic layers.

Family *Caryophyllaceae*. The fruit of *Spergularia sperguloides* is a dry dehiscent pod in caryx, pubescenced of grandular trichomes. Pericarp is thin and chaff-like. Seed-coat is formed from external integument. Exotesta is thickened, the cavity of cells filled up at tannin. Inneral integument is reduction. Reserved tissue is perisperm, as other species of family [9, 59–74].

Family *Fabaceae*. Fruit is polyspermous (*A. harpilobus*) or olygospermous bean, dry, dehiscent or partially dehiscent. The structure of the pericarp of studied species *Astragalus* (*A. ammophilus, A. harpilobus, A. cinerascens*) is similar. It consists of a single-row exocarp downy various trichomes; 3–4 orders parenchymal cells of mesocarp with the vascular bundles, which surrounded water-carring cells. Endocarp consists of divergent arrangement sclerenchymal fibers (parchment layer). Seed-coat consists of 5 layers: palisade cells (malpigie-cells), hypodermis (osteosclereide or lageniform sclereid), parenchyma, aleuronic layer. The fruits species have general similarity and distinctive signs: thick layer of malpigie-cells (*A. ammophilus*), thick pigmental layer (*A. harpilobus*), and pubescent of pericarp with exerescence (emergence) (*A. cinerascens*).

Family *Lamiaceae*. Fruit *Lallemantia royleana* is fractional pod (schizocarp) in tirse. Calyx is ribbed, downy prickle hairs, parenchymal, with the vascular bundles in the ribs. The pericarp of ereme is composed of slimy cells of the epidermis, 2–3 rows of pigmented parenchyma (Fig. 2 f).

Fruit of *Ziziphora tenuior* is fractional pod, with densely pubescent calyx, ribbed. Trichomes are simple, pricly and glandular with 8–12 secretory cells. Vascular bundle surrounded by sclerenchyma, is in each rib. Pericarps compose mucous epidermis, 2 rows of sclerenchyma and 1–2 rows of pigmental parenchyma. Seed-coat is thin, claying.

Conclusion

The fruit as part of the body's systems are complex adaptive traits. N. Kaden [10, 496] believed, that "the fruit should be regarded as organ which has developed through adaptation to better protects the seed and the different ways of dissemination". No less important are those signs associated with the functions of germination [6, 376]. In their view, the analysis of adaptive traits fruits should focus on adaptation to the dissemination methods, the protective features of the adverse factors and structural specialization to germinate.

Those are adequate basic functions of fruit: to survive, to expansion and to give rise to offspring.

The one-small dominated seed among the fruit of species (88.8 %), dry, indehiscent fruit the size of 3–10 mm. Availability

specialized hydro-cells in the pericarp and seed-coat in *Asteraceae* evidence of convergence of this trait. An important feature of the adaptive trait is to water-carring cells, which may be part of the pericarp or seed-coat.

A. Alyavdina [11, 85–100], Alexanderov, Rozhanovskiy [13, 20], Savchenkov [12, 129–147], Korobkov [14, 1302–1325] noted a correlation between dehiscence fruit and the presence of slimy layer. The dehiscence fruits of the family *Brassicaceae* are often slimy layer. We undisclosed slime cells in undeniscne fruits inherent on the plants of dry habitats. When the morning dew is settling, slime-cells quickly covered with a hydrocolloid film, poorly permeable at water.

The slimy-cells in fruits are a relatively wide-spread phenomenon among ephemeres [12, 129–147; 15, 108–109; 16, 1100–1111]. Slimy-cells in the fruit and seeds characterized plants by experiencing water shortages. Each epidermal cell of fruits species *Alyssum miksospermiya* contains slimy substance. Sclerotized of covers is one of the important signs of ephemeres. The sclerotized structure correlates with long-continued (for several years) preservation of seeds germination.

The fruits of each family and genus have their complex distinctive and adaptive signs caused by their belonging to a particular taxon. However, the same living conditions contributed to the formation of convergent features.

One of the leading adaptive signs in the family *Brassicaceae* is slimy-cells (p. *Alyssum. Hymenolobus*), and water-carring cells layer, combined with scleriphication. Slimy-cells of *A. szovitsianum* marked as colorless columns rising from the bottom wall and expanding fungiform. *A. dasycarpum* is colorless columns rising from the bottom walls of the cells with a small extension in the upper part.

Common adaptive features primitving apocarpous fruit species of *Astragalus* (*Fabaceae*) are imperfect type dehiscence. This allows to seeds a long stay in the pericarp. Bilocular, different types of trichomes and epidermal formations; sclerotized of pericarp and seed-coat are protect against environmental influences. The pubescent of exocarp (*A. harpilobus, A. remanens*) presents or nakes (*A. ammophilus*). Mesocarp is parenchymal cells with scleriphfillous vascular bundles, accompanied water-carring cells with spiral point and pore (*A. harpilobus, A. remanens*). The endocarp is sclerotized with parallel and perpendicular to the direction of the fibers. Seed-coat consists of 5 layers of differing power as all *Fabaceae*. The endosperm is the form of unstructured film.

Other families in this study presented a large number (2–3) species. In the family *Lamiaceae* observed complete slime-cells and sclerotized pericarp, provided deep physiological dormancy of seeds.

In the family *Boraginaceae* presence a thick layer of the endosperm and significant sclerotized pericarp.

All these features provide good protection of the embryo, but embarrassing germination. Increased protection of embryo against adverse conditions, the formation varying complexity coat of is regarded as one of the directions of evolution [17, 344].

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Haematological parameters of 2-year-old purebred Arabian racehorses in different periods of horse racing season

Abstract: Twenty-eight blood samples were collected from purebred Arabian racehorses. The results showed differences ($p < 0.05$) between some haematological and serum biochemical parameters in different periods of horse racing season.
Keywords: purebred Arabian racehorses, haematology and serum biochemistry parameters.

Introduction

Horse racing of purebred Arabian horses is an important part of international equestrian performance sport. IFAHR (The International federation of Arabian horse racing authorities) comprises more than 30 countries throughout the world. These are The Russian Federation, France, Germany, Belgium, United Arab Emirates, Qatar, Switzerland, United Kingdom, Austria, Holland, Saudi Arabia, Turkey, Poland and many more [8]. In most countries Arabian horses start their racing careers one year later than other breeds. Arabians can begin racing at the age of 3 because they develop slower than other breeds. Nevertheless in some countries (Russia, Qatar, Iraq, Sweden, Great Britain and some others). Arabian horses start racing at the age of 2. It is rather dangerous for a young immature organism [12].

In moderate climate in Russia horse-racing season continues from May to September [1; 11]. It's a very dramatic period in the lives of 2-year-old race horses. Existing training programs imply rigorous exercise, the loading is very heavy. It can lead to dramatic effects, especially for horses that are not yet physically mature [12]. Good race performances are connected with extreme functioning of all horse organism systems. Adaptative sport changes can give greater chances of high race speed however it can provoke different functional illnesses. Overtraining, chronic microtrauma and other destructive changes can influence the trophism and the structure of different body tissues and organs. It can lead to trauma and diseases. If it happens before a horse achieves physical maturity, serious health problems can appear and be for life.

Haematological parameters are a very important part of complex body diagnostic. It is a sensitive indicator, since in most cases haematological and serum biochemical changes are determined by physiological alteration of organ systems [2, 333–334; 3, 409–414; 4, 391–398; 5, 29–30].

It is very important to frame a plan of horse training and performance, if you want to do it in a proper way, it is necessary to know the changes occurring in horse organism during the race season. There are three periods inside horse racing season: the beginning of a period (May – the first half of June), the middle (the second half of June – August) and the ending (September).

The purpose of the present study was to compare haematological and some serum biochemical values in different periods of race season.

Materials and Methods

Twenty eight blood samples were collected from 2-year-old purebred Arabian racehorses. The horses took part in Central Moscow Hippodrome races in 2012–2014 race seasons. Only clinically healthy animals were used. Blood samples were collected from each horse on the next morning (at 6 a. m.) after the racing.

Venous blood was analysed for hematocrit (HCT), hemoglobin (HGB), red blood cells (RBC), mean cell volume (MCV), mean cell haemoglobin (MCH), mean cell hemoglobin concentration (MCHC), platelets (PLT), white blood cells (WBC) and leucogram; serum enzyme activities of creatine phosphokinase (CK), aspartate aminotransferase (AST), lactic dehydrogenase (LDH) and concentration of serum iron. An automated haematology analyzer MINDRAY BC-2300 was used to assess the parameters of complete blood cell count. Biochemical analyzer URIT — 8030 was used to assess serum biochemical values.

Statistic analysis was made with the help of statistics package SAS 9.4 и STATISTICA 10. Ultimate value of statistical significance level (p-level) 0.05.

Results and discussion

Our results show that some studied blood parameters have differences ($p < 0.05$) depending on the period of horseracing season (Table 1). The value of HCT, HGB, RBC, MCV MCHC, platelets and white blood cells did not vary during of racing season. Though red blood cell index — MCH (fig. 1) had maximal value in the beginning of season (May – the first half of June).

Percentage of segmented neutrophil (Neut) was maximal during the middle period — 62.50 ± 1.54 % (fig. 2) which is more ($p < 0.05$) than in the beginning (48.63 ± 3.51 %) and in the ending (50.70 ± 2.98 %) of horse racing season. At the same time the percentage of lymphocytes (Lym) was minimal — 34.20 ± 2.00 % (fig. 3). These changes demonstrate stress leukocytosis which is associated with cortisol release in stressful situations. This hormone induces neutrophilia and lymphopenia. Neutrophilia derives from the mobilization of the marginal pool, the reduced ability to migrate from the blood to the peripheral tissues and the increased mobilization of the population of bone marrow reserve. Lymphopenia is the result of Lym sequestration from lymphoid tissues (Caracostas et al., 1981; Welles, 2000). This response can also be provoked by a great variety of pathological processes (Welles, 2000) [11, 584].
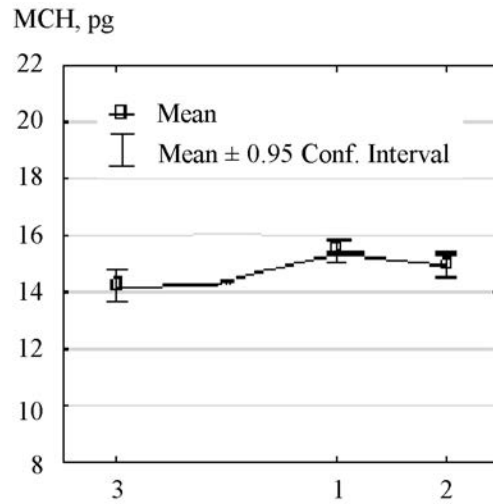
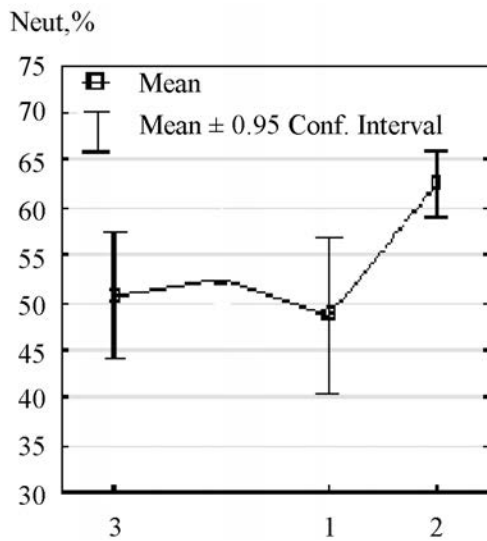Fig. 1. MCH in different periods of horse racing season

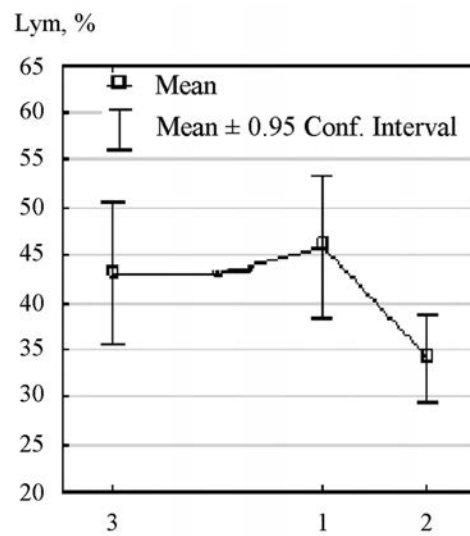Fig. 2. Neut in different periods of horse racing season

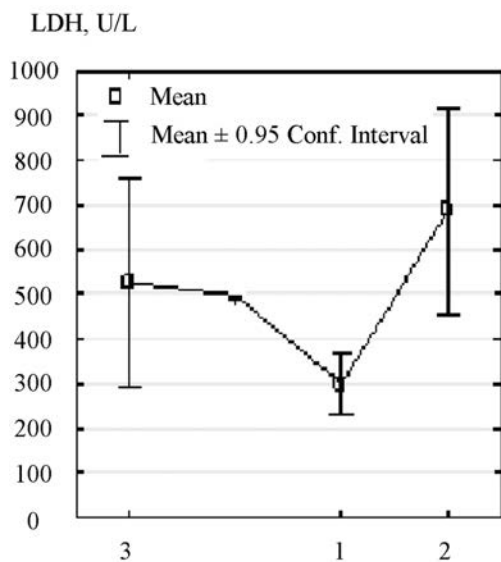Fig. 3. Lym in different periods of horse racing season

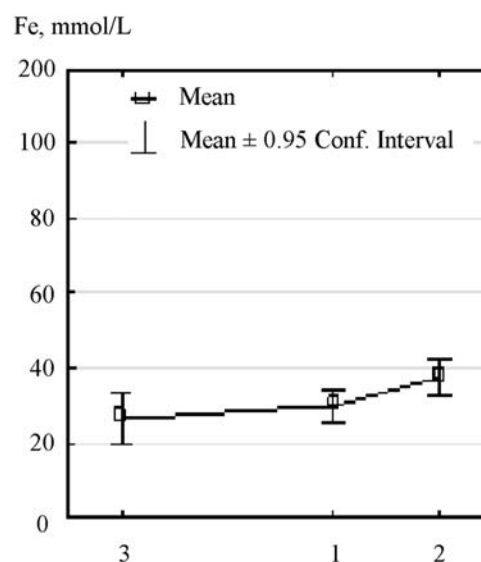Fig. 4. LDH in different periods of horse racing season

Fig. 5. Serum iron concentration in different periods of horse racing season

The activity of creatine phosphokinase and aspartate aminotransferase did not vary during of racing season. Serum LDH activity had maximal value $(p < 0.05)$ in the middle and in the ending of horse racing season (fig. 4). This enzyme is also used as indicator of skeletal muscle overtraining or damage during exercise [7, 389; 9,77; 10, 432–433]. LDH catalyzes the conversion of lactate to pyruvic acid and back. Cells use it when oxygen is scarce. Lactic acid can damage muscle structure.

The level of serum iron was higher $(p = 0.0173)$ — 37.66 ± 2.17 mmol/L during the middle period (fig.5). The most probable reason for that is supplementary feeding containing iron. So it should be avoided because iron deposit can have a very negative influence on different body processes [6, 64–68].

The present study provides the evidence that the middle is the most exhausting period of horse racing season. Most of horse organism systems are functioning on the edge of their limits. That is why segmented neutrophil and LDH activity had such high values.

The studied racehorses show that the racing load is maximal in the middle. This is really important in practice especially for immature 2-year-old Arabian race horses because the same kind of test should be repeated from time to time during the race season.

Table 1. – Effects of a period of horseracing season on haematological and serum biomedical parameters

Parameter	Mean values (M ± m)			p-level	
	The beginning. (n = 8)	The middle (n = 10)	The ending (n = 10)	Kruskal-Wallis Test	Van der Waerden Analysis
MCH, pg.	15.40 ± 0.17	14.92 ± 0.20	14.17 ± 0.25	0.0066	0.0078
Neut, %	48.63 ± 3.51	62.50 ± 1.54	50.70 ± 2.98	0.0034	0.0036
Lym, %	45.87 ± 3.11	34.20 ± 2.00	43.10 ± 3.27	0.0158	0.0130
LDH, U/L	301.00 ± 25.01	687.00 ± 100.45	527.00 ± 54.08	0.0453	0.0545
Serum iron, mmol/L	30.05 ± 1.89	37.66 ± 2.17	26.61 ± 2.91	0.0094	0.0173

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Section 2. Geography

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Mortality and life expectancy rates of population of the republic of Uzbekistan in the years after independence

Abstract: The paper deals mortality rate in the Republic of Uzbekistan is studied. The analysis of the factors of mortality by gender and age groups is carried out. At the end of work the analytical model of mortality is constructed.. The probability of a living out of men and women is defined by mathematical model.

Keywords: Maternal mortality, infant mortality rate, life expectancy.

The Republic of Uzbekistan for years has stood out with high rates of population growth. The total population growth is taking place entirely due to natural growth, in conditions of absolute and high rates of birth and low rates of mortality. However, the reduction of indicators defining these processes is poorly reflected in the population density, the solution of social and economic problems, although it enables the growth qualitative characteristics of the population (education, culture, health, etc.). The total population of the country as of 01.01.2014 was 30 492.8 thousand people, and the average annual growth was 0.85 %. For the period of 1991 to 2011, the number of population increased by 143.4 %, with an absolute growth of 8 951.5 thousand people. Analysis of the results of the last 4 population censuses and the following periods after them shows that every 10 years the number of people in the country increased by an average of 4 million people. Over the last decade in the country due to low levels of natural growth and negative indicators emigrational growth, overall rate of population growth dropped sharply. Increase in population numbers of Uzbekistan is solely due to the natural movement of the population, while the mechanical movement contributes to its reduction [1].

One of the achievements in the social and demographic development of the Republic of Uzbekistan in post-independence years is the reduction of mortality rates in all age groups. During this period, the country has improved the healthcare system as well as has paid special focus on mother and child healthcare. In addition, the increase in the proportion of young people and middle-aged people in the age groups of the population has taken place, decrease in birth rates has led to a decrease in mortality rates among children under 1 years of age, maternal mortality and total mortality rates. In a short period of time (1991–2013) overall mortality rates of population decreased by 1.2 points, or changed from 6.2 % (ppm) up to 4.8 % per thousand people [5].

Table 1. – Natural movement rates of Uzbekistan's population from 1991 to 2013 (Source: [2; 5])

Rates	years						
	1991	**1995**	**2000**	**2001**	**2005**	**2010**	**2013**
Fertility, %	34.5	29.8	21.3	20.4	20.3	22.4	22.5
Mortality, %	6.2	6.4	5.5	5.3	5.4	4.9	4.8
Natural Growth, %	28.3	23.4	15.8	15.1	14.9	17.5	17.7
TFR*	4.199	3.596	2.585	2.469	2.360	2.529	2.350
LE**, years	67.0	70.2	70.8	71.3	71.8	73.1	74.0
DC***	0.180	0.214	0.257	0.258	0.263	0.218	0.213

*Note: * — TFR is the total fertility rate, ** — Life expectancy in years; *** — DC-Depopulation coefficient, which is the ratio of the death rates to the birth rates.*

A main characteristic of Uzbekistan is the low coefficient of total mortality rates of its population in comparison to other CIS countries as well as majority of other countries. According to world statistics, for the year 2014 in the Republic total mortality rate was 5.0 %. For comparison, in Russia it was 13 %, in Ukraine — 15 %, in Belarus — 13 %, in Georgia — 11 %, in Kazakhstan — 8 %, in Tajikistan — 7 %, Turkmenistan — 8 %, and in Kyrgyzstan — 7 % [4].

The greatest influence on the growth of mortality rates has such factors like the environmental aspects and composition of population in terms of age and sex groups. A mortality rate of the rural population of Uzbekistan has always been lower compared to mortality rate among the urban population. In terms of age structure, apart from the increase in mortality rates among the elderly, permanent decline in mortality rates has been observed in all age groups. The increase in mortality rates among older people and the elderly can be associated with diseases peculiar to this age.

One of the indicators of the level of socio-economic development is the infant mortality rate, in particular, mortality rate among children under one years of age. Sharp decrease in the birth of children who are the fourth, fifth, sixth child in a family, led to a dramatic reduction of infant mortality to 3.3 times or it declined from 35.5 % per 1,000 live births to 9.8 %, and the maternal mortality rate declined from 33.3 to 20.2 per thousand, or 1.6 times (1991–2013) [6]. But the relatively high number of babies who have died due to various diseases and causes compared to older children — certainly is a negative factor. In particular, the highest mortality rate for children under one year is accounted for respiratory diseases (33.7 %) and pathological conditions of the perinatal stage of labor (48.7 %) [6].

Effect of endogenous factors on mortality associated with pathological conditions of the perinatal period birth compared to exogenous factors is slightly higher. Along with the large number of children who died of respiratory disease (33.7 % of the total mortality from all causes of infant mortality), it has decreased by 3.3 times during the research period. Deaths for reasons of birth defects, accidents and injuries, amounting to 10 % of the infant mortality rate for the period 1989–2012 has decreased 1.6–4.8 times [2].

In contrast to group of older people and other age groups, child mortality still remains high, despite the decline in mortality among children 0–4 years old. For example, during period of 1989 to 2013 child mortality among this age group ranged from 11.1 to 4.10 % per thousand children in this age group, although it has decreased by 63 %. Higher mortality rate is observed among boys rather than girls in the overall mortality of infants and children up to an age of 5, which is the reason for the sexual (gender) alignment in subsequent age groups. The low mortality rate in the country exists in a group of children and adolescents from 5 to 19 years of age, and decline of this indicator over the research period was 1.6–1.7 times which is a positive factor, because the mortality rate in the age group of 5–14 year olds for every thousand person in 1989 was 0.6 %, in 2012 it was 0.64 %, while in the age group of 15–19 year olds it was 0.8 % and 0.50 % respectively. The mortality rate was high mainly in groups of young children and older age groups, but at the same time, it begins to grow again in the age group of 60 year olds and older people.

In terms of gender composition of the population of Uzbekistan male mortality in all age groups is relatively higher, and it could be explained by some of the above mentioned factors. In addition, the fact that women in the country mainly do not work in labor-intensive (hard) works, while some of the them are not involved in the production at all, e.i housewives, makes them less exposed to such negative phenomena as alcohol, smoking, injuries, and their high biological resistance explain the lower mortality rate among women.

Specific changes in mortality of the population is most clearly expressed in its age-specific, and life expectancy at birth. In particular, during the period of 1989–2012 age mortality rates of the population in all age groups decreased by 1.6 times. For example, if in 1989, for every thousand people death for males was 6.8 %, and for the females was 5.9 %, in 2013, these figures were 5.1 % and 4.4 % respectively. The small difference in mortality rates in terms of gender (sex) composition of the population can also be observed in the age groups of the population. For example, the mortality rate among boys in overall child mortality among children under 5 years of age is 1.3 points which is higher than mortality among girls, despite the fact that during the years of 1989–2012 it declined by 7.5 %. Higher death rates by age groups are seen in groups of children of up to 10 years, but then they decrease for 10–14 year old group, and then they increase again in subsequent age groups. The lowest mortality rates are found in the age groups of 5–9, 10–14 and 15–19 year olds, where the mortality rate is less than 1 %. Mortality rate in the age groups of 50 years and older is 10 % and above, for every thousand people.

In the mortality rate by age most of mortality is among women and men of working age. In particular, the mortality rate is increasing rapidly after the age of 40. If the age group of 25–29 year old mortality rate is 0.8–1.2 %, for the 40–44 year old age group it is 3 %, and among men even more than 4 %. Among the causes of mortality in a large proportion of the working-age deaths occur due to cardiovascular disease, accidents and injuries and cancer, but the sequence of men and women are different. For example, mortality rates among women first of all caused by abnormalities of the cardiovascular system, second cause is cancer related illnesses, at the third place is the parts of the digestive system. Among men, on the contrary, mortality rates caused by accidents and injuries are placed second. Both among women and men of all-cause mortality rates are much lower compared to older age groups.

However, the leading cause of mortality in the age group of 60 years and older is the cardiovascular and other diseases associated with the development of the human body and its suspension from growth, which appear after reaching the working age limit. Decrease on year by year basis age-specific mortality rates of population also leads to increase in the life expectancy at birth. One of the most important aspects of the current demographic situation in Uzbekistan is the achievement in prolonging life expectancy.

The average life expectancy in terms of duration differs from that of life expectancy rates in the neighboring countries, including Kazakhstan (3 years), Kyrgyzstan (3 years) and Turkmenistan (9 years). Also, when compared with the CIS countries Uzbekistan is placed after such countries like Armenia (72 years), Georgia (74) and Azerbaijan (74, 2011).

Life expectancy rates among women living in Uzbekistan are relatively lower compared to women living in such countries like Russia, Ukraine, Armenia, Georgia, Azerbaijan and neighboring countries. However, among men higher life expectancy rates can be observed. In Uzbekistan life expectancy rates among women traditionally was higher than men for some years. During 1970–1971 women were living on average 9 years longer than men, in 1990–1991, the figure was 6 years and in 2013–2014 it dropped to 7 years. For 2010–2011 year life expectancy at birth among women was longer than men by about 30 years and it was on a constant basis.

Table 2. – Average life expectancy in Uzbekistan during 2010–2011

Age	Men	Women	For how many years women live longer than men	
			Years	Percentage
0 year old	70.6	74.9	4.3	6.1
5 year old	66.8	70.8	4	6.0
10 year old	61.9	65.9	4	6.5
20 year old	52.2	56.2	4	7.7
30 year old	42.7	46.5	3.8	8.9
40 year old	33.5	37.0	3.5	10.4
50 year old	24.8	27.8	3	12.1
60 year old	17.6	19.2	1.6	9.1
70 year old	10.8	12.1	1.3	12.0
80 year old	7.2	7.2	0	–
90 year old	7.6	4.9	–2.7	–35.5
100 year old	5.1	1.4	–3.7	–72.5

Note: The table is based on the author's calculations. Based on data provided by the State Statistics Committee of Uzbekistan.

Among women of 40–50 years, the average age is 3–3.5 years more, but in the older age groups, this age in both men and women do not differ much. But it is only in absolute figures and in relative terms, on the contrary, an increase of this index can be seen among the elderly in several times.

Particularly, in the table of mortality among Uzbekistan's population for the period of 2010–2011 in the age group of boys of 5 years $T = 6\,570\,573$, while $l = 98\,387$ if we calculate, by putting the figures into formula, the average life expectancy of five year old boys at birth is equal to 66.8 years, and it is established that they can live on average another 61.8 years. It is established that during this period there was no significant change in the average life expectancy for other age groups either.

While in 1989–1990, the average life expectancy at birth for the total population was 69.3 years, in 2010–2011, it increased to 74 years: among women the figure for this period increased from 72.4 years to 74.9 years and for men it grew from 66.1 years to 73 years [7].
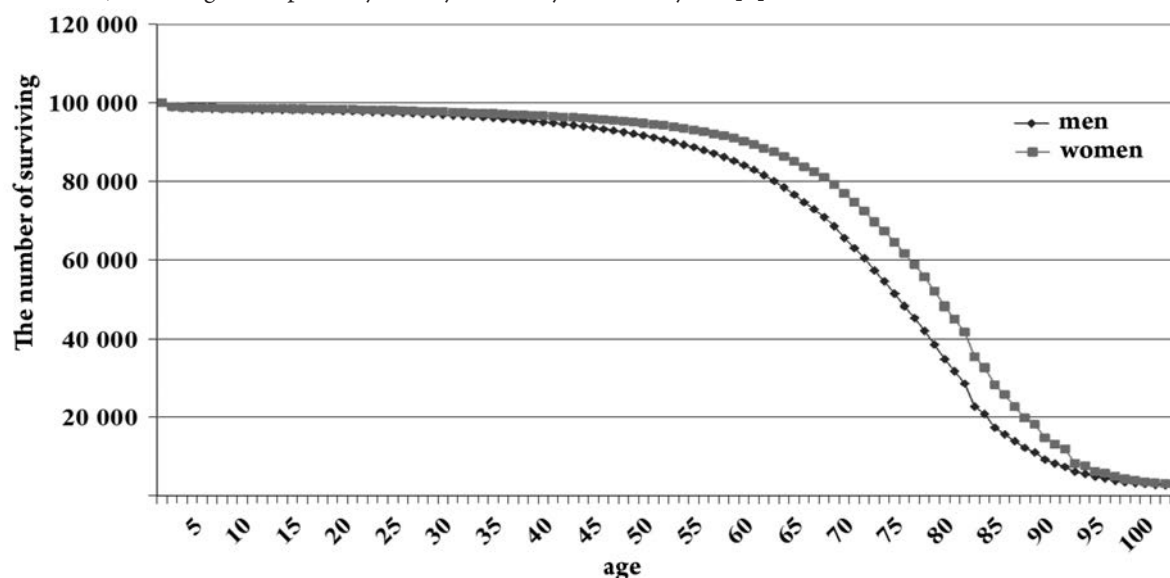

Fig. 1. Mortality curves for men and women in Uzbekistan, 2010–2011

While calculating the probability of survival, or how many out of 100 000 people can live up to a certain age of the mortality table, or the table of life expectancy, prepared on the basis of age-specific mortality rates, using the following formula:

$$Lx + 1 = PxLx$$

It is established that in Uzbekistan for the period of 2010–2011 — 100 000 births in 1 year, that is probability of reaching the 1 year threshold was $Lx = 98\,901$, of whom among women the figure was $Lx = 99\,044$, while for men it was $Lx = 98\,767$. Similarly, from the age group of up to 5 years did not reach that age only 1.5%, in other words 98.5% did reach that age. In addition to that, among girls of up 5 years of age did not live up to that age 1.4%, while from the boys 1.7%, or 98.6% and 98.3% respectively survived to this age.

Starting from 70–80 years old, the probability of survival among population is equal to half. Thus, it was established that on reaching 90 years of age, overall probability of survival of the population was $Lx = 9\,659$, $Lx = 11\,910$ among women and $Lx = 7\,365$ among men. The reason for this is primarily due to the reduction of infant (child) mortality in the country, and a sharp reduction in mortality rates in the older age groups. Data illustrated in Fig. 1 show high levels of survival probability among women compared to that of men, and this difference increases as the age increases. In particular, 72% of women and 61% of all men have the probability of reaching the age of 70. Similarly, up to 80 years of age survive 28.6% of men and 41.7% of women. This illustrates the need for increasing the survival probability among men.

Along with huge conditional probability of mortality in Uzbekistan in the age group of children from 0 years to 4 years, it is decreasing among age groups of up to 13–14 years. But, starting from this age, there can be seen a steady growth. For example, if the probability of mortality among children of 0–1 years is equal

to 1099 per 100 000, among 12–13 years it is 32 and among people at the age of 25–26 years it is 99, in the age group of 60–61 years old it is 1218, and in the age group 70–71 years it is equal to 2 955.

Increase from year to year in life expectancy at birth of Uzbekistan's population, the reduction of infant, child and maternal mortality, bears evidence of the qualitative level development of the population, socio-economic development of the country, establishment of a healthy lifestyle and a positive work-level of the healthcare system. Such positive improvements in the processes of mortality and in turn reduction of the birth rates led to the premise of the transition of reproduction in the country from the traditional to the modern type.

Results of demographic changes that are different from those of the former Soviet Union in same the period, shows a new stage in the demographic development of the Republic of Uzbekistan. This demographic situation and demographic development are reflected in the reduction of the growth rates and the average annual rates of population growth, birth and mortality rates. As both sudden decline as well as a sharp increase in population numbers present serious problems. Consequently, a sharp decline in population numbers or preventing excessive growth, the transition to the sound reproduction type of population, these demand the adoption of special demographic policy in Uzbekistan.

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Section 3. Geology

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Application of detailed seismography in coal exploration activities

Abstract: To search for coal seams on the example of the Angren career is proposed to use the method detailed seismi tomography.

Keywords: The career, the roof, Seismotomography, well.

Introduction

The method of detailed seismography can be used for the exploration of coal from coal-bearing layers. The inspection of the effectiveness of this Method was carried out at the producing field — Angren mine.

Methodology. The working technique is not different from the one specified in Fig. 1. The span between receiver positions was 2 m., and between the signal source points — 23 m. Observation was carried out using 24-chanel station. Seismic signal production method was mechanical shock. Seismic line laid on the bed of the mine (Fig. 1).
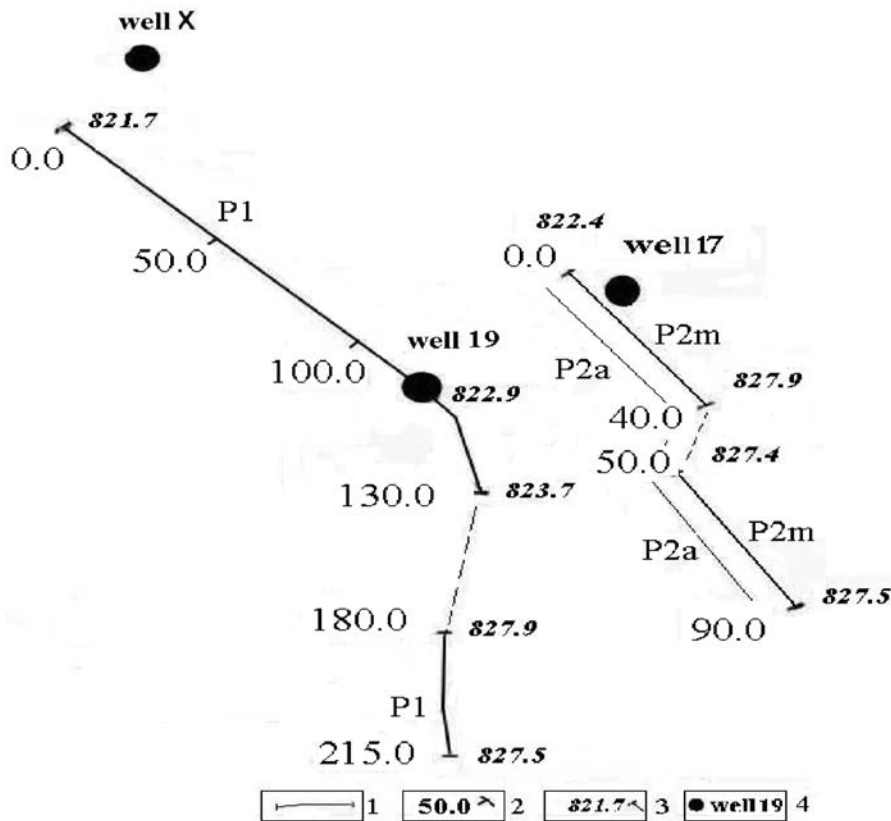

Fig. 1. Schematic of seismic profiles at the bottom of the quarry Angren. 1 — seismic profiles; 2 — pickets; 3 — the absolute level of all profiles; 4 — drilled wells; P2m — Profile 2 — main; P2a — Profile 2a — additional; P1 — Profile 1

Results of the study

Analyzed geologic environment is sedimentation mass with competency of 25–30 m. As considered, the bottom layer is overlying bed of mouldy kaoline. The absolute indicators of latter fluctuate ranging from 790 to 800 m. Daylight surface is located at the level of 820–830 m. Geologic environment was formed by the complex of semimetal rocks of Jurassic period: chalkstone, schist, sandstone with clay interlayer. Layer thickness fluctuates within 3–5 m., and in some cases — 8–10 m. Research target horizon was so called

"previously reserved coal bed". It occurs directly at the overlying bed of mouldy kaoline. Previously the bed was penetrated by wells, three of which were located at the working sites — No. X, No. 19 and No. 17. According to the drilling data, layer thickness was 3–5 m., stratification depth — 2 530 m. Basing on field seismic observation section of profiles No. 1 and No. 2 it can be concluded that "main" was prepared, as well as No. 2 — "additional" which is underlying in parallel with No. 2. "Main" is 5 m. away on the west. Profiles of previously reserved coal bed are given in Figures 2 and 3.
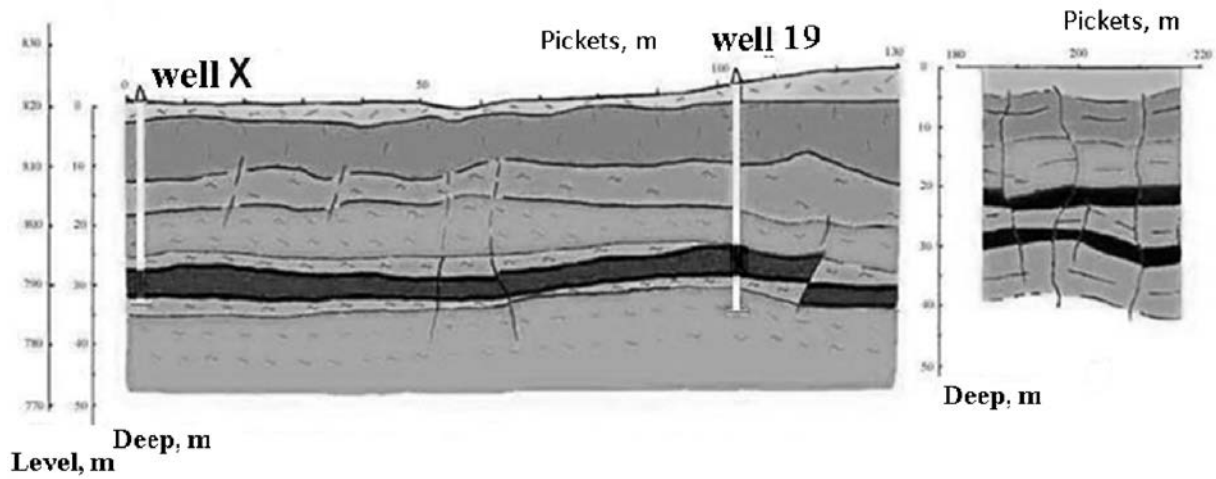
Fig. 2. Projected cuts in the coal seams previously installed on a profile 1.

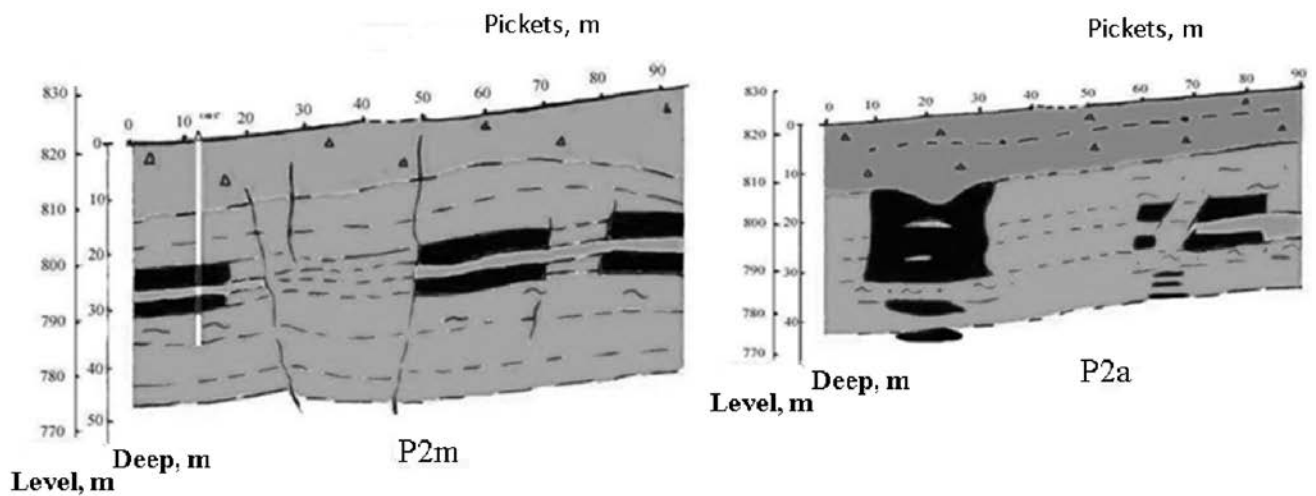■ — Plasty coal according to seismic tomography; ▌— Coal, tapped by drilling

Fig. 3. Projected cuts in the coal seams previously installed on a profile 2.

■ — Plasty coal according to seismic tomography; ▌— Coal, tapped by drilling

The bed has the following distribution limits. Overlying bed of Profile No.1 is traced at the absolute depth of 795 m. (SD 00) and 790 m. (SD 50). Farther the bed elevates up to the level of 800 m. (SD 120) and through the interruption sink up to 195–794 m. (PK120–130). The bed thickness varies from 2 m. to 1.5 m. from the north to the south (SD 50) and to 2–2.5 m. (SD 70–130) (?). Two interruptions are recorded along the bed: at PK60 (range — 1.5 m.) and at PK120 (range — 5 m). The bed was penetrated by the following wells: X — near to PK00 and No. 19 — PK104 (Fig. 2.). Our scheme matches the drilling data in a practical way. The south end of profile 1 (SD 180–220) in the previously reserved coal bed is traced in form of two layers. Overlying bed of the top layer occurs at the limits of 805, 807, 805 m.; the second layer — at 800–803 m. There is an interlayer of barren rocks with thickness of 1.5–2 m. between the layers. Displacement is recorded throughout the layers with range of 1.5–2 m. (PK205). Overall thickness of both layers is 5–6 m.
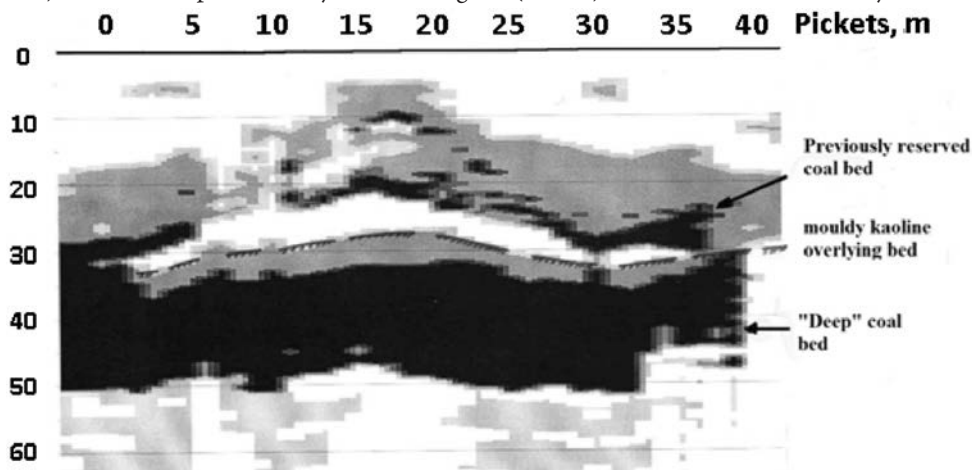

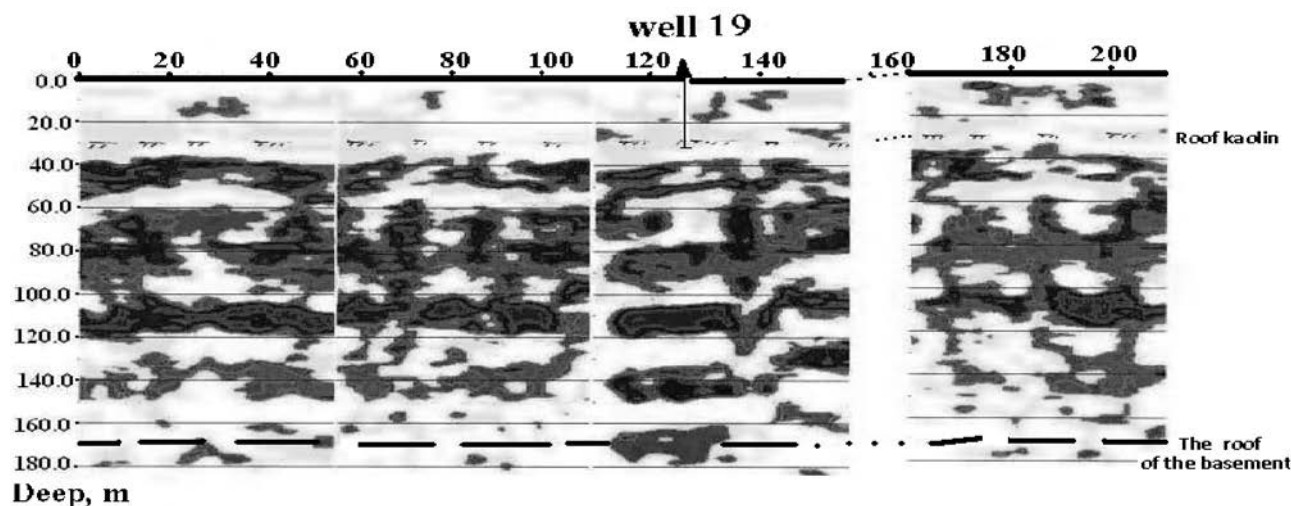Fig. 4. Example of coal bed under kaoline beds ("Deep" coal bed)

Fig. 5. Select all the coal in the thickness of the sedimentary cover from the bottom
of the quarry to the roof of the basement along the profile 1

The "main" profile 2 has the following coal seams plan. Two layers are clearly tracked with an interlayer of 2–3 m. Thickness of coal beds fluctuates from 1–2 m. at SD 0–5 and 50–55 up to 5–6 m. at SD 15 and 85. Second "additional" profile is more complicated. Within the intervals of 15–40 station distances, the coal beds form series of three beds with total thickness of 15–20 m. Farther to the southeast, the patch thickness considerably shrinks to 10 m. Top edge of coal bed is underlies at the limits of 800 m. (SD 00–10) and 803 (SD 50–80). The beds at SD 10 are penetrated by well No. 17. Our data fully match the drilling materials.

As the result, previously reserved coal is traced throughout all observation line. Absolute limits its top edges have uneven values — northern part of profile No.1 (SD 00–100) equals to 791–795, and at other parts increases up to 800 m. and 802–810 m. Thickness of beds is not also constant. Within the intervals SD 00–100 of profile No. 1 thickness is minimal: 2–1 m. Layer thickness in the south area (SD 180–200 profile No. 1 and profile No. 2) considerably expands, the coal bed is tracked in form of two and three (at some places) layer series, with total thickness of 7–10 m., and on occasion 15–20 m.

Apart from previously reserved coal beds, research works explored other coal beds: "deep" and "ultra deep".

"Deep" and "ultradeep" coal beds. As described above, target bed underlies at the layer of mouldy kaoline. As it was considered, this layer is corresponds to the overlying bed of Paleozoic foundation bed, thus the coal beds are not expected to be found below. Our materials can overturn this opinion. The coal bed profile, which overlying bed is located 5–6 m. below the kaolin level is given in Fig. 4. The bed, or possibly the coal series can possible have the thickness of 15 m. Stratification depth of overlying bed is about 40 m., which corresponds to the absolute limit of 780 m. On attempt to research the deeper levels, the series of coal beds are explored, which expands up to deepness of 140–150 m. with minor bracits (Fig. 5) ("ultra deep coal beds"). Thickness of beds is considerable — from 5 to 10 m. Layer gaps do not exceed 10–15 m. This information shows the following. The mouldy kaoline, generally, does not relate to the overlying bed and the heavy layer of sedimentary rock is underlying below. This implies that the coal productive depth considerably exceeds the values, known so far.

Conclusion. As the result of research works the forecast profiles of previously reserved coal beds were prepared, results match the drilling data; new perspective horizons were explored; coal hosted area is considerably expanded. Data on effective use of detailed seismography in coal exploration activities are acquired.

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Section 4. Study of art

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The problems of comparative and tipological study of Turkic musical traditions (on the example of stringed instruments)

Abstract: The most interesting material for studying the history of musical cultures of different peoples is musical instruments. If existing of the stringed instruments of Siberia Turks connected with archaic layers of their cultures (ancient cultures, beliefs and rituals), the Middle Asia Turks — with epic creativity. For the comparative musicology the problem of further evolution of "kobyz-like" instruments in the cultures of West (Turks-Arabs-Western Europe; Turks-Slavs-Western Europe) and East (Turks-Arabs-Muslim East) is of a great interest.

Keiwords: stringed instruments, eastern Turkics, western Turkics, "kobyz-like" instruments, ritual and magical practice, epic creation, evolution of instruments.

The theme "Traditional musi of the Turkic Speacing World" raises very important for musicology problems of interaction and interference of cultures. In this connection, we should say that in defining of types of musical cultures of Turkic people the language (linguistic) factor is not critical comparing to the other Eurasian superethnoses (on the basis of the ethnolanguage commonality), for example, Slavic, German, Chinese and others, the Turkic superethonose is not that monolithic. It can be explained by the fact that Turkics, beginning from the early middle Ages were conquering and forming their states not only in Central Asia, but far beyond its borders. The area that, for example, separates today's Yakutia and Turkey show an enormous territory and the vector of centuries-old traveling of Turkics from east to west. Therefore, by the time of forming the national musical cultures the Turkic states were very scattered territorially and it is directly reflected on formation of different types of musical cultures of the Turkic peoples. In this formation the great role was played by the connections with neighboring regions and interaction of cultures, their ad-, sub- and superstrate relations.

With that said, we assume that "Turkic frames" in Eurasia are needed to be expanded since, at least, two superethnic commonalities have been developed there: Turkic-Mongolian — east and Turkic-Iranian — west [1]. They generated two cultural systems that are conditionally, considering religious factor, can be called, respectively, Turkic-Tengrian and Turkic-Muslim.

Speaking of the western Turkics (Uzbeks, Azerbaijanis, Turks, partly Karakalpaks, Turkmens, etc.) and the eastern Turkics (Kazakhs, Kirghiz, Khakasses, Tuvans, Yakuts, etc.) we note that their cultures are characterized in the first place by different types of economic activity. Accordingly, western Turkics relate to the world of sedentary agricultural east and the eastern Turkics relate to the world of nomads. Although, this division is not absolute (the most common typologies) different landscape and geographical zones in east and west of the Central Asia as on the main region of Turkic states leave no doubts in certain *localization* here the sedentary agricultural and nomadic systems. This ensue the most important classificational and typological characteristics of the two types of cultures.

It is notable, that the area of ethnic music graphically demonstrates what happened with Turks in the time, i. e. in some way it is possible to track the history of Turkic peoples on the examples of musical instruments, folklore and oral-professional genres of their traditional music. Music, by virtue of certain conservatism of its language suggests for example saving the indigenous connections of eastern Turks and Mongols, their deepest cultural kinship and close mentality. Since in the eastern (steppe) zone of Central Asia the nomadic lifestyle existed until twentieth century, it is the representatives of Turkic-Mongolian superethnos who preserved in their traditional cultures the most archaic layers of music and its core elements that form the basis of its Turkic musical thinking. Again, relying on the traditional music, we can talk about the actual cultural assimilation of western Turks, who after getting in the sedentary-agricultural oases, of course, settled there and fell under the influence of local cultures (in particular, cultures of the Near and Middle East). That is, if in regard to the language in western-Turkic states we can talk about superstrate correlations (dominance of the language of Turkics-aliens), in regard of music — about substrate relations (domination of the native language speakers). This conclusion is the most common. We should consider the facts of genesis of some cultures (for instance, Turkmens and Karakalpaks), as well as the fact that in Turkic folklore of the Central Asia some archaic features preserved, that make them close to the folklore of Eastern Turks.

The most interesting material for studying the history of musical cultures of different peoples is musical instruments. Thus, for example, basing on the comparative-historical and comparative-typological study of bowed string instruments we can draw some certain parallels, find general and particular features in the musical cultures. But the most importantly — *on the example of string bowed instruments that different peoples have today we can not only track their historical processes of forming and development, but also visually have more or less clear picture of evolution of these musical instruments both in the World Musical Cultural existing and practice.*

Thus, the hypothesis of Central Asian and nomadic origin of bowed instruments is considered to be proven [2; 3] with their further spreading on the other regions of Asia (the Middle and Near East) and Europe. Their evolution here led to the gradual forming of modern bowed string instruments in the frames of "Eastern" and "Western" cultures.

Bowed two-stringed instrument, which preserved the specific constructive feature — hair strings still exists among Turkic peoples of Central and Middle Asia, North Caucasus (Turkic and non-Turkic) and Eastern Europe (South Slavic). Despite their different variations of names and details of construction they have the same tuning (fourth and fifth) and these instruments called "kobyz-like" by us are relic in the traditional cultures of the peoples named. In our study we paid our attention to the facts that besides the standard design, similar ways of playing and similarity of musical stylistics (for example, drone two-voice), there is one more important detail in the names of instruments of most peoples of Central Asia and Northern Caucasus. This important detail is that almost all the instruments in their quite different names have Turkic word (morpheme) *kyl* (*khyl, kil, kyi, khy, ki*) — hair: *kyl-koby z* (Kazakh, Karakalpak, Karahcai-Balkarian), *kiyak* (Kyrgyz), *kissyn-fandyr* (Osetin), *shikyepshyn* (Adygian), *ankhiyartsa* (Abkhazian). Another no less significant detail is that sometimes the name of an instrument can include the amount of hair strings — *eky* (*eki, iki, ykhi*) — two, for example: *eky + gyl = igyl* (Tuvan), *ikyly* (Altaic), *yykh* (Khakassian), *ih-khyr* (Mongolian) [4]. These similar names of bowed instruments' of different cultures indicate ethno-genetic (common origin) and contact levels of commonality of ethnic cultures of these peoples. See our articles about the evolution of the word "kobyz" and prospects of ethno-instrumental study of the ancient Central Asian type of bowed string instruments [5; 6].

As important factor of a community of an origin historical links of east and western people act. So, for example, bowed instrument with hair strings of the Central Asian nomadic peoples functioned mainly in ritual and magical practice, related to cosmogonic (shamanic) presentation of ancient Turks. This is evidenced by legends, connected with the origin of instruments and their existing in the ancient times, and they were well preserved by Eastern Turks (including Kazakhs), Buryats and Mongols [7]. Discovering the same ancient example of bowed instruments of peoples of Eastern Europe, for example, Bulgarians are associated with the history of Xiongnu — ancient unity of tribes that came from the depth of Asia and penetrated to the territory of the modern Western Europe. Bulgarian researchers investigating Proto-Bulgarian elements of their culture (Turkisms in their language, 12-year animal calendar, originality of art — music, ornaments, etc.), connect this with ethnogenesis of Bulgarian people, the basis of which is one of the Xiongnu tribes (Xiongnubulgar) [3].

Following this historical logic we find the explanation of existence of this instrument among Finn-Ugric peoples, once belonged to Volga-Kama Bulgaria, formed while disintegration of Great Bulgaria in seventh century [8]. Volga-Kama Bulgaria included also Mari, Komi, Chuvash and other Volga-Bulgarian peoples, including Tatars before the Mongol invasion. The process of assimilation of autochthonous people of Northern Caucasus and formation of many ethnoses here took place, as it is known, with participation of other ancient Turkic peoples, in particular, Ogyz, Alans and Kypchaks (Cumans), who also came from the Central Asia.

Another significant factor of a community bowed instruments is giving of special sacrality to instrumental music of these people. While moving to the west further functioning of the instrument in the epic tradition of Mongols, Kazakhs, Karakalpaks, Kyrgyz and peoples of North Caucasus can be explained by the fact that this sphere of nomads in the times of war and war democracy as well as the ritual and magical (rite) sphere is sacral. Thus, epic singing for Kazakhs-nomads is a rite of war magic in the context of ancestors' cult, and the bearers of the epic poetry tradition *zhyrau* are transmitter of this cult [9]. Thereby, the epicenter of "epic" of the instrument is the territory of Kazakhstan, the Middle Asia region: singing epos with kobyz, which Kazakhs lost because of declining their military lifestyle and becoming dependant on Russia, is well preserved by Karakalpaks. The epic tradition with kobyz of Kazakhs and Kirghiz evolved further in the epic instrumental tradition (kuis with epic legends). Also the Nart epos of Northern Caucasian peoples. is presented today along with solo and choral performance in the form of instrumental tunes (pshinatly).

In the course of comparative and typological studying of an existing bowed instruments the significant phenomenon, which is represented in Kobyz instrumental music (kuis) of Kazakhs, we can see the traces of shamanic and epic branch of Kobyz tradition [10]. It is interesting that in shamanic branch connected with the Firts *baksy*-shaman and the First musician Korkyt there are parallels with Zoroastrian (Iranian) mythology: Korkyt in the mythology of Kazakhs and Karakalpaks is close functionally to the demiurge (cultural hero) the son of Ahura Mazda Jamshid. The epic branch by and large correlates to Tengriism: this can be evidenced by an archaic layer of quinte kuis-legends that formed then in kuis of epic content. And they both certainly have a lot in common with the music of the Turkic-Mongolian people.

Astounding symbiosis in one national culture of different historical and musical traditions and musical styles explained in the first place by the fact that in the music of Kazakhs by virtue of medial location between Western and Eastern Turks, there are two different systems combined — Western Turkic and Eastern Turkic [11]. This is naturally reflected in the musical language of regional traditions of West and East of Kazakhstan, for example, in dombra kuis of different styles — tokpe (western Kazakhstan) and shertpe (eastern Kazakhstan) and accordingly in kobyz kuis of Korkyt tradition (relating to the western Syrdariya region) and epic tradition (relating to the eastern Arkyn region).

Kobyz-like instruments appeared in the Western Europe in the period of Middle Ages by two ways: 1) through the Slavs of Eastern Europe and Byzantium (Russian gudok, Bulgarian gudulka, South Slavic liritsa → fidel — viola — violin), 2) through Arabs, who borrowed the bowed string instruments from Persians (rabab → rebel — viola — violin). It seems to us that these two variants of instruments (European and Asian) became a source of play on European bowed string instruments — dagamba and dabraccio.

The question of studying of further penetration the bowed instruments to the west is also interesting. In the Middle and Near East stringed and bowed instruments had their own geographical distribution (through Middle Asian and North Caucasian regions in Iran, Transcaucasia, Arabic countries, Turkey, etc.) and its own way of evolution. We think that two names of bowed instruments — *gidzhak* as Middle Asian (Uzbeks, Tajiks, Turkmens, Karakalpaks) and *kemancha* (*keman*) as Persian — reflects not only two varieties of instruments, but their different etymology. Probably, the etymology of *gidzhak* can be explained in the context of Turkic language with the same meaning which was given by us relating to the word *kyl* (hair), i. e. *kylshak*. In the Middle Asian (Western Turkic) languages with more mild consonants this word maybe started to be pronounced as *gylshak, gizhak, gidzhak*. In Persian *kemancha* come from *keman* — a bow. In many Eastern cultures before bowed instrument with metallic (sometimes wire) strings there were instruments with hair strings that existed till twentieth century along with the "new" modernized instruments.

Thereby, in our article we emphasize the importance of musical comparison and the need for comparative-historical and comparative-typological researches in the sphere of the traditional music of Turkic peoples.

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Section 5. Medical science

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Profile immunogeneticheskie children with celiac disease Uzbek population

Abstract: The study involved 54 children with celiac disease Uzbek population aged 1 to 14 years. The diagnosis was verified on the basis of criteria ESPGAN. The positive association of HLA genes with D DQA1 * 0501, HLA DQV1 * 0201, HLA-DRV1 * 07 and * 13. For children, having allele DRB1 * 16 and DQA1 * 0501 is set at high risk for the disease refractory to carriers of alleles DRB1 * 12 — high risk of atypical forms of the disease.

Keywords: genetics, children, celiac disease, HLA-class II of.

Celiac disease (CD) at children one of actual problems of clinical pediatrics, owing to growth of its prevalence, tendency to recuring, and it is frequent also to the progressing current with development of the complicated forms conducting to an invalidization. Comprehension of her multisystem essence and development effective the serologicheskikh of tests have allowed to elicit the fact that the celiac disease meets much more often. Celiac disease — a disease with hereditary predisposition and the greatest risk of her development is observed in the presence of HLA-DQ2 and HLA-DQ8 of geterodimer which are defined more than 90 % of patients in Europe and the USA. Connection between development of CD and presence at sick some anti-genes of HLA system II of a class is established. Most often gap-lotipa of DR3, DR7, DQ2 meet. And, paramount value as it is found more than in 90 % of patients in Northern Europe is allocated for the last gaplotip. Approximately his same frequency (95 %) occurs at the Russian children, and ethnic Kazakhs have 62 % [1; 2; 3]. Heterodimeasures of DQ2 it is revealed at all Indian children, haplotype by DR3-at 34.28 % [4]. In Chile at patients with CD prevailed haplotype DQ8; at sick bedouins the same gaplotipa, as in the European population — DQ2 and DQ8 are revealed [5]. The Brazilian researchers have revealed high connection with development of a disease of alleles of DRB1 * 03,* 07 and DQV1 * 02 [6].

The role of various genes of HLA in definition of clinical results of a gluten enteropatiya is up to the end not studied. But such research, in our opinion, is important and necessary as allows to obtain new data on mechanisms of communication of HLA system and CD, to open new opportunities for more exact individual forecast of predisposition to CD, her prevention and the choice of treatment.

Search of associative communications of products of HLA with diseases begins as the rule, from the comparative analysis of features of a HLA phenotype of ill and healthy faces within one population. Therefore we have considered it expedient to study features of polymorphism of genes of a HLA II class in group of patients with CD.

Materials and methods

We have examined 54 children from CD Uzbek population aged from 1 till 14 years, middle age has made 7.3 ± 1.9 years, boys 27 (50 %) was girls 27 (50 %). The diagnosis was verified on the basis of criteria of ESPGAN. Separate allelic options of genes of HLA-DRB1, by HLA-DQA1 and HLA-DQB1 have been analysed and nature of distribution of spetsifichnost of a HLA II class of loci of DRB1 *, by DQA1 *, DQB1 * is studied. The class HLA-2 which are responsible for hereditary predisposition to C defined PTsR — method in the St. Petersburg Medico-genetic Center (Candidates of Medical Science N. V. Vokhmyanina). The control group was made by 109 children of Uzbeks [10].

Results and discussion

Children with C have a frequency of occurrence of alleles, HLA-DRB1 * 07 and * 13 was much higher, than in control group (tab. 1). At the same time at patients authentically less than in control, the HLA-DRB1 * 15 option tipirovatsya that demonstrates possible protective participation of these alleles in pathogenesis of development of Ts. Risk of development of CD in the persons having DR7 options in the genotype it is revealed, at 60 % of patients. The greatest criterion of reliability was defined for alleles of DRB1 *07 and * 13. Thus, specific predisposition to CD is associated with HLA-DRB1 * 13 at children of the Uzbek population.

DQA1 locus DQA1 * 0102 allele negatively are associated with CD and it allows to consider her as CD protectors. The maximum value relative rice and criterion of reliability is noted for allele by DQA1 * 0501, i. e. it positively is associated with CD (h2 = 7.28, RR = 2.03). We have also established that alleles of DQA1 * 0501 expressed at 66.6 % of sick Ts. U of North Americans this indicator has made 97 % of patients, Russians — 90, at ethnic Kazakhs have 26.4 % [3; 7; 8].

The criterion of reliability and relative risk at sick children with DQB1 * 0201 ($\chi^2 = 6.74$, RR = 1.97), i. e. he positively are associated with CD and can be considered as a marker of predisposition to CD. low values of relative risk and high rates of criterion of reliability from preventive fraction (RR = 0.16; $\chi^2 = 3.95$; PF = 4.95) in the presence allele DQB1 * 0303, demonstrate possible protective action of this allele.

The high risk of development of a disease was inherent in carriers with different combinations of alleles: DQA1 * 0102, * 0501 and DQV1 * 0201. The combination of pathological alleles of DQA1 * 0501 and DQV1 * 0201 is associated with the molecule DQ2; DQA1 * 0301 and DQV1 * 0302 — with the molecule DQ8.

Similar to other populations at our patients authentically more often than at healthy children, DQ2 heterodimeasures (88 %) met, and in every second case they were coded by genes in situation a trance. DQ8 came to light in 9 % of cases that by 4 times more often than at Europeans and, so his presence specifies, on high risk of hereditary predisposition to C.

Table 1. – Frequency of occurrence of spetsifichnost of a HLA II class
at patients from celiac disease Uzbek population

Allele DRB1*	Sick, n = 54							Control, n = 109	
	n	χ^2	P	Pc	EF	PF	RR	n	GF
DRB1 *07	11	3.88	0.03	0.04	0.12		2.17	24	0.11
DRB1 *12	2	1.53	0.19	0.21	0.02		2.98	3	0.01
DRB1 *13	14	6.52	0.01	0.01	0.17		2.53	29	0.13
DRB1 *15	3	3.85	0.02	0.05		1.94	0.31	38	0.17
HLA DQA1									
*0101	11	2.97	0.03	0.08		0.79	0.54	34	0.17
*0102	11	4.01	0.02	0.04		0.94	0.49	34	0.19
*0501	36	7.28		0.01	0.17		2.03	39	0.19
HLA DQB1									
*0201	36	6.74		0.01	0.16		1.97	41	0.20
*0303	1	3.95	0.03	0.04		4.99	0.16	12	0.05
*0503	4	1.86	0.12	0.17	0.02		2.75	3	0.01

Note: further on in this document: n — number of alleles in this selection; χ^2 — criterion of reliability; P — an importance indicator by exact criterion of Fischer; Rs — a reliability indicator according to Pearson; EF — etiologichesky fraction; PF — preventive fraction, RR — relative risk.

Table 2. – Frequency of occurrence of spetsifichnost of a HLA II class at patients with a
celiac disease depending on a phenotype and the course of a disease

Allele DRB1	Typical form, n = 41							Control n = 109	
	n	χ^2	P	Pc	EF	PF	RR	n	GF
*07	9	4.80	0.01	0.02	0.17		2.78	24	0.11
*13	13	13.16	0.01	0.0002	0.281		4.03	29	0.13
Allele DQA1									
*0102	6	5.95	0.06	0.014		1.69	0.34	34	0.19
*0501	29	7.60	0.002	0.005	0.195		2.22	39	0.19
Allele DQB1									
*0201	32	11.18		0.01	0.23		2.53	41	0.20
*0301	8	2.17	0.05	0.14		0.76	0.54	29	0.16
*0303	1	2.64	0.07	0.10		3.55	0.21	12	0.05
*0502	2	3.97	0.02	0.04		2.83	0.24	14	0.09
Allele DRB1*	**Atypical form, n = 13**								
*10	1	2.21	0.21	0.13	0.08		4.73	5	0.02
*11	2	0.76	0.22	0.38	0.10		2.02	24	0.11
*12	1	4.12	0.15	0.04	0.09		7.96	3	0.01
Allele DQA1									
*0101	3	0.45	0.22	0.50	0.09		1.57	34	0.17
*0201	2	0.30	0.27	0.58	0.05		1.54	25	0.14
Allele DQB1									
*0302	2	0.36	0.26	0.54	0.06		1.61	24	0.11
*0503	1	3.22	0.17	0.07	0.07		6.51	3	0.01
*0601	1	0.89	0.29	0.34	0.05		2.74	7	0.03
Allele DRB1	**Refractory current, n = 7**								
*15	2	2.96	0.12	0.085	0.39		4.89	38	0.17
*16	1	17.09	0.05	3.65	0.24			36	2	0.01
Allele DQA1									
*0102	3	0.06	0.25	0.808	0.03		1.17	34	0.19
*0201	2	0.10	0.28	0.749	0.03		1.28	25	0.14
*0501	6	4.22	0.03	0.039	0.28		3.05	39	0.19
Allele DQ1									
*0301		3.33			0.23		2.80	29	0.16
*0302		0.14			0.03		1.34	24	0.11

Thus, at persons of the Uzbek population the positive association C with HLA DQA1 genes *0501, HLA DQV1 *0201, HLA-DRV1 *07 and *13 is established.

Studying of a carriage of alleles of HLA of genes of the II class at children with a typical form of a disease has shown that the frequency of occurrence of alleles of DRB1 *07 and *13, DQA1 *0201 and *0501 was higher, than in control (tab. 2) that corresponds the published data and point to positive association of it allele with CD [9]. DQA1 allele *0102 and DQB1 *0502 was much higher, than in control (χ^2 = 5.95; PF = 1.69) and (χ^2 = 3.97;

PF = 2.83) that demonstrates protective participation of it allele in pathogenesis of CD.

At an atypical form the frequency of occurrence of alleles of DRB1 * 12, was higher, than at healthy. In the analysis of polymorphism of groups of alleles of a gene of DRB1 at children with a refractory current of CD the frequency of occurrence of an allele of DRB1 * 16 considerably exceeded control indicators. The high risk of development of a refractory course of a disease is established at DQA1 * 0501 and DRB1 * 16 carriers.

Thus, at our patients the positive association CD with genes of HLA DQA1 * 0501, HLA DQB1 * 0201, HLA-DRB1 * 07 and * 13 is established. For the children having an allele of DRB1 * 16 and DQA1 * 0501 the high risk of development of a refractory course of a disease, for carriers of alleles DRB1 * 12 — high risk of development of an atypical form of a disease is established. We regarded existence of HLA DRB1 * 12 as ethnic feature of the Uzbek population and the evidence of her participation in pathogenesis of development of an atypical form of a disease.

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The influence of immonumoduline on the effectiveness of vaccination of typhoid fever

Abstract: In 162 male volunteers aged 18–22 years, studied the efficacy of typhoid vaccines adsorbed liquid chemical production of "Uzbiofarm" Immunomodulin and influence on the process of antibody production.

Vaccinated receiving typhoid vaccine the formation of a protective level of antibodies was observed in 61.6 %, whereas 38.4 % of the vaccine did not contribute to the formation of protective antibody titers and was not effective. In the group vaccinated and received simultaneously Immunomodulin formation of a protective antibody titer was observed in 95.2 % of those with a lack of protective antibody titers — at 4.8 %. Immunomodulin contributed to the intensification of antibody production and a significant increase in the effectiveness of typhoid vaccine.

Low efficiency of typhoid vaccine was due to low levels of neutrophils in the blood additional activation NBT-test. The intensification of the process of antibody production under the influence of Immunomodulin was mediated through its effect on inducing functionally metabolic activity of blood neutrophils in response to a vaccine antigen.

Keywords: typhoid fever, typhoid vaccines, Immunomodulin, NBT-test, functionally metabolic activity of blood neutrophils.

Typhoid fever is one of the most serious intestinal infections in many developing countries, including in Asia. In endemic areas, the infection most commonly affects school children and youth, as well as widespread asymptomatic intestinal carriers of Salmonella typhi, which are the main source of infection. The most effective strategy to control the incidence of typhoid fever seems vaccination of people at risk [7].

The most objective assessment of immunological effectiveness of the vaccine can be obtained by studying the antibody response after vaccination in humans. Evaluation of immunogenicity of the vaccine preparation is carried out on the basis of determining the ratio of the number of persons classified as post-vaccination in seropositive and seronegative groups (BRIC).

An important indicator for the development of resistance of the organism is a functional state of neutrophilic granulocytes responsible for the process of phagocytosis and intracellular digestion of different antigens [8; 9]. The study of functional and metabolic activity of neutrophils (FMAN) in NBT-test reflects the intensity of phagocytosis process and reveals its biochemical basis [1]. With this test, you can identify the natural enzymatic neutrophil defects and defects after stimulation [3]. The difference between spontaneous and stimulated NBT test shows neutrophil reserve, available for sale on the impact of antigenic response [11].

The new major challenges of modern medical science in the field of immunization are specific study of the nature and mechanisms of realization of the non-specific and specific parts of the immune reaction, the solution of problems to increase the efficiency of typhoid vaccination [5]. The most realistic and cost-effective solution for this problem is to stimulate the immune response after vaccination with the help of modern means of immunomodulation which is the domestic product Immunomodulin.

The purpose of the study. To study the effect on phagocytic Immunomodulin level of antibody activity and processes with typhoid vaccine preventable.

Materials and methods

During the routine vaccination against typhoid by epidemiological indications in 162 male volunteers aged 18–22 years used a typhoid sorbed liquid chemical vaccine production of "Uzbiofarm" (hereinafter TSLCV). The first group included 99 individuals who has taken the typhoid vaccine. The second group consisted of 63 volunteers of the same age have taken the typhoid vaccine and 0.01 % Immunomodulin solution at a dose of 1.5 ml/m.

The immunological efficacy was assessed in determining the serum titers of specific antibodies against O-antigen of S. typhi by PHA [10]. In assessing the severity of the immune response we took into account the order of increase titers of specific antibodies in paired sera: before vaccination and 30 days after vaccination. According to the degree of increase in specific antibody titers vaccinated were distributed as follows: 0 degree — no rise in antibody titer (seronegative); 1st degree — rise in antibody titer to 1 order (seronegative); 2nd degree — the growth of antibody titers 2 orders, 3rd degree — an increase in antibody titer to 3 orders of magnitude, 4th degree — increase in antibody titer of 4 order, 5th degree — an increase in antibody titer to 5 orders of magnitude (Table 1).

Dynamics of changes in the functional-metabolic activity of neutrophils (FMAN) blood prior to vaccination and on the 4th day after vaccination was evaluated in a spontaneous and stimulated NBT-test [12]. In setting the stimulated NBT-test, we used an inductor (opsonized zymosan). The results have read on the screen-reader at a wavelength of 620 nm. and have expressed as extinction units. Stimulated NBT-test — shows the maximum potential to be activated; The spontaneous NBT-test — indicates the extent to which the feature Hf at the time of the study; The rate of increase of the activity of Hf (%) with the antigenic exposure — further implementation of the functional capabilities in response to antigenic exposure due to intracellular reserve.

Processing of statistical results were carried out using the program on the PC Sigmastat®.

Research results

The research results revealed that after vaccination TSLCV of 1 group the average rise in antibody titer reached 2.06 order (Tab. 1). Moreover, people with a lack of protective antibody titers (0 and 1 degree, seronegative) amounted to 38.4 % (Fig. 1). A person with a protective level of antibodies to PHA (2; 3; 4, and 5 degree — seropositive) were 61.6 %. That is, of the vaccination efficacy TSLCV "UZBIOFARM" was 61.6 %, whereas 38.4 % of the vaccine did not contribute to the formation of protective antibody titers and was not effective.

In the group vaccinated TSLCV and taken simultaneously Immunomodulin average rise in antibody titer was about 3.21 (Tab. 1). Moreover, person with a lack of protective antibodies (0 and 1 degree, seronegative) of 4.8 %. While persons with protective antibody levels (2, 3, 4, and 5 degree — seropositive) amounted to 95.2 %. Therefore, the use among inoculated persons Immunomodulin facilitated the efficiency of typhoid vaccine by 33.6 % (Fig. 1).

Table. 1. – Effect of Immunomodulin on the rising of the titer antibodies in vaccination «TSLCV» of "Uzbiofarm"

| | Average rise of antibody titers | HCT-test indications | | | | | |
| | | Before vaccination | | | After vaccination | | |
		Stimulation with Zimozan (optical density)	Spontaneous (optical density)	Difference between Spontan. and Stimul. (%)	Spontaneous (optical density)	Difference between Spontan. and Stimul. (%)	Rate of the rise HF activation (%)
"TSLCV"	2.06	0.584 ± 0.005	0.213 ± 0.003	36.5	0.303 ± 0.003	51.9	15.4
"TSLCV" + Immunomodulin	3.21	0.620 ± 0.005	0.200 ± 0.002	32.3	0.363 ± 0.005	58.5	26.3

On the 4th day after typhoid vaccine inoculation the rate of group-1 the activation of neutrophils in response to a vaccine antigen accounted for 15.4 % (Table 1). In group-2 taken the vaccine and Immunomodulin the activation of neutrophils rate made up 26.3 %. That is, under the influence of the degree Immunomodulin additional activation of neutrophils in response to typhoid vaccine antigen was 1.7 times higher than in the group without Immunomodulin.

Thus, the low efficiency of the immunization typhoid vaccine was due to low levels of additional neutrophil activation in blood. Use in vaccines Immunomodulin contributed to significant intensification of antibody production and a significant increase in the effectiveness of vaccination typhoid. The intensification of the process of antibody production under the influence of Immunomodulin mediated through its effect on inducing functionally metabolic activity of blood neutrophils.
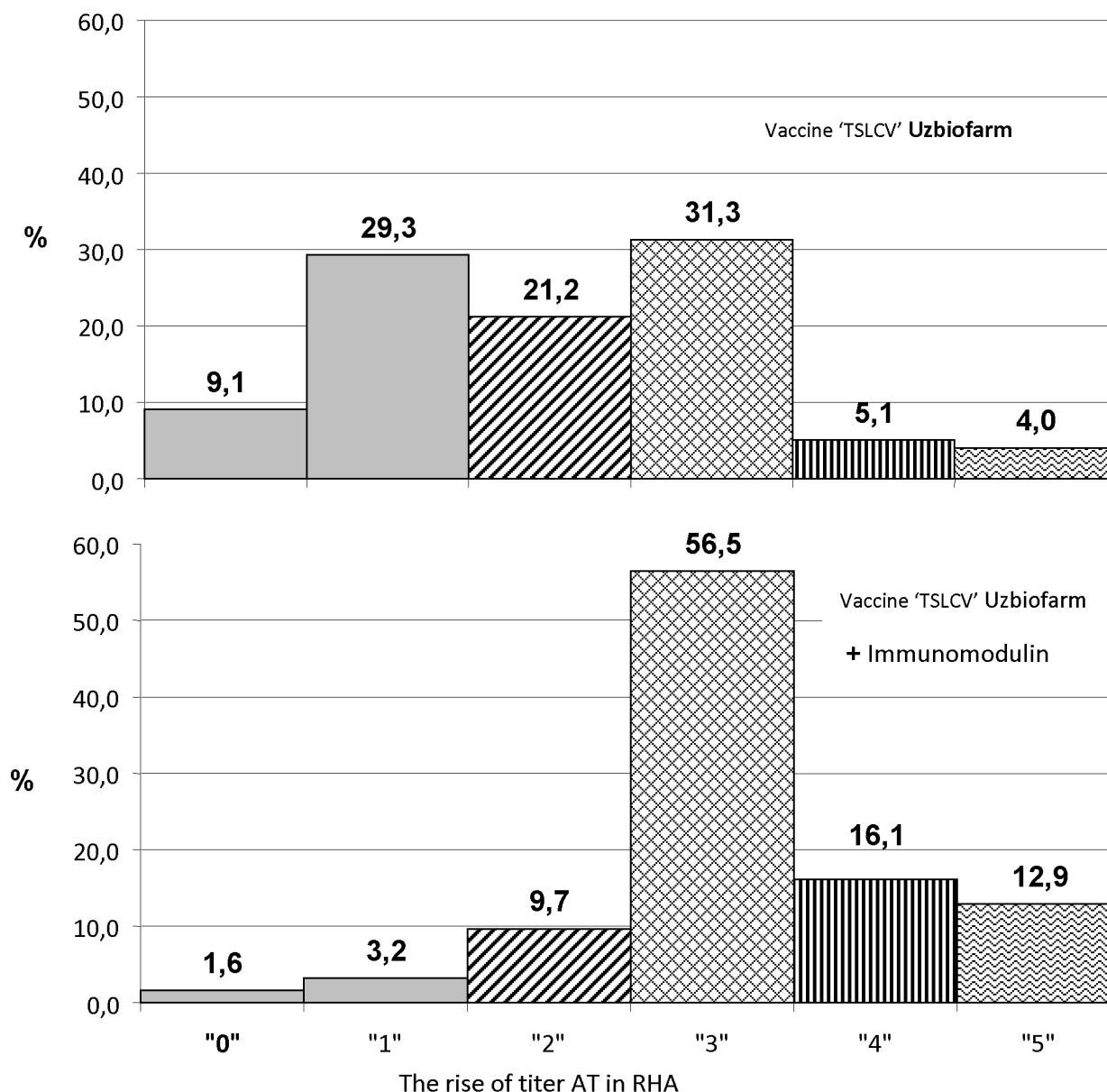
Fig. 1. The rate of increase of specific antibodies in vivo vaccination typhoid chemical sorbed liquid vaccine «TSLCV» produced by "UZBIOFARM" and Immunomodulin introduction simultaneously

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Approaches to the study of functional activity phagocytic link immune system (review)

Abstract: Literature data on the role and significance of phagocytic component, in particular, neutrophils in realization of immune response of an organism to antigen are analyzed. A special attention is paid to approaches to evaluation of functional state and reactivity of phagocytes. The most informative and objective method for evaluation of functional state of neutrophils is NBT-test. NBT-test allows to evaluate a potential maximal ability of neutrophils (stimulation test), what part of maximal ability neutrophils realize at the moment of examination (spontaneous test), degree of additional activation of neutrophils in response to antigen stimulation. Spectrophotometric modification of NBT-test permits to carry out many determinations simultaneously.

Keywords: phagocytic component of immune system, nitro blue tetrazolium reduction by neutrophils test (NBT-test).

In recent years, due to the deterioration of the environment and social conditions of the population increases the impact of negative factors on human health and the adaptive capacity of the body, including the immune system. There is a decrease of functional activity of mononuclear phagocyte system cells, T and B-lymphocytes, in particular, the development of post-vaccination immunity is broken and as a result, reduces the effectiveness of preventive vaccination and herd immunity level [32]. Differential response of phagocytic cells level, depending on the biological properties of bacterial infectious agents, plays a leading role at the stage of initiation of infectious processes [14; 15].

To date, determined the position of a single phagocytic immune system provides the body's resistance to infectious pathogens [14, 36]. The name of the system implies that along with lymphocytic cells in the formation of cellular and humoral immune responses participate mono- and polynuclear phagocytes, which in turn relate to the central unit of nonspecific protection [28]. It is difficult to find such a change in the internal environment of the organism, which is not recorded phagocytosis system. As powerful effectors, phagocytes are transformed into a communication center, a kind of strategic target, by which transformed all the reactions of the blood and connective tissue. With the penetration of the microbe in the first macro-organism cell that comes into the fight with him, it is a tissue macrophage. It absorbs and digests microbe's antigenic peptides representing T and B cells and thereby initiating the development of cellular and humoral response. Thus, macrophage allocates cytokines — interleukins 1, 6, 8, 12, and FNO that activate nonspecific resistance factors: neutrophils, monocytes, NK-cells — and act on T and B-lymphocytes, promoting the development of specific immunity. Thus, macrophages and other antigen-presenting cells are the first cells that initiate the development of non-specific resistance and specific immunity [26].

In addition to macrophages, neutrophils play an important role in the realization of the innate immune mechanisms. These cells predominate in the early cellular infiltrate at the site of inflammation. They are in the blood and virtually absent in normal tissues. Neutrophils — are short-lived cells. On average, their life is 3–4 days. By sharing in circulation every 5 hours, they are «photographed» changes that occur during this period, as a kind of mirror of homeostasis. With the implementation of the innate immune response produced by a variety of factors, and they quickly emigrate from the blood and enter the site of infection. The focus of neutrophils are able to eliminate many pathogens by phagocytosis [5; 6; 18].

In recent years, it found that neutrophils are closely interact with virtually all the humoral (immunoglobulins, complement, coagulation, kallikrein system, fibrinolysis system) and cellular (macrophages, lymphocytes, platelets, basophils, eosinophils, endothelial cells, fibroblasts), blood and connective systems tissue involved in maintaining homeostasis [7; 17]. The cooperative processes neutrophil, on the one hand, acts as a target cell, and on the other — as a cell regulator. All regulatory neutrophil reaction is carried out using a variety of mediators secreted from the cell into the pericellular environment: leukotrienes, prostaglandins, enzymes, cytokines — neutrophilokine, metabolites respiratory burst [13].

According to modern concepts, there are several mechanisms for cooperation of neutrophils and macrophages, the first — by neutrophils neutrophilokine able to modify the functional activity of macrophages; the second — neutrophils stimulate the bactericidal activity of macrophages by resorption latest neutrophil degradation products; third — neutrophils partially or completely neutralize secreted by the bacteria into the extracellular space agents [27].

It is known that phagocytosis process has the sharp increase in the consumption of oxygen by phagocytic cells (neutrophils, monocytes) of peripheral blood. This phenomenon, figuratively name «respiratory, metabolic or respiratory burst», it is one of the effector mechanisms (possibly leading) bactericidal cells. The essence of this phenomenon is reduced to a pronounced activation of membrane

oxidases that catalyze electron transfer from NADPH to molecular oxygen oxidation of glucose in the hexose monophosphate shunt, overproduction of reactive oxygen species and oxygen peroxide. These active forms of oxygen and hydrogen peroxide are biological oxidants with high cytotoxic activity, causes the final result of phagocytosis — killing microbes [19; 30].

One of the promising areas of modern experimental Immunology is the study of the influence of various endogenous and exogenous peptides as well as their synthetic analogues on the functioning of immune cells, including neutrophils [6; 7; 37; 38]. Functional sensing neutrophils, which are the first line of defense of the body and determine the development of a specific immune response, to evaluate not only their effector resources and reserves immunity [2].

The results indicate that the level of activity of the cytochemical changes of intracellular components of neutrophil system reflects the depth and severity of the disease process and the status of non-specific reactivity in patients with various forms of diseases of infectious and non-infectious origin [3; 20; 22; 25; 34].

In our study, the task to study the relationship of humoral, cellular and innate immunity in response to antigens typhoid bacteria through vaccination, as well as to develop a sustainable approach in the diagnosis of disorders of the immune response both in vivo, and in vitro using modern tests. One of the important trends in the development of modern immunology and infectious disease is the desire of experts to consider a broad and diverse set of biological factors related to the main categories of specific and nonspecific immunity, as a single functional complex. This agrees well with the data showing the importance of non-specific metabolic stimulation of lymphocytes for a specific phase of the immune response [4; 10].

It is no coincidence that the indicator tests based on high polynuclears reactivity has been used in the clinic for a long time and on the information content is often superior to other hematologic parameters. Of the many methods proposed in recent years, stands out assessment of reactive changes in the system of oxidative (oxygen-dependent) metabolism, which is largely due implementation of the effector features of phagocytosis [8; 17; 21]. Cytochemical methods for studying leukocytes are now widely used in medical practice for the study of the functioning and the degree of activation of phagocytic immunity in the dynamics of infectious process [19; 20; 21; 23].

Test recovery nitro blue tetrazolium (NBT-test) — the most widely used to quantify the degree of activity of intracellular enzyme systems phagocytic human and animal cells [4; 10]. Many studies show the undoubted role of NBT-test indices, its connection with other types of diagnostics and clinic different nature of infectious and somatic diseases [20]. NBT-test significantly earlier than other research methods to predict adverse outcome not only diseases but also for immunization, which makes it possible to apply effective treatment measures or immune corrective therapy to achieve adequate immune response to vaccination [24; 33]. For example, in typhoid fever with the outcome of the recovery, the dynamics of the NBT test performance indicates the maximum increase in metabolic and phagocytic activity of neutrophils in the blood during the height of the clinical manifestations and decreased activity in the period of early convalescence disease. From the early convalescence period to late convalescence, the indicators tend to further decline, but slightly higher than with those of healthy individuals. For the acute course of Salmonella infection is characterized by a high degree of frequency and oscillation parameters of cellular immunity and FMAN. Maximum implementation of immune mechanisms observed in the early stages of infection, in the later stages is characterized by stable dynamics of changes in the direction of their normalization [4; 9].

According Shukurova D. T. dynamics FMAN values in NBT-test has specific characteristics depending on the period and the disease. When acute course of gastrointestinal form of salmonellosis in children is a sharp activation of neutrophils in 2.8 times higher than normal values in the midst of their disease and a significant reduction in the period of convalescence. Such dynamics FMAN is characteristic of infection with acute course, followed by the complete elimination of the pathogen and the favorable outcome of the disease. On the other hand, if protracted course of the degree of activation of neutrophils moderate during the height of the disease and during convalescence neutrophil activity continues to rise. In other words, this dynamic is evaluated as an indicator of a weak immune response and high-risk chronic process [34].

An analysis of the literature data, epidemiological and clinical practice suggest the protective role of antitoxins in the occurrence of diphtheria. Healthy persons vaccinated during the year prior to the survey have normal levels of both cellular and humoral immunity and nonspecific factors of protection with a high level of sensitization of lymphocytes to diphtheria toxoid. Comparison of lymphocyte stimulation index of diphtheria toxoid in the vaccine group and without a history of vaccination of healthy persons makes it possible to use this reaction to assess the effectiveness of vaccination [1].

Value NBT-test is that it allows revealing the presence of «metabolic explosion» that arises in connection with neutrophils in the process of phagocytosis. We know that the implementation process of phagocytosis by neutrophils is accompanied by a sharp increase in oxygen consumption, the intensification of the hexose monophosphate shunt and the formation of hydrogen peroxide in these cells. The principle of the method is that NBT is a redox indicator, which went on phagocytic cells, subjected to reduction to insoluble Formosan under the influence of NADN oxidases free nucleotides and NADF [17; 29; 33].

The process of restoring by neutrophils colorless dye nitro blue tetrazolium to insoluble Formosan dark blue consists of two interconnected stages. The first stage — HCT own phagocytosis, which depends on the shell and granulocytes increases when it is damaged by the microorganism and its products or stimulating factors contact with the cell surface. The second stage — under the influence of oxidizing NADPH oxidase activity, an enzyme localized in lysosomes of granulocytes NBT to Formosan restored. It is believed that this process correlates with the intracellular formation of hydrogen peroxide, which, according to modern concepts, together with iodine forms an important bactericidal neutrophil granulocytes system. Stimulation of neutrophils disinhibits $NADFN_2$-diaphorase and activates the hexose monophosphate shunt. The electrons are taken from the $NADFN_2$, convert molecular oxygen to superoxide anion, which owns a direct role in restoring the NST. In general, NBT-test reflects the degree of activation of the oxygen metabolism, the function of the hexose monophosphate shunt and related free radicals operating time [19].

However, a significant drawback cytochemical studies are the high cost of time for consideration of the results in blood smears reaction. One way to reduce the time and objectivity of the results is a recovery test neutrophils nitro blue tetrazolium (NBT-test), which is conducted quantitative spectrophotometric method. Modification of this method enables to determine FMAN in large numbers of samples, a significant reduction of time and the possibility of counting results of research as a digestive ability of neutrophils in vivo, or in vitro. The advantages of the developed method is the ability to obtain information about the intracellular metabolism of neutrophils objective spectrophotometric method using a standard ELISA plate and enzyme immunoassay analyzer [8; 11; 12; 35; 36].

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Dynamics of clinical and immunological parameters of pharmacotherapy of pulmonary hypertension in patients with CHD in the surgical treatment stages

Abstract: Patients with congenital heart disease complicated by pulmonary hypertension in preoperative treatment were administered phosphodiesterase-5 inhibitors (IPDE-5) and ACE inhibitors (ACEI)-captopril, which promote vasodilation of the pulmonary circulation, reduce lung resistance and the pressure in the pulmonary artery by 10–14 %. The use of combined therapy in the postoperative period, including inotropic agents- dopamine, dobutamin, epinephrine; phosphodiesterase-3 inhibitors (IPDE-3) — milrenone, enoximone, perfan; IPDE-5, nitrates; prostaglandins E1-vasoprostan, which reduce the development of severe cardiovascular failure in the short term, prevent pulmonary hypertension crises and further reduce residual pulmonary hypertension by another 8–10 %.

Thus, drugs of IFDE-5 can be recommended as the first line drug for the treatment of PH in the preoperative period and as a maintenance therapy in patients with inoperable IIIb-IV level of PH, improving the quality and extending the life span. Combined therapy with these drugs can be recommended in early postoperative period, as an effective therapy aimed at preventing pulmonary hypertensive crisis, treatment of cardiovascular failure, the further reduction of residual PH, and thus, improvement of patients' condition in the late postoperative period.

On 52 patients between the ages of 3 to 14 with congenital heart failure, complicated pulmonary hypertension on 3rd degree are learned dynamic of cellular immunity on surgical treatment depend on different pharmacotherapy. Treatment was consist of traditional therapy in patient who have congenital heart failure with pulmonary hypertension inhibitors of phosphodiesterase-5 (iFDE-5) (Viagra, Pfizer) and inhibitors AFP (iAFP) shows with time length increasing tendency their favorable impact on character and degree of severity in patient with secondary immunodeficiency.

Keywords: congenital heart disease, pulmonary hypertension, cellular immunity, secondary immunodeficiency, pulmonary hypertensive crisis, pulmonary circulation, inhibitors phosphodiesterase-5 (iFDE).

More than 50 % of congenital heart disease is accompanied by fluid overload, pulmonary circulation (PC) with the formation of pulmonary hypertension (PH), which is based on a combination of marked structural abnormalities associated with a wide range of hemodynamic disorders [1; 10; 12]. An important problem of cardiac surgery remains residual pulmonary hypertension (PH) in 15 % of cases, against which in the early postoperative period may develop heart failure and severe as a consequence of it, the occurrence of pulmonary hypertensive crises (PHC). Mortality in PHC is 18–55 % [3; 12]. Pulmonary hypertension, causing the development of various by hypoxia severity and hypoxemia, the destabilization of metabolic processes, contributes to the imbalance of almost all parts of the humoral and cellular immunity and development immunodeficiency Immunedeficiency leads to increased susceptibility of various infections, propensity to development of multiple organ lesions, allergic and autoimmune processes, high the risk of complications in cardiac surgery. Many comorbidities in children with CHD, and purulent-septic complications after cardiac

surgery indicate the presence of the original immune deficiency and worsening immune status after surgery [11].

In recent years, intensively studied various options for combination therapy schemes LH and PHC, algorithms on a combination and dosage of drugs that reduce the PH in the preoperative period, and acting on the residual PH in the postoperative period [6; 9; 16; 17]. With this in mind the interest of cardiologists produce enzymes of the family of phosphodiesterases (PDEs) catalyze the hydrolysis of cyclic 3'5'-nucleoside adenosine monophosphate (cAMP) and 3'5'-guanosine monophosphate (cGMP). Currently, the treatment of foreign clinics LH is used in children phosphodiesterase-5 inhibitor (PDEI-5-sildenafil, Pfizer). Sildenafil — a selective inhibitor of cGMP-dependent phosphodiesterase (type 5), preventing the degradation of cGMP increases levels of endogenous nitric oxide, which is a potent vasodilator, selectively acting on the PC vessels [6; 9; 14; 16; 17]. A large number of studies and is dedicated to the combination of different inotropic agents in the treatment of post-operative complications. Besides catecholamines (dopamine,

dobutamine, epinephrine, norepinephrine) currently used nonkateholamine drugs, which are another group of inotropic agents relating to inhibitors of the phosphodiesterase-3 (3-PDEI) [4; 5; 8; 13; 15]. However, information on the nature of the immune status at the CHD are few and contradictory, and the immune system in patients, depending on the drug therapy on surgical treatment stages are often not examined, and, consequently, does not affect the tactics of surgical correction and the introduction of the patients in the early and later postoperatively. Cardiac surgery has a complex and multifaceted impact on the immune system, which can be characterized as an activation, and how suppressive, since the operation of different influences functioning immune cells, resulting in a complex of these changes can be summarized as immune dysregulation. In this connection, the study of the dynamics of immunological processes in CHD patients with PH body will allow to prepare them for the complex surgery and prevent possible complications in the postoperative period.

The purpose of research: comparison the results of application of immune preparations in combination with 5-PDEI (sildenafil) and ACE inhibitors, as well as the study of the dynamics of cellular immunity in the complex treatment of PH in patients with CHD in the surgical treatment stages.

Materials and methods of studies: The study included patients department of surgery of congenital heart disease RSCS named by academic V. Vahidov for the period 2007–2014 years. There were 965 patients with CHD characterized by arterio-venous shunt. Of these, PH-II–IV st. — 198 patients. All patients were examined by the standard technique. Patients with high PH performed catheterization of heart cavities and the sample with the inhalation of 100 % oxygen with X-ray. According to Fick's method of calculating the indicators that assess the state of the vessels of the pulmonary circulation (Qp/Qs, pulmonary resistance).

The studies were conducted for admission to the start of treatment, before surgery, after surgery and before discharge (at least 3–4 times). The obtained data were statistically processed using the program Statistica 6.0 for Windows. Quantitative indicators are presented in the form of Me (Q25 % – Q75 %), where Me — median value of the index, and (Q25 % – Q75 %) — interquartile spread. Validation of the differences produced by using nonparametric tests, since the distribution of patients by age and body mass different from normal. Differences were considered significant at p > 0.05.

In comparative perspective, patients divided into 2 groups.

Group A, n = 82. By the time of receipt of the mean age was 23.8 ± 22.6 (1–46 years), females — 47 (57.3 %), male — 35 (42.7 %). Ratio of 1.34: 1. All examined patients depending on the diagnosis and the degree of PH were divided into 3 groups. ASD: n = 23 (28 %); VSD: n = 39 (47.6 %); PDA: n = 20 (24.4 %).

All patients in group A preoperative received traditional therapy within 14–20 days (cardiac glycosides, potassium supplements, diuretics, restorative therapy if indicated). At baseline, patients in this group SBP in PA was 87.5 ± 15.2 mm. Hg. Art., the rate of Qp/Qs — 1.3 ± 0.3.

Group B, n = 116 patients. By the time of receipt of the mean age was 25.6 ± 23.1 (2–48 years). female, 76 persons (65.5 %), male — 40 (34.5 %). Ratio 1.9: 1. All examined patients depending on the diagnosis and the degree of PH were divided into 3 groups. ASD: n = 33 (28.4 %); VSD: n = 62 (53.5 %); PDA: n = 21 (18.1 %).

All patients in the group B in the preoperative period (14–20 days) are connected to conventional therapy: inhibitors fosfodiesterazy-5 (PDEI-5) — 2.5–3 mg/kg/day in 3 divided doses depending on the PH and ACE inhibitors (ACEI) (captopril)

12.5–25 mg/day in 2 divided doses. Rationale: inhibitors of phosphodiesterase-5 included in the scheme of conventional therapy in order to prevent the degradation of cGMP, increasing the level of the powerful endogenous vasodilator — nitric oxide selectively acting on the vessels of the pulmonary circulation (PC), an ACE inhibitor (captopril) in order — vazodilating effect (venular, arteriolar and capillary), increasing the intensity of capillary blood flow, reducing the aggregation of blood cells, increase in end-diastolic volume (EDV), stroke volume (SV), reducing the total peripheral resistance (OPS), which helps to reduce hypertension ICC.

In order to study the dynamics of cellular immunity, we examined 52 patients with a child aged 3 to 14 years of age with CHD-VSD — 43 (82.7 %) and CAP — 9 (17.3 %) with PH IIIa degree.

All patients according to preoperative preparation were divided into 2 groups: group 1 (24 patients aged 3 to 14 years) — the comparison group in the preoperative period of 10–14 days received traditional therapy. 2 group (28 patients aged 3 to 14 years) — 2-I group in the preoperative period to conventional therapy added: fosfodiesterazy-5 inhibitors (5-PDEI — Viagra, Pfizer) 2.5–3 mg/kg/day. 3 receiving ACE inhibitors (ACEI) 6–12.5 mg. 3 times a day. All the results were compared with a control group — an indicator of healthy children by age and gender comparable to treatment groups (n = 22).

All patients on admission to hospital, after the preoperative preparation, after 10–14 days and 3 months after surgery with general clinical tests, and special clinical studies were carried out immunological studies, including definition of the content of cellular immunity in peripheral blood — CD3+, CD4+, CD8+ and CD20+ — lymphocytes using monoclonal antibodies, production of Immunology Research Institute of the Ministry of Health of the Russian Federation (Moscow, company "Sorbent") method Garib F. Y. et al., for a more complete and objective evaluation of cellular immunity calculated value of the immunoregulatory index (IRI = CD4+/CD8+).

Results and their discussion

In group A After the treatment, not recorded significant reduction in systolic blood pressure (SBP) in the pulmonary artery (PA) and was 86,4 ± 14,8 mm Hg, rate Qp/Qs 1.4 ± 0.2.

Central hemodynamics in these patients did not change significantly (Table 1).

Table 1. – The results of preoperative treatment of patients in group A

Indicators	Initially	Without receiving PDEI-5
Heart rate, beats per minute	121 ± 20	122 ± 22
SBP, mm. Hg.	102 ± 8	100 ± 7
DBP, mm. Hg.	66 ± 5	67 ± 5
SatO2, %	87.4 ± 6.2	88.3 ± 7.1
Qp/Qs	1.3 ± 0.3	1.4 ± 0.2
SBP in PA mm. Hg.	91 ± 6	92 ± 5

Note: Results of operations in group A were analyzed in 74 patients.

Postoperatively, the patients of group A was conducted conventional therapy. In group A favorable during the early postoperative period was observed in 56 (76 %) patients, 18 (24 %) had a variety of complications with fatal outcome in 10 (13 %) cases. In group A in the early postoperative period in 10 patients having 16 critical complications, leading to death. Among the causes of mortality pulmonary hypertensive crisis was observed in 6 (8.1 %) patients.

Pulmonary hypertensive crisis (PHC) — a complication that is characterized by paroxysmal sharp increase in pulmonary arteriolar resistance, preventing blood flow in the left heart and accompanied by a sharp increase in pressure in the PA to the level of the

system. Sharp decrease of pulmonary blood flow in conjunction with a decrease in preload of the left ventricle leads to a decrease in cardiac output and coronary perfusion, leading to death. When PHC in 6 (8.1 %) patients experienced: increased pressure in the PA (PPA ≥ 70), system pressure drop, the rise of the central venous pressure above 10 mm. Hg., SraO2 fall below 89 %, a pH below 7, 35, PaCO2 above 35, PaO 2 less than 100, pvO2 below 28, the decline Murray index (PaO2/FiO2 ≤ 2), low cardiac output syndrome, tachycardia, increased airway pressure.

In 15 % of patients had residual pulmonary hypertension in the range of 50 to 60 mm. Hg. (Table 2).

Table 2. –Dynamic parameters depending on the stage of treatment in group A

Indicators	Before surgery	After surgery	Before writing out
Heart rate, beats per min.	115 ± 25	90 ± 15	88 ± 14
SBP, mm. Hg.	110 ± 15	105 ± 9	110 ± 8
DBP, mm. Hg.	62 ± 11	70 ± 9	70 ± 8
SatO2, %	86.0 ± 6.4	95.0 ± 4.2	96.0 ± 3.2
Qp/Qs	1.3 ± 0.3	3.3 ± 0.7	3.4 ± 0.8
SBP in PA, mm. Hg.	88 ± 8	64 ± 5	58 ± 3

In the group B. In conducting group analysis B found that all patients at baseline SBP was from 84 to 102 mm Hg. Art. DBP of 52 to 69 mm. Hg., and after receiving PDEI-5 SBP ranged from 85 to 108 mm. Hg., DBP from 50 to 78 mm. Hg. It shows a lack of effect of the drug on the blood vessels of the systemic circulation, as evidenced by stable indicators of systemic blood pressure and heart rate after administration of 5-PDEI. Combination therapy 5-PDEI with ACE inhibitor drugs let to reduce peripheral vascular resistance, and thus prevent the symptoms that can occur with an increase in shunt across the defect walls (raising blood pressure, tachycardia) (Table 3).

Patients in the group SBP in PA was 65–96 mm. Hg., the rate Qp/Qs 1.0–2.9; after taking PDEI-5 was registered SBP in PA 44–95 mm. Hg. Art. and Qp/Qs 1.0–5.0 (Table 3).

Table 3. – Indicators of hemodynamics in patients group B in the dynamics of complex preoperative treatment PDEI-5 and ACE inhibitors

Indicators	Initially	After treatment PDEI-5 + ACEI
Heart rate, beats per minute	120 ± 22	122 ± 20
SBP mm Hg.	93 ± 9	94 ± 10
DBP, mm Hg.	58 ± 6	57 ± 7
SatO2, %	88.6 ± 5.3	97.0 ± 1.2
Qp/Qs	1.6 ± 0.4	3.6 ± 1.1
SBP in PA mm Hg.	89 ± 14	76 ± 13

In group B, the results of operations are analyzed in 80 patients. In this group of deaths occurred in 3 (4 %) patients, 77 (96 %) patients — a favorable during the early postoperative period.

In this group, in the early postoperative period, 3 patients having 5 critical complications, leading to death. Prevalent heart failure, in any case, was not observed pulmonary hypertensive crisis.

All patients in the group receiving routine in the pre- and postoperative period PDEI-5 in combination with ACE inhibitors (total duration of treatment — 24.9 ± 4.6 days) in an average dose of 2.6 ± 0.49 mg/kg/day. Postoperatively, were connected to a conventional therapy PDEI-3 (mean dose milrinone — 0.4 ± 0.62 ug/kg/min, the duration of treatment — 42.5 ± 24.1 hours); Prostaglandin E1 (vazaprostan in doze — 1.76 ± 0.88 ng/kg/min, duration of therapy 40.8 ± 20.4 hours). Patients also received support cardiotonic: dopamine 6.2 ± 3.6 g/kg/min (67.5 ± 38.7 hours). At ineffectiveness of dopamine (control echocardiography) connected dobutamine — 4.4 ± 2.2 g/kg/min, duration of therapy — 38.6 ± 19.3 hours. Applies the semi prolonged ventilation (PIVL) with controlled pressure (the PCV), the ratio of inhalation/exhalation 1:2, Pinsp — 22–24 sm. vod. st., FiO2 — 60 %, PEEP — 2–3 mm. rt. st. PIVL efficiency criteria were: PaO2, SaO2, PaO2/the FiO2 (index Murray), pO2 (Ah) ie, pO2 (a/A) f. The effectiveness of the complex pharmacotherapy above drugs are presented in Table 4.

Table 4. – Dynamic parameters depending on the stage of treatment in the group B

Indicators	Before surgery	After surgery	Before writing out
Heart rate, beats per min.	124 ± 20	90 ± 15	88 ± 15
SBP, mm. Hg.	96 ± 10	110 ± 10	115 ± 12
DBP, mm. Hg.	57 ± 7	68 ± 12	69 ± 11
SatO2, %	94.2 ± 1.2	97.0 ± 3.0	98.8 ± 1.2
Qp/Qs	3.6 ± 1.0	3.6 ± 1.1	3.8 ± 1.2
SBP in PA, mm. Hg.	76 ± 13	55 ± 11	45 ± 10

Analysis of the research performance of cellular immunity of patients on admission showed significantly lower values we all studied immunocompetent cells. Thus, the level of T-lymphocytes (CD3+) (1.2 times) was significantly lower than control values at a fairly significant reductions indicators B-lymphocytes (CD20+), subpopulations of T-lymphocytes — T-helpers/inducers (CD4+) and T cytotoxic cells (CD8+) (Table 1).

At the same significant decrease subpopulations of T lymphocytes observed marked reduction in the immunoregulatory index (IRI = CD4+/CD8+ lymphocytes), which is connected, apparently, with a slightly larger decrease in T helper/inducer (1.4 times) than the T-cytotoxic cells (1.3 times), indicating that the suppressive nature of the condition of the immune response (Table 7).

Table 5. – Cellular immunity indicators CHD patients with PH at admission

Groups/indicators	CD3+ (%)	CD4+ (%)	CD8+ (%)	IRI	CD20+ (%)
Control (n = 22)	51.36 ± 0.99	30.71 ± 0.85	22.0 ± 0.35	1.40 ± 0.38	18.36 ± 0.57
On admission (n = 52)	42.68 ± 0.58*	21.32 ± 0.56*	17.11 ± 0.33*	1.25 ± 0.02*	14.96 ± 0.38*

*Note: * — P < 0.05 — reliability indices in comparison with the control.*

The results of the original value of of cellular immunity of patients surveyed indicate the presence of pronounced secondary immunodeficiency.

Comparative analysis of cellular immunity of patients in the control group (group 1) after traditional preoperative preparation shows a slight increase in all studied parameters of cellular immunity with respect to values at admission, but a significant increase is noted only indicators of regulatory subpopulations of T-lymphocytes — T-helper cells (CD4+) and T-suppressors (CD8+). Moreover, the multiplicity of the increase of their identical (1.04 times), in this connection, the immunoregulatory index virtually unchanged (1.24 ± 0.02) and the immune response retains the suppressor character (Table 6).

Table 6. – The dynamics of immunological parameters in CHD patients with PH control group (without taking PDEI-5)

Indicators	Control n = 22	On admission n = 52	Before surgery n = 24	After surgery on 12–14 day	After 3 months
CD3+	51.36 ± 0.99	42.68 ± 0.58*	42.58 ± 0.38*	43.13 ± 0.31*	46.35 ± 0.54♦
CD4+	30.71 ± 0.85	21.32 ± 0.56*	22.25 ± 0.32*▪	22.67 ± 0.31*▪	23.65 ± 0.27♦
CD8+	22.0 ± 0.35	17.11 ± 0.33*	17.96 ± 0.25*▪	17.83 ± 0.31*	18.82 ± 0.32♦
IRI	1.40 ± 0.38	1.25 ± 0.02*	1.24 ± 0.02*	1.27 ± 0.02*	1.26 ± 0.01♦
CD20+	18.36 ± 0.57	14.96 ± 0.38*	14.71 ± 0.20*	15.08 ± 0.17*	16.35 ± 0.35♦

*Note: further on in this document: * — $P < 0.05$ — reliability indices in comparison with the control; ▪ — $P < 0.05$ — the accuracy of the indicators in comparison with indicators of admission; • — $P < 0.05$ — the accuracy of the indicators in comparison with indicators before surgery; ♦ — $P < 0.05$ — the accuracy of the indicators in comparison with indicators of research and monitoring*

Analysis of the data of immunological examination of patients 12–14 days after the operation shows a slight rise in cellular immunity, while remaining significantly lower than the control values. At the expense of some increase in T-helper cells and a slight decrease of T-suppressor on the previous studies, a slight increase in IRI that indicates a positive trend in the course of the disease (Table 6).

A similar, but more pronounced trend is observed in the dynamics of immunological parameters at 3 months after surgery. Thus, there is a significant increase in the level of T-lymphocytes (CD3+) from previous studies (at admission, after preoperative preparation and 14 days after surgery), B-lymphocytes (CD20+), subpopulations of T-lymphocytes — T.
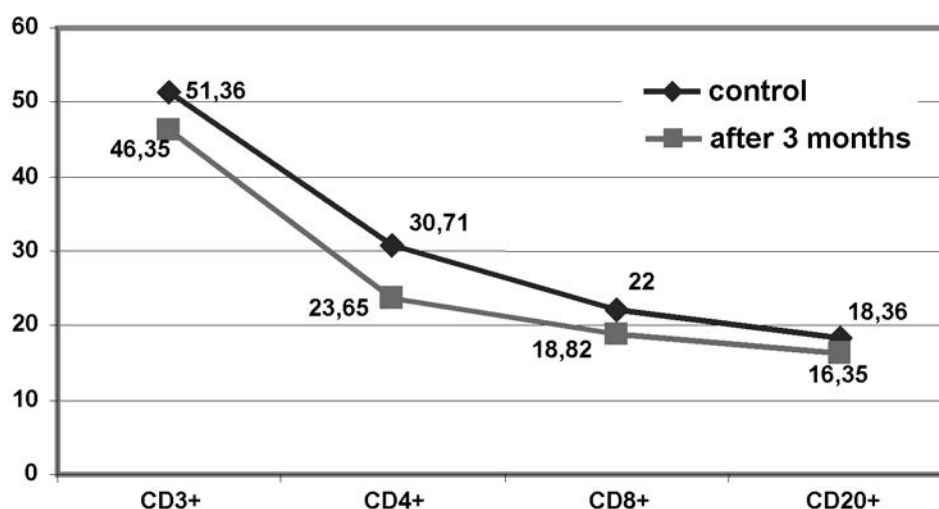
Fig. 1. The dynamics of cellular immunity in patients with conventional preoperative preparation of 3 months after the operation (in %)

Analysis of increasing multiplicity of all our studies of cellular immunity cells showed the same level of relative values on admission (1.1 times). It should be noted that in this case, the restoration and normalization of the immunological status of patients of values does not occur, since the analysis of the results shows a highly significant difference to their performance in healthy children (Tab. 6, Fig. 1).

Studying the dynamics of cellular immunity in CHD patients with PH IIIa st. in the 2nd group (2nd group — 28 patients), which in the preoperative period to conventional therapy added: PDEI-5 and ACE inhibitors has shown that orientation changes are identical to those of group 1 patients studied, but also the severity of the dynamics of the studied parameters It differs only slightly among themselves, having basically the same fold increase relative to the initial values of the indicators. Thus, if the level of T-lymphocytes (CD3+) 1 group examined after traditional

preoperative preparation is 42.58 ± 0.38 %, then in the 2nd group — 43.82 ± 0.59 %, 1.0 times higher than the corresponding figures in admission (42.68 ± 0.58 %, respectively, P > 0.05). Also, only an order of magnitude higher than the level of B lymphocytes (CD20+), identical in 1.0 times lower than the values on admission, subpopulations of T-lymphocytes — T-helpers/inducers (CD4+) and T-cytotoxic cells (CD8+) (Tab. 7).

However, it should be noted that in group 2 fold increase of T-helpers/inducers (CD4+) subpopulations of T-lymphocytes relatively higher degree of increase of the indicator in group 1 (1.05 and 1.8 times, respectively), and that it is important to intensity increasing up for enhancing the cytotoxic T-cells (CD8+) in the group, resulting in an increase of the immunoregulatory index IRI regarding admission that, in turn, is a favorable sign in dynamics immunological studies (Table 7).

Table 7. – The dynamics of immunological parameters in CHD patients with PH receiving PDEI-5

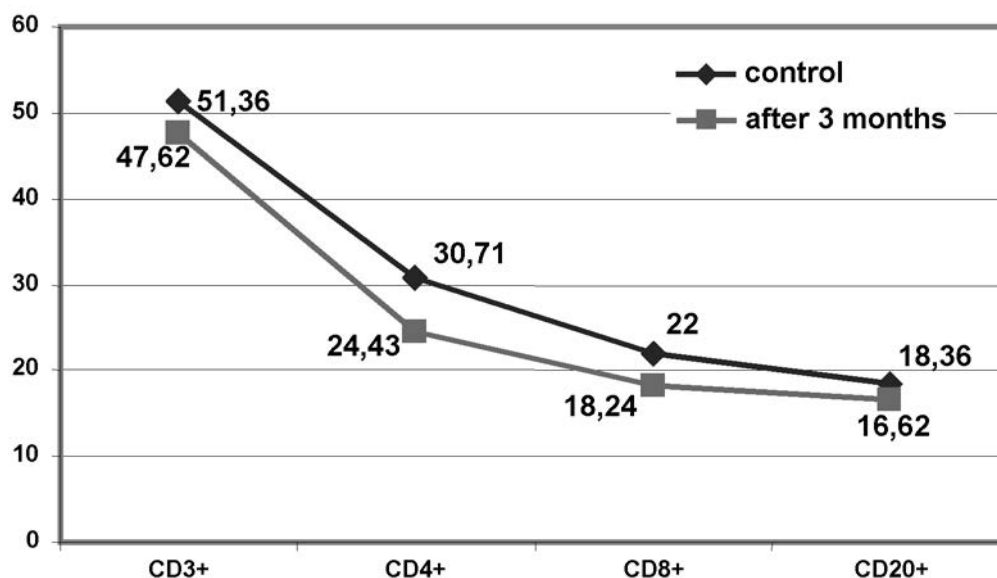| Indicators	Control n = 22	On admission n = 52	Before surgery n = 24	After surgery on 12–14 day	After 3 months
CD3+	51.36 ± 0.99	42.50 ± 0.45*	43.82 ± 0.59*	44.04 ± 0.53*	47.62 ± 0.58♦
CD4+	30.71 ± 0.85	21.23 ± 0.34*	23.07 ± 0.30*▪	23.39 ± 0.40*▪	24.43 ± 0.41♦
CD8+	22.0 ± 0.35	17.17 ± 0.22*	18.04 ± 0.27*▪	18.07 ± 0.29*	18.24 ± 0.28♦
IRI	1.40 ± 0.38	1.24 ± 0.01*	1.29 ± 0.02*	1.30 ± 0.01*	1.34 ± 0.02♦
CD20+	18.36 ± 0.57	14.67 ± 0.24*	15.75 ± 0.20*	16.07 ± 0.33*	16.62 ± 0.38♦

Fig. 2. The dynamics of cellular immunity of patients in group 2 while taking PDEI-5 at 3 months after surgery (in %)

This is a small, but positive dynamics observed in the 2nd group of studied patients and in 12–14 days and 3 months after surgery (Table 7). As in group 1 patients studied all the indicators of cellular immunity are significantly lower with respect to indicators of healthy individuals, i.e, eliminate the cause of the disease is not enough to restore the disturbed balance of the immune system in such a short period of time (Fig. 2).

Thus, the analysis of the dynamics of cellular immunity (T-lymphocytes (CD3+); B lymphocytes (CD20+); subpopulations of T lymphocytes — T-helpers/inducers (CD4+) and T-cytotoxic cells (CD8+) CHD patients with PH 2 – the second group, which in the preoperative period to conventional therapy added: PDEI-5 and ACE inhibitors, shows no significant effect on their nature and severity of secondary immunodeficiency may have to restore the disturbed balance of the immune system requires a longer application PDEI-5.

Conclusions:

1. Treatment PDEI-5 (sildenafil) in combination with an ACE inhibitor (captopril) preoperatively revealed a decrease in pulmonary resistance and SBP in PA by an average of 10–14 % in patients of group B compared with patients of group A.

2. The main complications after radical correction of CHD are the residual pulmonary hypertension, heart failure and pulmonary — hypertensive crises.

3. Risk factors for the development of PHC and adverse outcome in the early postoperative period is the presence of residual pulmonary hypertension (PAP/BP > 0.5), decrease in the index Murray (pa02/Fi02) of less than 2, increasing the average values of CVP greater than 10 mm. Hg.

4. Use of 5-PDEI (sildenafil) and an ACE inhibitor in combination with infusional PDEI-3 (milrenon, enoximone 0.3–1.0 mg/kg/min), with inotropic drugs (dopamine, dobutamine 5–15 mg/kg/min) and prostaglandin E1 (vazaprostan 1–6 ng/kg/min), in the development of acute left and/or right ventricular failure with residual pulmonary hypertension is accompanied by a decrease in average CVP values, heart rate, increased blood pressure and the rate of diuresis, Murray index, decreased pulmonary artery pressure and leads to the stabilization of the patients.

5. Keeping patients in the early postoperative period in pressure modes with limited peak inspiratory pressure, decrease PEEP to 2–3 mm. Hg. and increasing FiO2 > 60 % more efficient in relation to the correction of hypoxemia in heart failure and prevention of pulmonary hypertensive crises and reduce the duration of PIVL after radical correction of CHD complicated with high PH.

6. Inclusion in the traditional therapy of CHD patients with PH inhibitors fosfodiesterazy-5 (PDEI-5) (Viagra, Pfizer) and ACE inhibitors (ACEI) shows a rising trend over time favorable impact of them on the nature and severity of existing secondary immunodeficiency patients.

7. Based on the above, PDEI-5 (sildenafil) can be recommended as the primary drug in the treatment of PH in the preoperative period, in the treatment of post-operative period in combination with the above drugs, and as maintenance therapy in patients with congenital heart disease complicated by high PH not be surgical treatment. Thus, expanding the indications for surgical treatment, there is a more favorable trend in the early postoperative period, reduces mortality, improves condition and prolongs the life of patients who are not subject to surgical intervention. The objectivity of the information obtained was confirmed by repeated echocardiography and catheterization of cardiac cavities.

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Endoprosthesis of the knee joint without use of metallic modular blocks in the elderly patients with axial deformations

Abstract: The purpose of this research was to evaluate the results of endoprosthesis of the knee joint without use of modular metal blocks in the elderly patients. It was determined that in the endoprosthesis of the knee joint with defects of the tibial plateau condyles with use of metal modular blocks the positive results may be achieved after endoprosthesis in minor and middle defects of the tibia. In the elderly patients (75–84 years) the cement replacement was preferable, and at the more younger age (61–74 years) the bone autoplasty with additional osteotropic therapy is more rational.

Keywords: knee joint, endoprosthesis, tibial condyle, scales, elderly patients.

Introduction

Stable pain in the knee joint with presence of accompanied diseases at the aged age is the indication to the endoprosthesis, ignoring the principles of the further revision interventions [4; 8].

The use of modular metallic blocks resulted in significant improvement of the knee joint endoprosthesis in the axial deformations. However, use of these constructions in the patients with accompanying osteoporotic bone tissue leads to the early instability of the tibial component. The efforts of the surgeons to save the osseous mass for further revision intervention do not always prove their value, and, on the contrary, shorten the time for early intervention in the elderly patients with this pathology [2; 5; 9; 12; 13; 14; 16; 17; 19].

Introduction of the principle of resection of the tibial plateau along "the bottom of defect" with insertion of the polyethylene inset of the more size at this age resulted in significant improvement of the outcomes of endoprosthesis of the knee joint in this category of patients. At large defects the use of bone plasty taking into account the bone mineral density showed also satisfactory clinical-functional outcomes of the endoprosthesis of the knee joint [1; 5; 8; 10; 20].

The prior type of fixation in the endoprosthesis of the knee joint is cement, which was required for biomechanics of the joint when mutual pulling out of the joint components occurs under the effect of force of the antagonistic muscles [1; 13; 15].

In the elderly age the bone mineral density reduces and use of the endoprosthesis with modular metal blocks induced doubts of fixing stability of the endoprosthesis components.

Purpose of this research is the assessment of the results of endoprosthesis of the knee joint without use of modular metal blocks in the elderly patients with axial deformation of the knee joint.

Materials and methods

In the department of adult orthopedics of the Scientific Research Institute of Traumatology and Orthopedics of the Ministry of Health of the Republic of Uzbekistan in 45 patients (29 women, 16 men; of the minimal age 61 years old, maximal age 84 years old, and average age 67 years old) with axial deformations and defects of the condyles of tibia there were performed endoprosthesis of a knee joint: with autobone plasty in 15, and with cement filling in 30 patients.

The operative intervention was performed by the standard methods. Parapatellar approach was used for dissection of the joint, the pathological changed tissues were removed. After proximal resection of the tibial plateau in determination of the large defect the autograft was created from the intercondylar zone for autograft plasty during figured osteotomy of the distal femur, which after giving the form appropriate to the bed of defect was implanted and fixed with the screw then the endoprosthesis of the joint with cement fixation was carried out. In cases of noted insignificant defect of the condyle after osteotomy of tibial plateau there was made bonesaw-line of the tibial plateau on the bottom of defect. If the defect of condyle still remained, the defect was filling with cement during implantation of the total endoprosthesis of the knee joint after preliminary formation of the anchor holes, in some cases there was performed reinforcement with the screw, then cementation and implantation of the total endoprosthesis was made.

All patient were implanted the total endoprosthesis of the knee joint of firm ("DePuy" and "Zimmer", manufacture of USA) with the posterior stabilizer.

All patients before operative intervention were carried out clinical-roentgenological, laboratory and instrumental methods of research (densitometry, dopplerography).

The clinical examination of the patients was performed by the following estimated scales for a knee joint: Bristol Knee Score [11], Lysholm Knee Scoring Scale [18], Knee-Rating Scale [6; 7]. At performance of researches we used principles of evidence-based medicine.

Results and discussion. The clinical examinations of the patients in 6 months after operation were performed on the basis of the above-stated estimated scales for a knee joint depending on a kind of replacement of defect.

In a scale Bristol Knee Score 4 categories of parameters — function, pain, amplitude of movements, deformation are estimated. Performance of estimation on this scale is very simple and convenient. At autograft plasty in 9 patients the good outcome (36–40 numbers) was marked, the satisfactory outcome (30–35 numbers) was received in 6 patients. At cement replacement the good outcome on this scale was noted in 19 patients, the satisfactory result was found in 11 patients. The unsatisfactory results were not marked (tab. 1).

At use of Lysholm Knee Scoring Scale 8 categories of parameters — lameness, additional means, blocking of a joint, instability of a joint, pain, slight swelling, walking upstairs, squatting position are estimated.

The researches have shown, that at autografting plasty in 2 patients there was noted excellent outcome (86–100 numbers), in 7 good outcome (71–85 numbers), the satisfactory outcome (30–35 numbers) was received in 5 patients (tab. 2). In the cement plasty excellent result was received in 1 patient good result in 16, satisfactory result in 13 patients, unsatisfactory results were not registered.

Use of Knee-Rating Scale means evaluation of a state of knee joint by 6 categories of parameters — pain, function of legs, amplitude of movements, muscular force, restriction of flexion, instability in a joint.

At autografting plasty in 1patient excellent result was received (85–100 numbers) by this estimated scale, in 8 patients — good results (70–84 numbers), and in 15 patients satisfactory outcome (60–69 numbers). The unsatisfactory results were not noted (tab. 3).

Table 1. – Estimation of endoprosthesis outcome in the patients at the patients of elderly age on a scale of Bristol Knee Score

Method of endoprosthesis plasty of the knee joint	Excellent 41–50 numbers	Good 36–40 numbers	Satisfactory 30–35 numbers	Unsatisfactory < 30 numbers
Osseous	–	9	6	–
Cement	–	19	11	–

Table 2. – Estimation of endoprosthesis outcome in the patients of elderly age on Lysholm Knee Scoring Scale

Method of endoprosthesis plasty of the knee joint	Excellent 86–100 numbers	Good 71–85 numbers	Satisfactory 61–70 numbers	Unsatisfactory < 60 numbers
Osseous	2	7	6	–
Cement	1	16	13	–

Table 3. – Estimation of endoprosthesis outcome in the patients of elderly age on Knee-Rating Scale

Method of endoprosthesis plasty of the knee joint	Excellent 85–100 numbers	Good 70–84 numbers	Satisfactory 60–69 numbers	Unsatisfactory < 60 numbers
Osseous	1	8	6	–
Cement	1	14	15	–

At observation of all patients in 1 year after operation the clinical results were evaluated as excellent in 1 patient with bone plasty and in 1 with patient with cement plasty, in the rest cases the good and satisfactory outcomes were marked.

The comparative parameters show, that in relation to informativity and reliability, the values of knee joint after endoprosthesis with regard to simplicity of use, availability and clinical efficiency, obtained by these scales, practically did not differ among themselves. Even by the results received between them the reliable differences did not observe, though some stable results at the same time were received more often while using Bristol Knee Score.

Besides we establish some insignificant features of advantage of the Bristol Knee Score in relation to other scales: firstly, for estimation of a knee joint of the patient not enough time is spent; secondly, the partial load mode for the patients is chosen at the estimation; thirdly, the subtracted numbers are absent, which complicate account; in fourth, the estimated tests are very simple, are accessible, does not require high qualification and special preparation of the doctor.

In this connection, at the estimation of a knee joint after endoprosthesis we recommend to use all estimated scales, described by us, but preference we give to scale Bristol Knee Score.

The long-term results show, that expressed muscle imbalance was available for 1 patient, which was shown by discomfort in a joint. After physiotherapeutic procedures. The complex of physical exercises for strengthening and relaxation of the muscle groups this feeling has decreased.

On the roentgenogram there was defined osteosclerosis around cement mantle of endoprostesis. On a place of osteoimpactionn

there was present union of the autobone with plateau of the tibia in the patients of younger age (61–68 years). In a zone of osteosclerosis there was observed the signs of lysis with displacement of femur component in anterior-posterior and lateral directions to 2.0 mm., of the tibial component in anterior-posterior also up to 2.0 mm., above a zone of cement mantle in the persons of the senior age category (70–84 years). These patients were carried out the course of osteotropic treatment, and then the sensations of discomfort have disappeared.

Densitometric parameters allowed identification of osteopenia in the peripheral segments of a skeleton, and dopplerographic investigations showed decrease in blood flow in the veins of the both ankle joints.

As illustrations we present cases of the successful total endoprosthesis of knee joint.

Patient of 84-year-old has admitted to the clinic with the complaints on pains in both knee joints more on the right side, deformation, damage of the support of the ankle joint. There was revealed bilateral gonarthrosis of the III degree, flexion contracture of the right knee joint, varus deformation. In 2014 there was performed total endoprosthesis of the right knee joint with implants for knee «DePuy», the defect internal condyle was eliminated by sawing of the tibial plateau on the bottom of defect with bone autografting plus screw fixation. The postoperative period was smooth, with wound primary adhesion. The patient was discharged from the clinic in 2 weeks after operation. At discharge there were no pains in the knee joint, the extremity axis is restored, contracture in the knee joint is eliminated, the flexion has increased up to 90°. At survey in 6 months later complaints was absent, the gait was independent (fig. 1).

Fig. 1. Roentgenograms of the right knee joint of the patient K. G. Before treatment (a, b) and after treatment (c, d)

The patient P. M., of 66-year-old, during 15 years suffer from rheumatoid arthritis, has admitted to he clinic with the complaints to sharp pains in both knee joints more on the left side, deformation, damage of the extremity support. There was diagnosed left-hand gonarthrosis of III degree with defect of internal condyle, varus deformation. In 2013 there was made total endoprosthesis of the left knee joint with implant of firm "DePuy" with replacement

of a zone of defect by cement with formation of anchor aperture (fig. 2). Postoperative period was smooth, with the wound of primary adhesion. The patient was discharged in 2 weeks after operation. At discharge the pains were absent in the knee, the axis of extremity was restored, flexion achieved 90°.

At survey in 6 months after the complaints were absent, gait was independent, osteolysis around the cement mantle was not found.
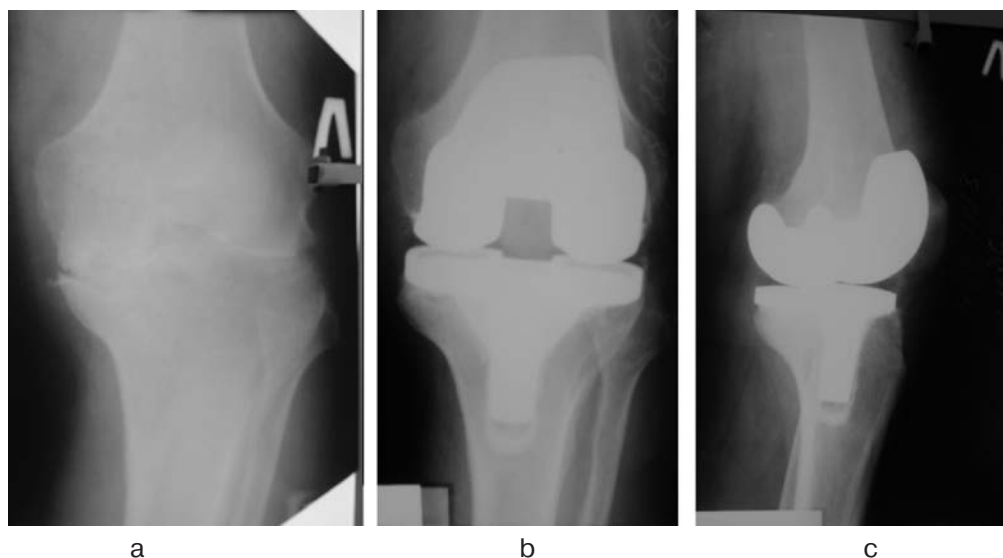

Fig. 2. Roentgenograms of the left knee joint of the patient P. M.
Before treatment (a) and after treatment (b, c)

Conclusions:

1. In elderly age in endoprosthesis of the knee joint with defects of tibial plateau condyles without application of metal modular blocks, the successive positive results may be achieved in miner and middle defects of the tibial condyles.

2. In the patients of elderly age (75–84 years) the cement replacement is more preferable, in younger age (61–74 years) the bone autoplasty with additional osteotropic therapy.

3. The cement replacement in minor and middle defective zones of condyles provides sufficient stable fixation of implant.

4. The bone autoplasty of the tibial plateau resulted in its union with tibial plateau, and in a zone of osteosclerosis there was found lysis of the bone tissue around cement mantle of the total endoprosthesis of the knee joint.

5. The comparative analysis of the clinical assessment of the results of the endoprosthesis of the knee joint showed that it is more preferable to use an estimated scale Bristol Knee Score.

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Clinico-endoscopic characteristic of gastropathy due to non-steroid anti-inflammatory drugs in the patients with ischemic heart disease

Abstract: The retrospective analysis of the history of the ischemic heart disease in the patients with gastropathy, induced by non-steroid anti-inflammatory drugs, has allowed revealing the high degree of correlation ($R2 = 0.95$) between the frequency of non-steroidal anti-inflammatory drug-gastropathies and duration of application of these drugs. The algorithm of treatment and prophylactic measures for non-steroid anti-inflammatory drug-gastropathies in patients with ischemic heart disease should include usage of proton pump inhibitors and nonabsorbable antacids. When detecting infection H.pylori it is necessary to conduct basic eradication therapy during 10 days.

Keywords: Non-steroid anti-inflammatory agents — gastropathies, antisecretory therapy, IHD, H. pylori infection.

Introduction

The algorithm of therapeutic-preventive measures of non-steroid anti-inflammatory drug-gastropathies in the patients with ischemic heart disease (IHD) provides application of the proton pump inhibitors and of non-absorbable antacids. At revealing of the infection H. pylori it is necessary to perform 10-day basis eradication therapy.

Ischemic heart disease (IHD) is characterized by developing and progressing disturbances of the homeostasis, that dictates necessity in use of persistent anti-aggregate therapy. The preparations made on the basis of acetylsalicylic acid (ASA) seem to be the "gold" standard for this purpose [1].

Representative researches showed that the use of ASA and non-steroid anti-inflammatory preparations (NSAID) induces statistically significant decrease in risk of development of myocardial infarction and stroke as well as lethal outcome in one third of patients with high risk of coronary artery occlusion [2]. However, despite of high efficiency, the application of ASA in 25% of cases was accompanied by development of adverse effects. The most significant of them are the gastropathies induced by NSAID [3]. Potentially the development of gastropathy threatens to any patient receiving ASA for a long time [4].

NSAID-gastropathy is a collective notion including ulcers and erosion of the mucosa of gastroduodenal zone (GDZM) and the special form of gastritis — "chemical", according to the Sydney classification [5].

NSAID have property to penetrate directly into the cells of mucosa in the gastric acid medium. Change of mucous-bicarbonate barrier and reversal diffusion of hydrogen ions result in "contact" damage of the superficial endothelium. The processes of oxidizing phosphorilation, developing as a result of blocking of mitochondrial epitheliocyte enzymatic systems promote to reduction of cell resistance to aggressive effect of the hydrochloric acid and pepsin, formation of necrobiotic processes, appearance of erosive-ulcerative processes, disturbance of the regeneration processes in the mucosa [6].

The risk factors of NSAID-gastropathy include gastroduodenal ulcer in the medical history of the patient; high doses of the NSAID; their combined receiving preparations of ASA, antiaggregates, steroids, anticoagulants; age above 65 years; smoking; presence of Helicobacter pylori infection; activity of the chronic gastritis in the anthral part according to the findings of the morphological investigation [7].

NSAID-gastropathies have a latent clinical course approximately in 50% of patients. Frequently, only bleedings can be a single sign of the erosive-ulcerative damages of the gastroduodenal mucosa. Only in a part of patients there is observed dyspepsia, pain and discomfort in the epigastral area. As a rule, only the gastroduodenal complications at the receiving of NSAIDS are manifested without previous dyspepsia [8].

The criteria of the diagnosis of NSAID-gastropathy in the patients with IHD [9] are as follows:

– Appearance, on the basis of NSAID usage, of acute, usually multiple gastroduodenal erosions and/or ulcers with predominant localization in the anthral site of stomach;
– absence of local inflammation and histological signs of gastritis;
– few symptoms or asymptomatic clinical picture;
– frequent manifestation of complications;
– ulcer tendency to healing at stopping of NSAID receiving.

The majority of patients with gastrointestinal risk factors, receiving NSAIDS or ASA for a short or long periods should receive prophylactically every day the antisecretory drugs of the group of proton pump inhibitors (PPI), that decreases dyspepsia and improves the quality of life of the patients [8].

Developing for a long time the asymptomatic NSAID-gastropathy is frequently complicated by gastroduodenal bleeding or ulcer perforation, that appears to be the cause of lethal outcome. In this connection the questions of early diagnosis and adequate therapy of NSAID-gastropathy in the patients with IHD seems to be very actual.

Purpose of the research was to study clinical and endoscopic events of gastropathies induced by receiving of non-steroid anti-inflammatory drugs in the patients with IHD.

Material and methods. Under supervision there were 121 patients with the various forms of IHD, receiving the common treatment in the Republican clinical hospital № 1 of the Ministry of Health of the Republic of Uzbekistan, during the period

from 2012 to 2014. The gastroduodenal pathology was related to usage of NSAIDS and ASA (cardiomagnil, thromboass, aspirin-cardio) and was found in 101 (83.5%) cases. The mean age of the patients accounted for 67.7 ± 3.5 years. Males were 78 (65.5%), females — 43 (34.5%).

The examination of the patients included assessment of the main disease, frequency and structure of NSAID-gastropathy and its complications, clinical (dyspeptic and pain) and objective (localization and intensity of the abdominal pain) gastroenterological symptoms, details of the medical history (duration of NSAIDS receiving, age, sex, "ulcerative anamnesis").

There were analyzed conclusions of the fibroesophagogastroduodenoscopy (FEGDS): character, intensity, localization of the inflammatory and erosive-ulcerative changes in the gastroduodenal mucosa. Endoscopic investigations were performed in patients with IHD according to the following indications: presence of gastroenterological symptoms; before performance of coronarography, operation of aorta-coronary bypass, stenting of the coronary arteries.

Results of research and their discussion

At the analysis of the complaints it was appeared, that the most often symptoms in the patients were heartburn in 18 (14.9%) and periodical weak abdominal pains — in 22 (18.2%) patients. Dyspeptic symptoms, nausea and vomiting were noted only in 6.5% and 3.9% of case, respectively. In the majority of patients (74.8%) with erosive-ulcerative lesions of the gastroduodenal mucosa the clinical symptoms of dyspepsia and abdominal pains were absent.

The signs of gastroduodenal bleeding — coffee-ground vomiting and tarry stool were noted in 7 (9.1%) patients

The erosive-ulcerative lesions of gastroduodenal mucosa were observed predominantly in the patients with acute or repeated myocardial infarction. In all the cases the performed conservative haemostatic therapy (quamatel 40 mg. in 200 ml. of isotonic solution of NaCl intravenously by drops in the system, etamzilat 40 mg. intravenously) allowed stopping of bleeding. The lethal outcome due to severe bleeding lost was not observed.

It the patients receiving NSAIDS or ASA there was performed search for gastroenterological risk factors. For this purpose the "ulcerative" anamnesis was studied and it was determined whether there was complication (bleeding, penetration or perforation). At absence of "ulcerative" anamnesis the other risk factors were evaluated.

Analysis of the risk factors showed that in the patients with IHD with NSAID-gastropathy mainly there were two factors prevailed, that is, age above 65 years (82.5%) and prolonged receiving of preparations ASA or NSAIDS (70%). The "ulcerative" anamnesis was revealed only in 6.5% of cases.

Detailed study of anamnesis data has allowed establishment that during increase in period of disease development and, consequently, duration in using NSAIDS or ASA, as preventive antiaggregate therapy, there was noted direct proportional dependence of the increase in frequency of gastropathy.

The basic mass consisted of the patients receiving NSAIDS and ASA preparations during the period from 10 till 15 years (26.0%) and more than 15 years (39.0%). The patients using these medicinal preparations about 1 year (3.9%) were least of all.

The analysis of nosological forms of IHD has shown, that the greatest specific weight was made by the patients with progressing stenocardia (49.4%) and acute myocardial infarction (26.0%). The patients with a repeated heart attack accounted for 13.0%, with the primary arisen stenocardia — 6.5%. The detailed elaboration of the data of anamnesis has allowed establishment, that the patients with primary arisen stenocardia were also prescribed

ASA preparations due to present arterial hypertension of various severity degree for some years.

The clinical picture at NSAID-induced gastropathies was characterized by disbalance between symptoms and endoscopic changes. So, in a number of the patients having pains or others dyspeptic disorders, at PEGDS there were revealed minimal changes in the gastroduodenal mucosa. On the contrary at presence of multiple erosion and ulcers the NSAID-gastropathies were progressing frequently without symptoms. At PEGDS in the patients with IHD there were revealed various changes in the gastroduodenal mucosa (table 1).

Table 1. – Endoscopic signs of the NSAID-gastropathy

N	Endoscopic changes	abs	%
1	Chronic superficial gastritis	68	56.2
2.	Duodenogastric reflux	28	23.2
3.	Acute gastric erosion	24	19.9
4.	Acute gastric ulcers	22	18.2
5.	Acute duodenal erosion	19	5.7
6.	Acute duodenal ulcers	15	12.4
7.	Chronic gastric erosion	15	12.4
8.	Chronic gastric ulcer	14	11.6
9.	Chronic gastroduodenal ulcer	13	10.8
10.	Mellory Weiss syndrome	8	6.7

The analysis of results of endoscopic researches allowed to ascertain, that in the patients, receiving preparations ASA or NSAID for a long time, the changes were mainly observed as chronic gastritis (56.2%). On the second place by frequency there was observed duodenogastric reflux (23.2%). The acute erosion and ulcers were located mainly in a stomach, accounting for 18.2% and 15.7%, in the duodenum they were in 12.4% and 10.8%, respectively. The chronic erosion and ulcer of a stomach (respectively, 12.4% and 11.6% of cases), chronic duodenal ulcer (10.8%), Mellory-Weiss's syndrome (6.7%) cases were revealed too.

In the clinical practice it is difficult to determine a clear border between NSAID-gastropathies and «stressful» erosions and ulcers arising in the patients with acute myocardial infarction and other heavy pathology or operative interventions. Only carefully detailed anamnesis, indicating about duration of receiving of preparations of ASA and NSAIDS allows identification of these damages in the top departments of a digestive tract. It was established, that all patients used various preparations of ASA or NSAIDS for a long time. Therefore, all presented cases of GDP in the patients with IHD revealed at careful examinations of the studied patients, allow us to believe about presence of NSAID-gastropathy in them.

According to the results of the researches performed the algorithm of treatment of NSAID-gastropathies included the following notions: prescription of a medical diet (Table 1); at all patients with erosion-ulcerative lesions in the gastroduodenal mucosa there was solved the problem on an opportunity of a cancellation or decrease of a doze of NSAID and antiaggregants; proton pump inhibitors were nominated in standard dozes and modes.

To the patients with ulcerative anamnesis and also at detection of an infection Helicobacter pylori (H. pylori) with the help of immunofermentative analysis (IFA) or urease respiratory test, the 10-days eradication therapy was prescribed which included: omeprazole 20 mg. 1 tab. × 2 times a day, + amoxicillin 1000 mg. 2 tab. × 2 times a day + clarythromycin 500 mg. in 2 tab. × 2 times a day.

At detection of H.pylori the eradication should be performed before application of NSAIDS or ASA. Eradication of the presenting infection is rationalized also in a case of prospective long preventive application of PPI. At absence of ulcerative anamnesis and

under the conditions of continuing therapy with NSAID or ASA the eradication therapy should be also performed. It is necessary to take into account, that in all situations the successful eradication of an infection H. pylori does not exclude necessity of the subsequent preventive application of PPI [12].

As symptomatic treatment the patients were prescribed the widely used in the gastroenterological practice non-absorbable antacids (almagel, Maalox or other). They, absorbing the hydrochloric acid, reduce proteolytic activity of gastric juice (by means of pepsin absorbtion, increase in pH of the environment), therefore pepsin has become inactive. Antacides have enveloping properties, binds lizolecitin and bilious acids having unfavoutable effect on the gastroduodenal mucosa. Last years in the experimental and clinical researches it has been established, that cytoprotective effect of antacides is caused by increase in prostaglandins contents in the gastric wall, increase in bicarbonate secretion, and increase in glycoproteins in the gastric mucus. Their application has shown sufficient therapeutic efficiency as medical means for elimination of dyspeptic syndrome [10; 11].

Erosive changes in the gastroduodenal mucosa at absence of the symptoms of hemorrhage did not require stopping receiving of NSAID or ASA. In a case of identification of the ulcerative damages at any stage of NSAID-therapy their cancellation and prescription

of PPI appeared to be the most rational tactics. The same means were applied in the cases when it was impossible to stop receiving of NSAID because of high risk of thromboembolic complications of the ischemic heart diseases. The patients were recommended continuing treatment with PPI during 4 to 8 weeks with subsequent endoscopic control.

Conclusions:

1. The clinical features of NSAID-gastropathy and revealed at endoscopic examinations changes in the gastroduodenal mucosa in the patients with IHD do not meet, so endoscopic control, particularly at early time of treatment (the first 1–2 months) is an obligatory and adequate method of prevention of heavy complications.

2. At the patients with IHD at presence of gastroduodenal ulcers and erosion with a bleeding or its threat it is recommended to cancel NSAID, if this is impossible, it is necessary to lower a doze of a preparation and to prescribe PPI + antacids.

3. Strategy of treatment and prevention of NSAID-gastropathies should include prescription of gastroprotectors at presence of risk factors and symptoms of dyspepsia.

4. At revealing of H. pylori, according to the recommendations of Maastricht IV Consensus (2011) it is necessary to perform 10-day basic eradication therapy.

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A food the working enterprises glass products in the conditions adverse factors

Abstract:

Objective: Hygienic estimation of a condition a food of adverse factors manufacture glass products working in the conditions of influence. *Methods:* Hygienic estimation a condition a food of adverse factors of manufacture glass products working in the conditions of influence. For an estimation of condition TPF by means a method of questioning and poll method, learned

a daily true condition a food of the working. **Results:** In a daily food allowance of workers at the enterprise for manufacture of quartz glasses, dairy products, meat, fish and chicken meat on 12–50 % below hygienic norm, especially irreplaceable amino acids (methionine, Triptofan, Fenilalanin, lizig, leytsin) on 40–55 % below norm.

Conclusions: As a result in this analysis a daily diet of the squirrel, fats, carbohydrates, vitamins, microcells and considering harmful factors manufacture new food allowances are developed.

Keywords: days of diet, a food, the enterprise, glasses, dairy products.

Relevance

According to the UN the world produces up to 1 million names per year of previously existing products, including up to 100 thousand chemical compounds, from which about 15 thousand are potential toxicants. It is believed that up to 80 % of all chemical compounds emitted into the environment, sooner or later fall into natural water from industrial, domestic and storm water, in soil, and then in raw and processed food products. As a result in food and drinking water can be tens, and sometimes hundreds of toxic chemicals that can negatively affect the health of people [7; 8; 9].

For the organism as an open self-regulating biological system protection from external influences (protection of the internal environment of the organism) is implemented in the form of a number of universal mechanisms [3]. Food provides energy and substrate to support their functioning [2].

Research aim: hygienic assessment of the nutritional status working in conditions of influence adverse factors of production of glass products.

Material and methods

For the development of preventive nutrition, we used the recommendations of the San R and N No. 0184–05 "Hygienic norms of medical-prophylactic nutrition of workers employed in harmful working conditions". The study used the number of food products analysed depending on age and season (spring and winter). Nutritional status was studied in 100 workers, including 35 aged 16 to 29 years, 35 aged 30–49 years, and 30 aged 50–59 years. To assess the status of BOB by using the method of questionnaire and method of survey studied daily the true power status of employees. As a result of this analysis in the daily diet of proteins, fats, carbohydrates, vitamins, trace elements and taking into account the harmful production factors developed new rations of food [1; 4; 5].

Results and statistical processing

The true power status of workers manufacturing enterprise quartz product and the composition of the diet was studied using the method of questionnaire survey and measurement method. Information obtained from the questionnaires were analyzed by statistical methods. Data about the Composition of subsistence consumption of milk and dairy products operating LLC "Quartz", are shown in table 1.

The questionnaire assessed the consumption of milk and dairy products (milk, suzma, cheese, etc.); meat and meat products (beef, lamb and chicken meat, eggs); vegetables (potatoes, carrots, beets, tomatoes); fruits (apples, grapes, pomegranate, pears, persimmons, figs, peaches, citrus), cereal products (bread, flour, peas, rice). The power of men and women studied differenty. Taking into account the objectives of the study the questionnaire consisted of questions discussed and approved at the methodological meeting. It turned out that the day workers had used cow's milk in an amount of 0.03–0.05 kg., susimi 0.01–0.013 kg., cheese 0.01–0.02 kg., eggs 0.011–0.013 kg. In General, the amount of milk and dairy products amounted to 0.063–0.096, on average 0.078 kg. the Comparison data poluchennyh hygienic standards showed that the number of products was 1.5 times lower hygiene standards.

Table 1. – The composition of the daily consumption of milk and dairy products operating LLC "Quartz"

Product	Milk	Kefir	Cheese	Egg	Total
Product amount (kg.)	0.03–0.05	0.01–0.013	0.01–0.02	0.011–0.013	0.063–0.096
Protein (gr.)	1.05		2.75	1.408	5.1
Triptophan (mg.)	0.0147	0.0049	0.0375	0.0232	0.07
Isoleicine	0.0669	0.0223	0.1853	0.0935	0.35
Leicine	0.1032	0.0344	0.2681	0.1239	0.52
Lizine	0.0816	0.0272	0.2017	0.0901	0.42
Metionine	0.0258	0.0086	0.0715	0.044	0.44
Cistyne	0.0093	0.0031	0.0155	0.0329	0.047
Fenilalanine	0.051	0.017	0.1474	0.0813	0.24
Amino isovaleric acid	0.072	0.024	0.1974	0.1056	0.30
Arginine	0.0384	0.0128	0.1004	0.0924	0.20
Fats (%)	4	1.2	1.2	1.7	7
Vit A (mg %)	0.005	0.0005	0.00049	0.0016	0.0035
Vit B$_1$ (mg %)	0.005	0.0005	0.0005	0.0015	0.0035
Vit B$_2$ (mg %)	0.007	0.048	0.043	0.076	0.003
Vit B$_{12}$ (mg %)	0.0014	0.002	0.005	0.0095	0.066
Vit C (mg %)	0.008	0.04	0.03	0.034	0.15
Calcium	36.1	18.2	95.6	21.8	86.8
Magnesium	4.2	2.0	0.56	23.8	98.0
Phosphor	28.5	16.9	109.2		66.5

Meat and meat products a day working consumed on average; in an amount of 0.05 from 0.07 (beef) of up to 0.01–0.032 (lamb) and 0.001–0.005 kg. (pork). The total number of meat and meat products — 0.06–0.1 kg. 0.08 kg. on average According to hygienic norms (a day supposed to consume 176 g.), i. e., workers of meat and meat products 45.5 % less. The consumption

of grain and grain products per day averaged: 0.335 bread-and 0.750 kg. of rice 0.010–0.012 kg. of peas of 0.001–0.005 kg., wheat flour of 0.25–0.3 kg. the Total number of grains and grain products — 0.55–1.6 kg. the Comparison of obtained data with hygiene standards showed that consumption of grain and its products was 2.8 times more.

The consumption of vegetables and fruit during the day averaged: potatoes 0.15 to 0.20 g. carrots 0.12–0.16 g., cucumbers 0.10–0.11g., turnip 0.001–0.008 g., tomato is 0.18–0.22 g., onions of 0.10–0.15 g., greens of 0.01–0.05 g. the Total number of fruit and vegetables — 1.27g., i. e. workers received vegetables 1.6 times more hygienic norms. Table 2 shows data on the daily diet of workers of the enterprise for the production of kvartsevykh glasses.

In 0.079 kg. of milk and dairy products in contains of 5.75 g. of protein, 0.070 kg. of meat and meat products 10.4 g., 0.325 kg. of grain and grain products 0.8 g. of fruit and vegetables is 8.7 proteins. The total amount of protein is 1.27 g.

If the daily requirement of protein 80–100 g., the results of 29 % below normal. Common diet animal products 0.149 g., therefore, animal protein in total daily ration is 28 % (normally 55 %) with regard to the Analysis of amino acids in the food composition; methionine content of 1.13 mg, which is below the norm by 50 %, leucine 0.52 mg., i. e. Indispensable amino acids 20–38 % lower hygienic standards. The content of valine is equal to 3.0 mg., which is also 25 % lower hygienic requirements.

Amount of tryptophan in the daily diet is 0.71 mg., which is 29 % lower hygienic standards, threonine 2.05 mg. (the norm is 2–3 mg.),

phenylalanine 2.38 mg. (normal 2–4 mg.), arginine 3.23 mg., histidine 1.43 mg. Based on the survey revealed that the major amount of protein intake with beef, the average number is 10–11 g., the amount of fat in beef 13–16 g., 2–5 g. mutton Chicken meat and pork are eaten very rarely. A large number of vitamins, macro-minerals in the organism enters through meat products. Study of the amount of grain products in the daily diet of the workers at the plant for the production of quartrous glasses showed that the body receives the bread in the amount of 24.5 g. of rice 0.76 g., peas 2.38 g. of flour 33.2, a large number of amino acids come from bread and flour. For example, as part flour products determined tryptophan (0.35 mg.), threonine (0.86 mg.), isoleucine (1.32 mg.), leucine (2.0 mg.), methionine (0.45 mg.), cystine (0.51 mg.), phenylalanine (0.51 mg.), valine (0.51 mg.). Fat intake from bread 5.25 g., rice 0.157 g., 0.002 g. peas, flour, or 0.42 g.

The carbohydrate intake of 175 g. bread, rice 13.3 g., 1.51 g. peas, flour, 163 g. In cereal products vitamin a is found in small quantity is 0.019–0.7 mg., vitamin B^1 0.002–1.27 mg., vitamin B^{12} in cereal products is not defined (except peas). Using grain products on average are macro-minerals: calcium 2.9 to 10.2 g., magnesium 4.0–73.6 g., phosphorus 30 to 37 g.

In the daily diet of workers. Thus, in the daily diet, working at the enterprise for the production of glass, corvigo milk, meat, fish and chicken dishes on 12–50 % lower hygienic standards. Osobenni deficiency was noted in the essential aminokislot methionine, tryptophan, phenylanine, lysine, leucine 40–55 % below health standards.

Table 2. – The average need for food the workers at the plant for the production of glass

Product	Demand into nutrition, g.	Proposed norm (brutto)
Wheat bread	335–750	200
Black bread	70–80	250.0
Wheat flour	41–50	15.0
Noodles	55–60	40.0
Bob	35–45	70
Fabaceae (bean, soy-bean, pea)	Rice 10–12 Peas 1–5	50
Sugar	40–45	50.0
Meat (beaf, mutton, chicken)	beaf 50–70 mutton 10–32	150.0
Fish	2–4	20.0
Liver	3–5	25
Eggs, pcs	0.5	0.5
Milk, kefir	30–505	500.0
Cheese	5–8	10.0
Curd	20–30	100
Beaf fat	7–8	10.0
Vegetable Oil	8–9	50.0
Potato	150–200	400
Vegetables	75–80	550
Fruits and juice	62–74	100.0
Energy value	1110.3 ± 17	1710.2 ± 13.0
Proteins	43 ± 0.5	57 ± 0.2
Lipids	49 ± 0.7	51 ± 0.3
Carbohydrates	230 ± 2.5	170 ± 1.2

In terms of environmental (alien) load power, in addition to traditional functions, should also provide:
- reduce the absorption of xenobiotics in the GI tract;
- the weakening of the adverse effects of foreign substances and factors at the cellular and organ levels;

- reducing the level of deposition of xenobiotics and their metabolites in the tissues of the tropic of accelerating their excretion from the body.

When developing BOB working in glass manufacture must be added to the daily diet primarily recommended natural non-specific

sorbents: dietary fibers, alginates, collagen, mucus, zeolites, chitin. They also enhance intestinal motility, reducing effective period of absorption of xenobiotics. Absorption of foreign substances in the gastro-intestinal tract and the extent of their receipt of the internal environment of the body depends on several factors: the residence time of food in the intestine, condition of membrane of enterocytes, the activity of the enzymatic digestion, the nature of the microbiota and the chemical composition of the diet. The latter implies the possibility of existence of different types of interaction between xenobiotics and nutrients: competitive, synergistic or neutral flowing in the cavity space and on biological membranes, in the cytosol of cells.

Conclusions

1. In the daily diet of workers at the enterprise for manufacture of quartz product, dairy products, meat, fish and chicken 12–50 % lower hygienic standards, particularly the significant deficiency noted in the relationship of essential amino acids (methionine, tryptophan, phenylalanine, lysine, leucine, tryptophan) at 40–55 % below normal.

2. The workers in the workshops for the production of glass of conditions by Norm and rule sanitary № 0141–03 class 2–3–4 degree of danger, in the shops of the RMC and ICC conditions 3.3 and 3.4 of class and severity.

3. The value of basal metabolism for men is 1665 kcal., for women 1580 kcal., specific dynamic action of food is 165.7 kcal. for men, to 158.5 kcal. for women, total energy value 4110 kcal. for men, for women 3941.

Protein 57 g., fat 51 g. carbohydrates: 170 g., calories 1200 kcal. It is proposed to enrich the composition of the diet on 2-categories meat, liver, fish, dairy, produktami, suzma and vegetables.

4. For glass production, blocking in some way the absorption of xenobiotics, primarily recommended natural non-specific sorbents: dietary fibers, alginates, collagen, mucus, zeolites, chitin. They also enhance intestinal motility, reducing effective period of absorption of xenobiotics. Works in reducing the entry of xenobiotics into the body.

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Influence of xenobiotics on the course of rheumatoid arthritis

Abstract: The results of disperse analysis indicated degree of contamination of air and soil by xenobiotics. It depended on the clinical, radiographic and sonographic signs of articular syndrome in RA.

Keywords: rheumatoid arthritis, articular syndrome, ecologic factors, climate geographic zone.

Climatic peculiarity of human habitat have always been the most important factor which affect to health. When marked effects of different environmental indicators to human health, it became clear that the priority of environmental factor composes — up to 30 %. Of these, pollution accounts about 20 % and climate geographic conditions — 10 % [1, 157–158]. Therefore, it is obvious that the problems associated with the disease can not be considered without debate and features of the environment.

Geographical factors, according to a study conducted under the auspices of the WHO are estimated as external risk factors that could adversely affect to functioning of all systems of the human body, as well as the to course and outcome of various diseases, including rheumatic diseases [2, 28–30]. In recent years, it began to discuss the possible connection of the current and future features of rheumatoid arthritis with unfavorable environmental factors [3, 68]. RA is a multi factorial disease in which the interaction of genetic

component and environmental factors determines not only the disease but also its pronounced clinical polymorphism [4, 2206]. Weighting of disease occurs under the simultaneous influence of environmental factors [5, 1747; 6, 7–8; 7, 86].

To date, Uzbekistan is the object of many investigations of medical and geographic directions, as Republic is distinctive by its geographical location, climate and nature of the development of industry and agriculture. Moreover, special attention should be paid to the environmental problem in certain areas of the Republic. As is known, deterioration of the nature does not occur immediately or instantly, this process is observed for a long time, in other words, the environmental situation gradually accumulates. The big environmental problem in Uzbekistan is the high degree of soil salinity. The real threat was extensive contamination of soil by various types of industrial and household wastes. One of the major problems is the quality of water resources, the problem of the disappearance of the Aral Sea and the threat of ecological safety in the country and contamination of air space. Our Republic of Uzbekistan is located in the arid zone and characterized by the presence of major natural sources of atmospheric dust as the Karakum and Kyzylkum deserts with frequent dust storms [8, 78]. Therefore, we believe that actual study in this field, particularly in matters of environmental rheumatology, in particular on the issues of RA in various climatic and geographical regions of Uzbekistan. We are interested in properties of development and duration of RA associated with environmental factors.

The aim of this study was evaluate the influence of environmental factors to articular syndrome in patients from various regions of Uzbekistan.

Material and Methods

The study is included 460 patients with a documented diagnosis of RA at the age of 50.6 ± 9.1 years, disease duration 9.9 ± 4.7 years:

1) I area, the northern region — Tashkent — 144 patients;
2) II region, the western region — Khorezm region — 112 patients;
3) III region, the eastern region — Namangan region — 104 patients;
4) IV area, the southern region — Surkhandarya region — 100 patients.

These hygienic assessment of environmental pollution, in particular xenobiotics in its three objects — air, soil and water (surface water and underground water sources) were obtained as a result of laboratory tests of sanitary stations, government offices of regional committees in the field of hydrometeorology, control of natural condition and environmental safety, as well as governmental Committee of Uzbekistan by protection of nature. Total emissions of air pollutants from stationary and mobile sources characterize the general anthropogenic load to the air. According to these data, the level for 5 years in the atmospheric emissions to the area of the experimental zones includes following:

– in the I area for the year was 302.76 ± 96.12 t/km^2, to 1 patient with RA — 17.2 ± 29.16 kg.;
– in the II area of 81.2 ± 16.2 t/km^2, to 1 patient with RA — 31.2 ± 1.8 kg.;
– in the III area 68.51 ± 11.4 t/km^2, to 1 patient with RA — 9.1 ± 1.1 kg.;
– in the IV area of 90.5 ± 8.9 t/km^2, to 1 patient with RA — 35.1 ± 3.4 kg.

Using of integral indicators of environmental burden to the atmosphere (ψ), water (σ) and soil (ω), compared them with clinical signs of RA (F) on the number of patients and with integral criterion in the study areas of Uzbekistan (G).

Statistical analysis of the results of research carried out by computer variations, correlation, one (ANOVA) and multivariate (ANOVA/MANOVA) dispersion analysis (programs «Microsoft Excel» and «Statistica-Stat-Soft», USA). We evaluated average values (M), their errors (m), the standard deviations (s), the correlation coefficients (r), the criteria of dispersion (D), the Student (t), Wilcoxon – Rao (WR), χ^2 McNemar – Fisher and reliability of statistical parameters (p).

Results and discussion

Among the studied patients predominance women — 336 (93.3 %). 85 (18.5 %) patients suffered from this disease less than 5 years, from 5 up to 10 years — 255 (55.4 %), and more than 10 years — 120 patients (26.1 %). Drug remission was determined in 80 patients (17.4 %), the activity is preserved — in 366 patients (79.6 %). Poly arthritis were in 440 patients (95.7 %). Systemic manifestations were detected in 269 patients (58.5 %). In addition to the articular syndrome, the most frequent complaints were general weakness (65.2 %), irritability, sleep and attention disorders (56.5 %), restlessness and anxiety (65.2 %), low-grade fever (39.1 %). Almost all RA patients had signs of anemia of chronic inflammation.

The results of our analysis establishes the impact of the degree of environmental pollution by xenobiotics air ψ to the ω soil, as well as direct correlation ω with integral parameter of contamination of groundwater and drinking water σ. There are significant positive correlations with the degree of ω plant emissions of harmful substances into the atmosphere, with a level of accumulation in the regions of industrial waste and fluoride chloride (FH) load by xenobiotics, sulfates and phosphates in drinking water. At the same time the degree of dust ψ depends on ω salinity ($r = 0.76$; $p = 0.032$).

It is known that the content of substances in the soil enters into the human body through the vegetable and animal food. In turn, plants and animals are supplied by micronutrients from the soil [9, 72]. Thus, the composition of minerals in the soil has a positive or negative effect to the human body, thereby specifically affects to duration of diseases, in particular to RA [3, 66]. Especially, human activity and anthropogenic impact influence to the composition of the soil. Thus parameters G influence to the levels in the soil zone of residence of patients with RA as toxic microelements as nickel, aluminum and fluorine, and sulfates, which shown results from one factor dispersion analyses. Indicators G directly correlated with the content in the soil of nickel and aluminum fluoride ($r = 0.69$; $r = 0.77$; $r = 0.71$) and backwards — with concentrations of zinc ($r = -0.66$).

According to ANOVA integral indicator of soil contamination with nickel ω significantly affect to the radiological stage of the disease and indexes Ritchie and Larsen. It should be noted that there is a significant direct correlation between the values of ω and articular syndrome, however, high aluminum content of the soil was significantly affected to the localization of the articular syndrome. So, in figures $G < 2$ Aluminum G has a negative correlation ($r = -0.44$; $r = -0.42$; $r = -0.32$) with NPJ, NSJ and duration of morning stiffness, which become positive ($r = 0.89$; $r = 0. 73$; $r = 0.79$) in rates $G > 2$. It means that increasing of accumulation in the soil influences to pronounced degree of articular syndrome. As can be seen from fig. 1, area with high aluminum in the soil (IV area) is valid pronounced characters of above symptoms ($p = 0.0042$ & $p = 0.033J$).

It should be noted that on the background $G > 2$, the severity of air pollution by xenobiotics significantly influences (in the figure indicated in black) to the incidence of lesions of the elbow ($p = 0.023$), the shoulder ($p = 0.052$), knee ($p = 0.049$) and hip ($p = 0.037$).
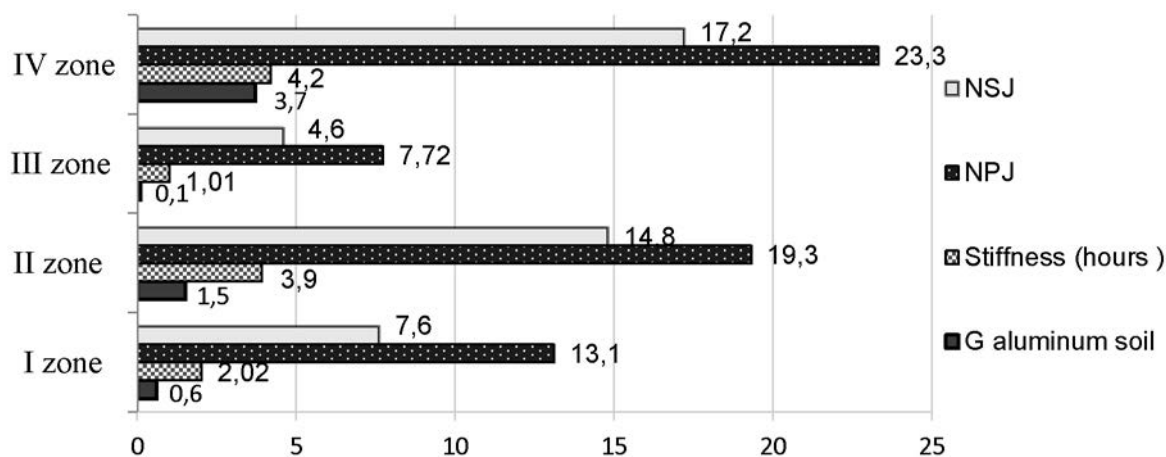
Fig. 1. Articular syndrome depends on index G aluminum in soil. NPJ — the number of painful joints; NSJ — the number of swollen joints
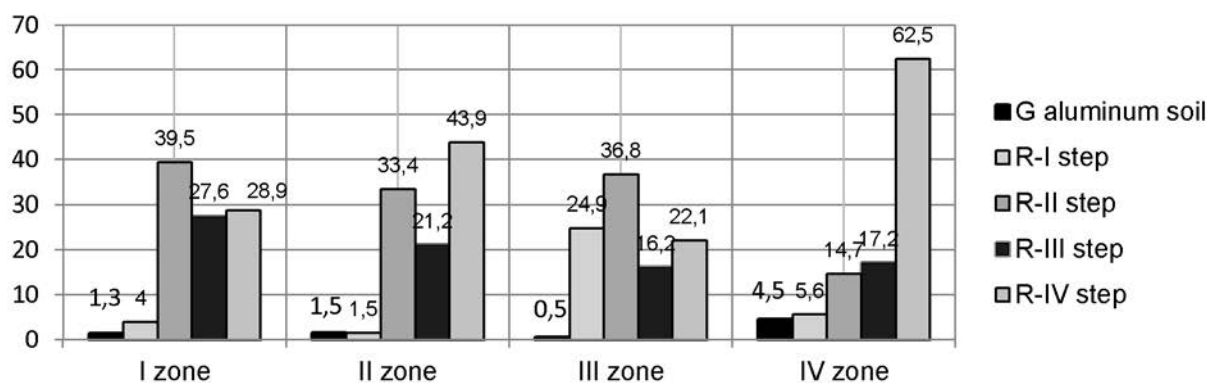

Fig. 2. X-ray changes in the RA depend on index G aluminum in soil

It is noteworthy, as shown by one-factor disperse analysis to the functional index of HAQ affects ω soil zinc (Zn). This performance is directly correlated with the G Ritchie index (r = 0.59) and back to the index HAQ (r = –0.67). Thus, by decreasing of ω, i. e. decreasing of concentration of Zn in the soil degraded functionality of the joint, which reflect on the index of HAQ, in particular in zones II and IV and contrast with the increasing of concentration in the soil improved HAQ, in particular in the zone III (p = 0.0034\$, p = 0.043J). It should be noted, according to the literature [10, 702], against changes in the level of Zn in the blood of patients with RA in synovial environment increases the number of proteolytic activity of matrix metalloproteinases, which are involved in the implementation of preinflammatory and destructive action to the joint.

The important point, indicating the degree of progression of disease and complication of anatomical defects of joint in RA is radiological evidence of articular syndrome. As mentioned above, the rate of soil contamination ω significantly affect to the radiological stage of the disease and the index of Larsen. As can be seen from fig. 2, in contrast from other zones in zone IV with increasing of accumulation of nickel (r = 0.089) will increase cases with ankylosis (IV radiographic stage of RA) and significantly increase Larsen index (p = 0.0023\$, p = 0.033J). At the same time multivariate

dispersion analysis also shows a high degree of impact on the overall ψ sonographic signs of RA. The degree of atmospheric pollution by xenobiotics significantly influences (in the figure indicated in black) to the frequency of sonographic and radiographic signs of RA.

It is noted the dependence of tendovaginitis, enthesopathies, ligamentosus, intra-articular calcifications, changes of horns of the menisci, Baker's cysts and bodies of Hoff on the parameters ψ. As the one-factor dispersion analysis to the frequency of sonographic and radiographic signs of RA affects to the degree of ω salinity. Thus, in ω salinity G > 2 (II zone) observed its direct strong correlation with indicators such as the tendovaginitis (r = 0.84), ligamentosus (r = 0.97), Baker's cyst (r = 0.77) and body of Hoff (r = 0.91). It means that with increasing of salinity of the soil whereas increases above cases.

We should note that F articular syndrome in RA are not associated with the parameters of sulfates and phosphates in the drinking water (p > 0.05).

Thus, the results of disperse analysis indicate the degree of ω and ψ depend on clinical, radiographic and sonographic signs of articular syndrome in RA. It means that changes in the micro elementary composition of soil and air which depends on the zone of residence of patients with RA in Uzbekistan contributes rate of progression of joint syndrome.

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Signs and surgical tactics in continued growth of gliomas of supratentorial localization in children

Abstract: This work is devoted to pediatric neuro-oncology. The analysis of examination and treatment of 55 patients with continued growth of brain supratentorial gliomas is presented. Based on the study, diagnostic criteria and surgical treatment tactics for patients with continued growth of supratentorial gliomas have been determined.

Keywords: continued growth, brain tumors, central nervous system, pediatric age.

Introduction. According to data from cancer registries in European countries and the USA, tumors of the central nervous system (CNS) occupy the second place among all cancers in children [1, 35–39]. Malignant types are the most frequent, like anaplastic astrocytomas, ependymomas, and glioblastomas [3, 53–63; 2, 30].

There are several studies devoted to continued growth of CNS tumors in children. In the literature over past 10–15 years, there is no consensus about the frequency of tumors of continued growth with different histostructure in children [6, 319–331; 4, 40–51].

According to several authors, in a group with tumor clinical manifestations, terms of continued growth were significantly shorter than in a group with radiographic (X-ray) signs. While identification early and late periods of the appearance of continued tumor growth, most of the early periods were determined clinically; this difference maintained even after the distribution of nosology, and there were no statistically significant differences between age, gender and race. Patients with large volume of surgical interventions prevailed in a group with radiographic (X-ray) detection of prolonged tumor growth [7, 4135–4140; 5, 1273–1280].

Macedoni-Luksic et al. (2003) in a retrospective long-term study of history cases of 61 patients, who underwent surgical treatment, could observe the nature of neurological abnormalities associated by continued growth or recurrence of hemispheric tumors [8, 89–101].

However, according to Minn et al. (2001), a factor of extent of surgical resection of the tumor becomes to be of great importance for forecasting the possibility of further tumor growth [7, 4135–4140].

The most significant prognostic factor for survival is the extent of surgical resection. This factor can be changed unlike other factors, such as the differentiation of tumor cells, X-ray therapy, and age of the patient. Race and gender, according to the researchers, probably, do not play such a huge role, but, as has been reported, correlated with survival rate [10, 16–26; 9, 138–150].

Rozumenko et al. (2006) reported that surgical tactics plays the important role in life expectancy of patients and improving the quality of life [4, 40–51]. According to Butowski et al. (2006), clinical manifestation of hypertension syndrome with tendency to progression, appearance and aggravation of focal neurological deficit, the pattern of tumor progression on brain CT and MRI in the form of mass-effect, displacement of structures in the midline, signs of decay and hemorrhage in the tumor are the indications for reoperation in hemispheric tumors with prolonged growth. Along with this, the absence of effect of conservative treatment is an indication for surgical intervention as well [5, 1273–1280].

The purpose of study was to analyze data of patients with assessment of the informative value of brain CT and MRI in determining surgical tactics for brain supratentorial gliomas with continued growth.

Materials and methods

In the Centre of Neurosurgery of Tashkent city, we carried out analysis of data of 55 patients (28 boys and 27 girls), who had been diagnosed and treated for glial tumors with continued growth of supratentorial localization during the period 2010–2014. The age of children ranged from 2 to 17 years. The diagnosis was made based on clinical-neurological and instrumental examinations. For determining and selecting surgical tactics for gliomas with continued growth, brain CT was used in 30 (54.5 %) patients and brain MRI with and without contrast enhancement was used in 25 (45.5 %) patients, respectively. The degree of radicality was assessed by the program "Calculation of volume of tumors".

Results and discussion

Re-appearance of intracranial hypertension (60 %) and/or increase of symptoms of epileptic syndrome (25 %) and focal neurological deficit (15 %) were clinical signs of continued tumor growth. Later on, further growth of tumor was confirmed by additional studies using different methods (brain CT or MRI).

A group of main risk factors for occurrence of continued growth of brain tumors of supratentorial localization in children included surgery radicality (total operation in 41.8 % of cases), malignancy grade of neoplasms (56.3 % were anaplastic), tumor localization, its location in the medial parts of hemisphere and expansion to the neighboring lobe and subcortical structures (61.8 %). The totality of removal was calculated by the program "Calculation of tumor volume".

Table 1. – Relationship between continued tumor growth and radicality degree of surgical intervention

Surgery radicality degree	Frontal lobe		Temporal lobe		Parietal lobe		Medial structures		Occipital lobe		Total
	Abs	%	Abs	%	Abs	%	Abs	%	Abs	%	Abs
Total	4	16.6	6	25	5	20.8	2	8.7	6	25	23
Subtotal	4	19.0	4	19.0	5	23.8	7	31.86	2	9.5	22
Partial and biopsy	1	10	2	20	1	10	5	50	1	10	10
Total	9	100	12	100	11	100	14	100	9	100	55

Table 2. – The distribution of tumors by anaplasia degree, depending on localization

Histological type	Frontal lobe		Temporal lobe		Parietal lobe		Medial structures		Occipital lobe		Total
	Abs	%	Abs	%	Abs	%	Abs	%	Abs	%	Abs
Benign	4	16.6	5	20.8	5	20.8	6	25	4	16.6	24
Anaplastic	5	16.1	7	22.6	6	19.3	8	25.8	5	16.1	31
Total	9	100	12	100	11	100	14	100	9	100	55

Table 1 shows that in 55 children, who later revealed continued growth of tumors, mainly underwent subtotal resection, partial removal and biopsy (58.2 %). 24 (43.6 %) patients had histologically benign tumors, 31 (56.3 %) ones had anaplastic types (Table 2). Anaplastic tumors were more likely located in the medial brain structures.

According to brain CT and MRI, re-appearance of tumor lesion or increase in size, depending on surgery radicality are the signs of continued tumor growth. The presence of perifocal edema and dislocation of midline structures indicate the progression of tumor growth.

By CT data, the average tumor size was approximately 4.5 ± 1.5 cm., tumor lesion had clear boundaries in 13 (52 %) patients, and indistinct boundaties in 12 (48 %) patients, in most cases of heterogeneous structure. X-ray density (HU) in the continued growth changed as hypodensive lesions in 11 (44 %) patients with gliomas of typical structure and in 6 (24 %) patients with anaplastic gliomas. Hyperdensive lesions were noted in 5 (20 %) patients with malignant gliomas. Isodensive lesions were observed in 3 (12 %) of cases with malignant gliomas as well. Continued growth of gliomas, containing cysts, observed in 12 cases. The accumulation of contrast agent in the continued growth of gliomas increased in 1.5–2.0 times.

According to brain MRI, in continued tumor growth, the average diameter was 5.5 ± 1.0 cm., with heterogeneous nature. Isodensive lesions were revealed in 13 (43.3 %) patients that was more typical for low-grade gliomas. Hypodensive lesions were marked in 17 (56.7 %) patients with anaplastic forms of continued growth of gliomas. Continued growth of tumor with solid-cystic component was noted in 14 observations.

Choice of surgical tactics for patients with continued growth of supratentorial brain gliomas should be based on data regarding the histological type of tumor, tumor expansion, involvement of neighboring brain structures, and nature of growth. Infiltrative growth was noted in 26 observations, nodular growth in 29 cases, vascularization of tumor, presence of hemorrhage were detected in 14 cases, indicating increased vascularization and time between primary tumor removal and continued growth. Thus, surgical approach should be determined by the clinical-instrumental pattern.

Conclusions

1. Surgical tactics for continued growth of supratentorial brain gliomas largely depends on the results of comprehensive clinical-neurological examination, CT and MRI diagnostic studies.
2. We have developed a program "Calculation of tumor volume", which was used to accurately determine the degree of radicality of surgical intervention.
3. Manifestations of neurological symptoms is of great value and alertness for physicians and must be considered for further conducting a comprehensive examination, including CT and MRI of the brain.

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Hygienic assessment planning house of mercy of the Republic of Uzbekistan

Abstract: The preservation and strengthening of health of the younger generation is very important hygienically complete habitat that is determined by the degree of accomplishment and sanitary condition of educational and training institutions.

Keywords: House of Mercy, planning, zoning, land, building, swimming pool, natural and artificial lighting.

Relevance of the work

In the new conditions of development of sovereign Uzbekistan formation of humanism and charity as essential qualities of democracy becomes one of the most important tasks of education and educational work in all educational institutions, including general education, secondary education, education, charity houses, colleges, high schools and universities [1].

The development of these qualities can be successfully carried out during the formation of the whole person, having high moral and spiritual principles, which stores and contributing to the development of national culture. Features of the individual to a large extent determined by the way of life activities, including lifestyle, providing education of a healthy generation, which is a child learns to take care of health as their own, and others. Hygienic training and education of the population, promotion of healthy lifestyles — are one of the most important parts of preventive health care destinations. The preservation and strengthening of health of the younger generation is very important hygienically complete habitat that is determined by the degree of accomplishment and sanitary condition of educational and training institutions [2; 3; 4; 5; 6; 7; 8].

Purpose of the study

Post a hygienic assessment of planning and residential building orphanages in the Republic of Uzbekistan. Based on the goal, we have the following tasks:

1. Hygienic assessment of the land and the building of orphanages;
2. Hygienic assessment of the living conditions and residential building orphanages;
3. Hygienic evaluation of the condition of sanitary facilities (heating, water, sewer).

Materials and methods

The subjects to assess the hygienic substantiation and evaluation of devices and the content of orphanages selected charity homes are located in the city of Tashkent, Andijan, Namangan and Margilan.

Hygienic assessment plan orphanages were determined by the following indicators:

1. General information on boarding schools (House of Mercy): type orphanages (junior, middle); the number of students, which is designed to house of mercy.

2. Distribution of land. Area landscaping, traffic routes, zoning, organization of waste collectors.

3. The building of:
   a) Location at the site;
   b) The number of floors and the composition (centralized, block with warm transitions, pavilions);
   c) The union premises in the complex (training, sleeping, school-wide, administrative, commercial premises), or in teaching and residential sections.

4. The complex of classrooms: classrooms and training rooms; laboratory; premises for labor training; gym; Assembly Hall; recreational facilities; library; The lobby and dressing room with a dryer; living room; washrooms and toilets.

5. Sleeping quarters: bedrooms; washrooms and toilets at the bedrooms; showers; a room for cleaning clothes and shoes.

6. Dining: dining room; kitchen.

7. Medical item insulator.

8. Sanitary facilities and installations; daylight.

In the study of illumination using light meter U-116. The study was conducted in accordance with GOST 29940. In assessing the performance of natural and artificial light guided SNIP (KMK 2.01.05.98).

Results and discussion

The study of hygienic assessment of living conditions of residents conducted in orphanages located in the city of Namangan, Margilan, Andijan and Tashkent. All known charity house built to the standard project. Power Project — 100 seats, organizing — developer Glavtashkentstroy year development projects 60–70 years. All the houses of mercy are a 2-storey brick building. The number of students at the time of the survey is in the house of mercy Margilan 96 children (43 girls, 53 boys) in the house of mercy city of Namangan — 153 children (75 girls, 78 boys), 86 children living in the home of mercy city of Andijan (42devochek, 44 boys) and in the house of mercy in Tashkent 95 children (40 girls, 45 boys). Study location orphanages in the city plan showed Margilan House of Mercy is located in the neighborhood, Namangan and Andijan House of Mercy — in a residential area, the city of Tashkent Mercy House is located in a residential area. The study of buffer zones to the nearest residential, public and industrial buildings showed Margilan House of Mercy is located at a distance of 75 meters, Namangan House of Mercy — 100 meters, Andijan House of Mercy — at a distance of 50 meters, the House of Mercy in Tashkent is located at a distance of 150 meters. Removal from the trunk of mercy Margilan house is situated at a distance of 32 meters, Namangan House of Mercy — at a distance of 25 meters, Andijan House of Mercy — at a distance of 45 meters, the house of Tashkent Mercy located at a distance of 30 meters (50 meters with sanitary norms). All the houses of mercy protected. The height of the fence Margilan House of Mercy is 1.5 meters, Namangan — 1.4 m., Andijan House of Mercy — 1.2 meters, the house of Mercy of Tashkent — 1.5 meters. Area landscaping Margilan House of Mercy is 49 %, in the house of mercy Namangan — 44 %, Andijan house charity — 46 %, planting area of the house of Tashkent Mercy is 42 %. If we take note of the rate of planting area is 60 %, it can be determined that the planting area of the territory of all homes do not meet the sanitary rules. Lot sizes, from 1.5 to 6 hectares, the area is landscaped, paved area, the percentage of construction — 47 %. In the presence of playgrounds and sports grounds in Margilan House of Mercy has track and field area, there is no ground for handball, gymnastics area, but there is a combined volleyball and basketball. Not available pool available, breaks up farm buildings — 25 m.

In Namangan home of mercy no pool, no soccer, track and field, a playground for handball, golf gym, an on-site playground for volleyball and basketball, but they are not equipped. In Andijan house of mercy it has a swimming pool, athletics playground for handball, golf gym equipped with a combined volleyball and basketball. Tashkent House of Mercy more landscaped, a swimming pool, soccer, track and field ground for handball, gymnastics and golf equipped combined volleyball and basketball. In assessing the type of building is set: all studied at home mildoserdiya corridor type, Andijan gallery type of charity house building block system, the Tashkent House of Mercy — compact type. All houses have a charity medical room size 12–14 m². Dressing area in Margilan house of mercy is 65 m², in Namangan — 45 m², in Andijan — 52 m² and 60 m² Tashkent. Evaluation dressing area by comparison with the sanitary standards showed that the house charity Namangan dressing area does not meet sanitary standards. In the building there are ordinary, end, angular, semi-detached, triplex, chetyrehkvartirnye section. A built-in institutions (hospitals, laundries, shops, canteens, child care facilities, etc.) in all houses there is no mercy. The size of the main building is the width of 50 meters, length 250 meters. Features of the building: the foundation 1.5 meters, has waterproofing, basement has a dry, not used on purpose; exterior walls are constructed from a material sand and cement, plaster, thickness 3–10 cm., the overall design; internal partitions — brick material, concrete slabs, 20–25 cm. thick, concrete structure; intercommunication overlap — material reinforced concrete slabs, wood beams rubble, fillers, design, sound and waterproofing are met, the finished floor material — chipboard, parquet, linoleum; attic floor — wood material, design — cipher, tiles, insulation — glass package; roofing — plain, combined with technical attic; stairs — march width — 1.1–1.5 meter, the number of marches between floors — 2 March, the number of stages in the march — 12 things, step height — 30 cm. Natural lighting stairs — enough; the possibility of ventilation; windows (with conventional binders), height 50 cm. and width of 70 cm., their area of 3.5 m² glazed surfaces, the exterior doors of the apartments have a material timber, a wooden structure, the thickness of 20–30 cm. All orphanages has central heating, central water, central sewerage.

Conclusions:

1. Structure and content of charity houses, generally meets the modern hygienic standards for the planning, however, there are some variations on the wind rose, on allocation of land for gardening area, the area of residential buildings, especially in orphanages located in the adapted premises.

2. Boarding schools should be located in the green zone, the suburbs, the countryside, in areas remote from industrial, utility and agricultural facilities, railways and roads with heavy traffic, transformer substations and other sources of electromagnetic radiation.

3. Each institution must have an independent site, remote from the main line at least 30 meters. The dimensions of each area must comply with the correct location of the necessary buildings and structures, as well as to create the most favorable hygienic conditions for the normal development and life of children.

4. On the land should be clearly identified the main areas: recreation, sports, educational and experimental (subsistence farming), shopping. The recreation area is intended for the organization of mobile and quiet games, individual lessons outdoors pupils. Group sites for preschool children around the perimeter of the ring connected to the track width of 1.5 meters (for cycling, study traffic rules and of the like).

5. The area of gardening site should be at least 50 %. Green spaces should not interfere with access to sunlight in the building of residential buildings and the need to protect the building and the site group from overheating; shrubs should be planted no closer than 5 m., and the trees — 10 meters from the building.

6. Buildings residential institutions must be located in separate buildings of no more than three floors. During the construction of buildings higher storeys is prohibited to use the third floor above to stay children. Depending on the capacity and the climatic conditions of the building can be compact, block or pavilion structure. Buildings should be equipped with systems of domestic water, fire and hot water supply, sewerage and central heating.

7. Orphanages living conditions, devices and content must comply with sanitary rules and norms № 031–14.

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Specificity of micro-vascular density in superficial bladder cancer

Abstract: With the aim of studying the dependence of density of microvessels on kind of impact on the tumor process, patients with bladder cancer (BC) were divided into 2 groups: 1 group — basic, including 35 patients who underwent neo-adjuvant probiotiko therapy the subsequent TUR. 2group — control, consisted of 50 patients with the traditional TUR of the tumor. Patients of the 1st group and 2nd group when carrying out diagnostic tests, to start treatment procedure perform diagnostic cystoscopy with biopsy of the tumor. The last study in terms of histological verification, and in terms of the severity of pathological vessel acquisition in the tumor tissue.

Keywords: bladder cancer, probiotics, transurethral resection, recurrence, density of microvessels.

Bladder cancer is one of the most frequent cancer in developed countries. Much of the mortality from BC is due not only to the occurrences of distant metastases, but also the development of local recurrence, which is typical of the resection methods of treatment.

Now in accordance with the standards, the BC treatment should be multidisciplinary: in addition to surgery it is necessary to use neoadjuvant therapy [1; 2; 3]. This is due not only to lack of widespread availability of the TUR, but also a number of other reasons: heavy somatic status of the patient, presence of complications of the tumor process, etc.

As one of methods of struggle with the unsatisfactory results of the round and prevent appearance local recurrence at the end of last century proposed intravesical application of various drugs with antitumor activity. The main advantage of the intravesical route of administration of the chemotherapeutic agent or another agent is the ability to achieve a relatively high concentration of the drug. Therefore it contributes to the sustainable effects of the drug on the mucosa of the bladder for a long time. This direct contact leads to primary attack antitumor agent of tumor cells, to achieve first-pass effect on the migration of tumor cells [4; 5; 6].

At the cancer research center since 2011, we conducted a study and implementation in practice of the method of intravesical propitiatory in the neo — adjuvant regimen in the combined treatment of urinary bladder cancer.

As you know the development of the tumor, its metastasis and ingrowth into adjacent structures is inextricably linked with the development of pathological angiogenesis in tumor tissue. J. Folkman at all. (1971), one of the first to point out that for the growth and development of tumors requires the development of new feeding the tumor vessels. In confirmation of this, a number of authors have suggested that by blocking neo-angiogenesis factors can be used to achieve tumor regression. Exactly, this point of view was the beginning of an era research microangiology vessels, factors causing angiogenesis and drugs that can block these factors. First, the density of microvessels (the density of microvessels) in tumors of the lung immunohistochemically defined in 1992 Maechiarini et al., using antibodies to von Willebrand factor, CD31, CD34. Subsequently, it was shown that angiogenesis begins when tumor size 1–2 mm., it affects tumor growth and progression [2; 7; 8; 12]. This is a key for us and has led to the study of PMS in the RMP. However, the available literature we did not find any study, aggravated to the problem.

Material and methods: due To the need to find new biological markers for monitoring and predicting outcome of treatment with BC, to determine the effectiveness of the treatment and risk of recurrence of the disease, as well as scientific validity used in adjuvant mode of preparations, our ongoing studies on the severity of the density of microvessels in superficial urinary bladder cancer. The main objectives of the density of microvessels in the study were:

1) study the characteristics of the severity of the density of microvesselsin the tumor tissue when the BC;

2) detection of a dependence of the the density of microvessels from the histostructure of the tumor Ph and the presence of dysbiosis urine;

3) determine the sensitivity of neoangiogenesis to adjuvant intravesical therapy. To count the number of microvessels used the markers, binding to endothelial cells: factor VIII, CD31, CD34, the latter two of the member of the family of immunoglobulins and a transmembrane glycoprotein CD34, which is located on the surface of leukocytes and endothelial cells of the the density of microvessels inthe BC.

With the aim of studying the dependence of the density of microvessels on kind of impact on the tumor process, patients with PMP were divided into 2 groups: 1 group — basic, including 35 patients who underwent neoadjuvant probiotic therapy the subsequent TUR. 2 group — control, consisted of 50 patients with the traditional TUR of the tumor. Patients of the 1st group and 2nd group when carrying out diagnostic tests, to start treatment procedur perform diagnostic cystoscopy with biopsy of the tumor. The last study in terms of histological verification, and in terms of the severity of the pathological vessel formation in tumor tissue. After preoperative preparation and TUR of the tumor, remote macropreparations also was subjected to study density of microvessels. For the adequacy of matching in both groups, the preoperative duration of events averaged 6.5 ± 0.5 ($p > 0.005$) days. In this case, the control group patients received restorative, antibacterial and indications of cytotoxic therapy. In contrast, in the main group of patients was not performed AB therapy, which instead used a probiotic. As used probiotic Bifidobacterium strain Esherucha coli M 17. The density of microvessels was determined by immunohistochemistry using the marker CD 31, which is proposed by A. P. Kolesnik et al. (2013) selectively label endothelial cells of blood vessels. For counting microvessels used a method Basari S. et all. (1992). To identify fields with the greatest concentration of microvascular, analyzed several

tissue sections of the biopsy under low magnification (about X 40). Thus chose 2 fields with the greatest concentration of microvessels, were counted under magnification X 200. The amount of vessels was divided by 2 obtained the average value of the density of microvessels in the tumor tissue. It should be noted that the calculation does not include vessels of medium or large caliber. The unit served as the absolute number of microvessels in 1 mm2 of tumor tissue. Statistical processing of material was carried out in the system Stat 16.0. The study of the expressiveness of Express CD31 showed that upon admission to the hospital, no significant differences the density of microvessels in patients of both study groups is not observed, accounting for 65.3 ± 3.4 and 63.3 ± 3.1 ($p < 0.05$), respectively, the main and control groups. Also upon admission to hospital to start treatment procedures proportional relation between the clinical manifestations of the disease and development of microvascular neoangiogenesis of the tumor we have not yet determined. This picture was in the evaluation of the localization of the tumor in the bladder wall, the degree of differentiation of the tumor, gender and age of patients. However, there was a certain correlation between the size of the primary tumor and of the density of microvessels, so if you increase the size of the tumor tissue showed a higher number of microvessels.

After preoperative effects in the control group was confirmed stable the same number of microvessels in the tumor tissue, without signs of dynamic change. Consequently, any drugs aimed at the preparation of the patient for the TUR had no direct exposure to pathological process. This fact indicates the activity of the pathological neoangiogenesis in tumors in this group of patients.

In contrast, in patients of the 1st group there were significant changes in the density of microvessels, due to the direct effects of probiotics within 120 hours prior to the TOUR as a whole, the average the density of microvesselsin this group decreased from 65.3 ± 3.4 to 52.5 ± 2.7 of 1 mm². It was also stated the dependence of intensity microvessels from the size of the tumor, differentiation and age. In the tumor tissue up to 1 cm in greatest dimension was noted on average 47.7 ± 2.5 vessels up to 2 cm. — 53.8 ± 3.1 of 1 mm². Also, 1 G was characterized by more dense microvascular network (55.3 ± 1.8) in comparison with G 3 (48.1 ± 2.3). In young patients in the Prime working ages showed marked pathological angiogenesis in contrast to patients age — 54.8 ± 2.3 and 47.3 ± 2.7 respectively. In patients with BC, up to 1 cm in greatest dimension was noted in the average the density of microvessels 64.5 ± 4.1 (DI: 62.2–70.3) on 1 mm² of tumor tissue. However, with increase in tumor size up to 2 cm. tended to increase in both the density and the number of microvessels — 68.7 ± 3.1. Thus, the study of the density of microvessels shows that there is a link microvascular angina exponential of the tumor and size of primary lesion, on the background of the lack of dependence of the density of microvesselson the age, localization, gender, and patients. Also, the lowest level of differentiation of the tumor tissue accompanied by a higher frequency of pathological neoangiogenesis. The holding in the pre period traditional conservative methods of therapy do not affect MMR in the tumor tissue. Therefore, these patients remain at high risk of hematogenous tumor cell Traeger before radical TUR, what could be the cause of high frequency of local recurrences BC. In contrast, the use of probiotics neoadjuvant mode significantly reduced the density of microvessels, indicating the inhibition of aggression of tumor cells. This circumstance has directly proportional dependence from age, resources, and differentiation of tumor tissue that dictates the necessity of taking into account in the assessment of further tactics of treatment of patients. It should be noted that the use of probiotics in return, antibiotic therapy does not affect the development of purulent — inflammatory complications of TUR, which is grounded on the absence of existing local complications in observable patients.

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Introduction of the control system for the HIV medicinal resistance to antiretroviral preparations

Abstract: The development of the surveillance of the primary and acquired drug resistance of the human viral of immune deficit (HIV) to the antiretroviral (ARV) preparations among the people living with HIV (PLH) and introduction of the system of control into the practical health service. The strategy which is used by the system of health service includes the use of standardized and simplified schemes of treatment, which corresponds to the international standards and may be used in relation to the specific of the country [2; 3; 8]. Therefore there has been developed methodic recommendation on monitoring of the development of HIV drug resistance to ARV drugs [1]. Performance of the antiretroviral therapy (ART) without taking into account data about resistance to the used preparations may lead to the development of HIV drug crossed resistance to the majority of essential drugs and risk of the distribution of the HIV resistant strains among the general population, that raises a problem in the choice of effective scheme of treatment [4; 5; 6; 9]. Introduction of the system of identification and monitoring of the development of HIV drug resistance to ARV drugs into the clinical practice allows improvement of the quality of treatment and economic efficacy of the therapy in the patients with HIV-infection.

Keywords: HIV, antiretroviral drugs, resistance, genotyping, monitoring.

Materials and methods. In order to study prevalence of the HIV strains resistance to ARV preparations among PLH beginning ART – of primary resistance, the group included adults (≥ 18 years) with HIV-infection, all persons beginning to receive ART for the first time and patients with viral load more than 2000 copies/ml. at the moment of ART beginning. The criteria for exclusion were patients already receiving ART and women receiving previously single dose of nevirapin during delivery.

For studying of prevalence of the HIV strains resistant to ARV drugs among the PLH, receiving ART during 12 months with acquired resistance the group was composed of adults (≥ 18 years) with HIV-infection, all persons having ART during 12 months at the moment of inclusion into the investigation and patients with viral load more than 1000 copies/ml. Criteria for exclusion of the patients were age under 18 years. The blood plasma of the studied patients was material for testing at identification of the HIV drug resistance to ARV preparations.

There were only 375 patients with HIV-infection under our observation. The HIV-infected persons were divided into 2 groups: group 1 consisted of PLH beginning ART for determination of the HIV drug primary resistance to ARV preparations (n = 234), second group was composed of PLH, receiving ART during 12 months for determination of the acquired resistance (n = 141).

The age of the patients from the first group fluctuated from 18 to 65 years (mean age 35.7 years). Males were 119, women — 115. The viral load of HIV-infection was from 376 to 7 451 796 copies/ml (mean 845 248 copies/ml).

The age of the patients of the second group accounted from 21 to 62 years (mean age 33.4 years). Males were 65, women — 77. HIV viral load was from 500 to 56 020 946 copy/ml (mean 550 014 copies/ml).

The viral load of HIV RNA was determined with use of polymerase chain reaction (PCR). For HIV genotyping with PCR method and further DNA sequencing the special test-system was used. The viral RNA was isolated from plasma and was converted into DNA, and some its sites was amplified with use of PCR. The PCR underwent to sequencing for determination of the nucleotide sequence which was compared with the nucleotide sequence of the wild type viral genome for identification of mutations associated with resistance. For interpretation of the results obtained the analysis of sequencing was performed with application of specialized program being in the free access in the Internet (for example, on the site [12]) for comparison of the spectrum of mutations revealed with dada of world computer bases containing information about interrelationship of the mutations revealed with clinical resistance [7; 10; 11].

Results and discussion. The results of study of genotyping with consequent virus sequence there were received the following changes: among the studied patients from the first group HIV resistance to ARV preparations was revealed in 6 patients, that accounted for 2.56%.

Of 6 patients who had HIV resistance to antiretroviral preparations in 5 patients there was noted resistance to nucleoside inhibitors of the reverse transcriptase, such preparations as nevirapin (NVP), efavirents (EFV) and nelfinavir (NFV/r). Among which in 4 patients there was found HIV drugs resistant to preparations nevirapin

(NVR) and efavirentc (EFV). The attenuation of the HIV sensitivity to nevirapin (NVP) in one patient, and to nelfinavir (NFV/r) in the other patients was revealed.

It should be especially noted that among the 6 persons living with HIV in 5 patients during study of resistance of HIV to the nucleoside inhibitors of the reverse transcriptase the revealed high resistance to efavirentc (EFV) met only at the background of high resistance to nevirapin (NVP). In one case the HIV high resistance was registered to preparation nevirapin (NVP) in which to efavirentc (EFV) there was revealed HIV resistance of moderate level.

In 4.44 % of cases from the total quantity of the patients of the second group with revealed resistance to ARV preparations there was established HIV high resistance to protease inhibitors: in one case to nelfinavir (NFV/r) and in two cases to fosamprenavir (FPV/r) (Table 1).

In one patient from this group the HIV high resistance was revealed to all ARV preparations from the group of protease inhibitors: atazanavir (ATV/r), fosamprenavir (FPV/r), idinavir (IDV/r), lopinavir (LPV/r), nelfinavir (NFV/r), sakvinavir (SQV/r) and tipranavir (TPV/r). In the same patient there was found resistance to all ARV preparations of nucleosides and unneucleoside inhibitors of the reverse transcriptase (table 2).

The table 2 shows that the highest prevalence of the cases of virus resistance equally high revealed to the antiretroviral preparations emtricitabin (FTC) and lamividin (3TC), 46.8 % and 46.8 %, respectively. The lowest degree of HIV drug resistance was registered to azidotimidin (AZT) (7.09 %).

It was also revealed that the HIV drug resistance was revealed mostly frequent to nucleoside inhibitors of the reverse transcriptase (Table 3).

Table 1. – Prevalence of the cases of HIV drug resistance to protease inhibitors

Parameter	Drug name							
	ATV/r	DRV/r	FPV/r	IDV/r	LPV/r	NFV/r	SQV/r	TPV/r
Number of cases	2	0	3	1	1	2	1	1
at %	1.42	0	2.13	0.71	0.71	1.42	0.71	0.71

Table 2. – Prevalence of the cases of HIV drug resistance to nucleoside inhibitors of the reverse transcriptase

Parameter	Drug name						
	TDF	FTC	AZT	D4T	DDI	3TC	ABC
Number of cases	24	66	10	13	35	66	36
at %	17.0	46.8	7.09	9.22	24.8	46.8	25.5

Table 3. – Frequency of the cases of HIV drug resistant to nucleoside inhibitors of the reverse transcriptase

Parameter	Drug name			
	RPV	EFV	ETR	NVP
Number of cases	25	78	12	85
at %	17.7	55.3	8.51	60.3

This table shows that in the patients of the second group with high frequency observed there was observed high drug resistance to such nucleoside inhibitors of the reverse transcriptase as azidotimidin (AZT) in 60.3 % cases and efavirence (EFV) in 55.3 % of cases.

It is necessary to note that though the primary resistance among the population accounted for 2.56 %, the acquired resistance with high frequency was revealed to many nucleoside and unnucleoside inhibitors of the reserve transcriptase that may increase risk of the distribution to ARV resistant HIV drugs among the population.

Therefore, monitoring of the HIV drug resistance to antiretroviral therapy is one of the main directions in the prevention of the distribution of the viral resistant forms and in the specific therapy of the patients with HIV-infection.

Thus, there has been studied prevalence of the HIV-drug resistance to the known antiretroviral drugs as in the people, living with HIV not receiving ART so in the patients receiving ART during 12 hours. It was established that the primary resistance was observed in 2,56 % of case among the PLH not receiving ART, the high frequency of HIV drug resistance to many inhibitors of the HIV enzymes should aware about presence of risk of distribution of the HIV resistant strains among the population. All above-described show necessity of identification of the factors resulting in insufficient ART with development of HIV drug resistance to ART drugs, that, in its turn, increase in efficacy of the antiretroviral therapy performed and results in improvement of the quality and duration of life in the patients with HIV-infection.

Conclusions:

1. Introduction of the surveillance system for the HIV drugs resistance to antiretroviral therapy and into the clinical practice allows determination of the prevalence of the HIV resistant strains both among the people living with HIV, not receiving ART and among he patients being on the background of therapy.

2. The results of the study of HIV drugs resistance to ART drugs show that primary resistance among the people living with HIV not receiving ART accounted only 2.56 %.

3. Analysis of the HIV drug resistance to ARV among the patients receiving ART, show presence of the viral strains resistant to many inhibitors of the viral enzymes that indicates about need in increase of measures for prevention of the distribution of the HIV resistant forms among the population.

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Protective efficiency of "Phosphogliv" at high active antiretroviral therapy in patients with HIV-infection, associated with chronic viral hepatitis C

Abstract: Purpose of research was assessment of the hepatoprotector efficacy in high active antiretroviral therapy (HAART) in the patients with HIV-infection associated with chronic viral hepatitis C. There has been studied efficacy of the drug hepatoprotector "Phosphogliv" in the complex of specific HAART in the patients with HIV-infection associated with chronic viral hepatitis C, and it has been established that the positive dynamics has been noted as in relation to clinical symptoms (attenuation and/or elimination of clinical expressions of disorders in the hepatobiliary system), so as in the biochemical characteristics, which has been expressed by reduction in the contents of total bilirubin, activity of transaminases, thymol test, AP and GGTP, insignificant reduction of the contents of cholesterol and glucose in the blood.

Keywords: HIV-infection, phosphogliv, high active antiretroviral therapy, chronic viral hepatitis C, treatment.

Antiretroviral drugs are hepatotoxic [1; 3; 6; 10]. There was chosen drug "Phosphogliv" with purpose of reduction of hepatotoxicity of antiretroviral drugs in treatment of the patients with HIV-infection associated with chronic viral hepatitis C [5; 9]. Phosphogliv is a hepatoprotector. Phospholipids have ability to effect on the state of the cellular membranes as their integral components and have strong hepatoprotective effect on the liver. This drug prevents atrophy of the cellular structures in the liver, normalizes activity of the alaninaminotransferase (ALT) and aspartataminotransferase (AST). Phosphogliv is used in dose 2 capsule 3 times a day during 3 months in hepatitis of various etiology. Taking into account that one of the unfavourable effect of HAART is hepatotoxicity, the study of efficacy of Phosphogliv with purpose of reduction of hepatotoxicity of HAART in the patients with HIV-infection associated with chronic viral hepatitis C seems to be rational.

Material and methods. Our surveillance covered only 65 patients with HIV-infection associated with chronic viral hepatitis C at the age of 16 to 58 years. The patients were divided into 2 groups: studied group consisted of patients with HIV-infection associated with chronic viral hepatitis C, who were prescribed phosphogliv additionally to HAART (n = 36), control group was composed of patients with HIV-infection associated with chronic viral hepatitis C who received HAART without phosphogliv (n = 29).

The patients were comparable in relation to sex, age, health state, clinical stages of HIV-infection, presence of accompanied and opportunistic infections. In the both groups the general health state was evaluated as of moderate severity.

The diagnosis of "chronic viral hepatitis C" in the studied patients was verified on the basis of epidemiological, clinical and laboratory data (by method of immunoenzymatic analysis there were revealed antiHCV in blood, with method of polymerase chain reaction the quantitative and qualitative determination of viral hepatitis C RNA — HCV RNA was performed).

HAART was prescribed for the patients in the both groups according to the recommendations of the World Health Organization (WHO). The patients of the both groups received schemes HAART without hepatotoxic drug nevirapin. The patients in the both groups did not receive specific antiviral preparations against viral hepatitis C.

According to a number of authors hepatic toxicity of the antiretroviral preparations is often observed in the first 4 weeks (to 3 months after prescription of HAART) [2; 4; 7; 8].

So, the patients were examined before onset and one month after HAART prescription.

The complex clinical-biochemical examination included assessment of the treatment efficacy by dynamics of the clinical symptoms of the hepatobiliary system impairment and biochemical blood parameters.

The determination of the total protein in the blood serum was performed with use of biuretic method, and albumin concentration in the blood serum was measured by unified colorimetric method. There were used reagents of the Manufacture OOO "Olvex Diagnosticum" (Russia).

Activity of AlT, AsT, γ-glutamiltranspeptidasa (GGTP) and alkaline phosphatase (AP) in the blood serum was determined with kinetic US method (IFCC) with kits of reagents of firm "Herbos Diagnostika" (Croatia).

The level of bilirubin total and its fractions in the blood serum was determined with method of Endrassic-Grof.

For identification of the mesenchymal-inflammatory syndrome in the studied patients there was used thymol test sensitive to changes in the lipid contents.

The parameters of the glucose contents (glycemia) in the blood were determined with use of enzymatic-colorimetric method with kits of reagents of Firm "Herbos Dijagnostika" (Croatia).

Concentration of the urea in the blood serum was measured by enzymatic-colorimetric method with kit of reagents NOVOKARB of the Manufacture ZAO "Vector-Best" (Russia).

The level of creatinin in the blood serum of the patients was measured with use of pseudokinetic method on the basis of Yaffe reaction without deproteinization with kit of reagents of the Manufacture OOO "Olvex Diagnosticum" (Russia).

The contents of cholesterol total in the blood serum was determined with enzymatic-colorimetric method with use of reagents of Manufacture OOO "Olvex Diagnosticum" (Russia).

Statistic processing of the results obtained was performed on the computer with use of special program EXCEL. The results were considered to be statistic significant in all the used methods at $p < 0.05$.

Results and discussion. The use of drug Phosphogliv resulted in significant decrease or elimination of the clinical symptoms, that contributed to the improvement of the general health state (Table 1).

Table 1. – Occurrence of the clinical symptoms in the patients
with HIV-infection associated with viral hepatitis C

Clinical symptoms	Studied group			Control group		
	before onset of HAART	1 month after HAART onset	P	before onset of HAART	1 month after HAART onset	P
General weakness	87.1	51.3	< 0.05	86.9	73.8	> 0.05
Fatigue	88.8	57.1	< 0.05	93.3	84.1	> 0.05
Insomnia	70.9	65.7	> 0.05	68.7	54.5	> 0.05
Bitter in the mouth	72.2	31.3	< 0.05	70.6	61.9	> 0.05
Poor appetite	95.5	47.1	< 0.05	93.9	85.2	> 0.05
Nausea	27.8	7.10	< 0.05	28.1	21.9	> 0.05
Pains in the right hypochondrium	61.5	24.3	< 0.05	58.7	46.3	> 0.05
Pains in the epigastrium	53.2	20.3	< 0.05	47.8	43.3	> 0.05
Pains in the joints	31.7	27.9	> 0.05	28.5	26.6	> 0.05
Pruritus	43.0	21.0	< 0.05	31.0	29.0	> 0.05
Eruptions	21.0	9.0	< 0.05	19.0	17.0	> 0.05
Sclera yellowness	33.9	15.2	< 0.05	36.3	32.9	> 0.05
Hepathomegalia	31.4	27.6	> 0.05	29.5	28.3	> 0.05
Splenomegalia	19.0	19.0	> 0.05	18.0	18.0	> 0.05

Note: P — reliability of the differences in the values before HAART onset and one month after HAART onset.

The table shows that in the patients of studied group there was revealed a number of statistically reliable changes in comparison with control group; attenuation of the general weakness, fatigue, bitter in the mouth, nausea, pains in the right hypochondrium and epigastrium, yellowness of sclera, pruritus and appetite improvement while there were no reliable differences between groups in relation to such symptoms as insomnia, pains in the joints, hepatomegalia and splenomegalia.

With regard to biochemical shifts in the both groups there were found hyperfermentemia and hyperbilirubinemia, as well as disorder of pigment metabolism. The parameters of the contents of the total protein, albumin, cholesterol and glucose in the blood were in normal borders in the majority of patients.

The changes of the biochemical parameters reflecting liver functional state on the background of the application of various methods of treatment presented in table 2.

Table 2. – Biochemical parameters in the patients with HIV-infection associated with chronic viral hepatitis C

Parameters	Studied group			Control group		
	Before HAART onset	1 month after HAART onset	P	Before HAART onset	1 month after HAART onset	P
Total bilirubin, mcmol/l	39.9 ± 2.1	18.2 ± 1.2	< 0.05	35.6 ± 1.8	33.5 ± 1.5	> 0.05
AlAT, mmol/lʌ	1.3 ± 0.2	0.41 ± 0.2	< 0.05	1.2 ± 0.2	1.0 ± 0.3	> 0.05
AsAT, mmol/l	0.96 ± 0.2	0.37 ± 0.1	< 0.05	0.95 ± 0.3	0.8 ± 0.3	> 0.05
Total protein, g/l	63.5 ± 2.0	67.3 ± 1.1	> 0.05	65.5 ± 3.1	66.3 ± 3.1	> 0.05
Prothrombin index	67.3 ± 2.1	69.5 ± 2.2	> 0.05	65.3 ± 2.9	66.1 ± 2.5	> 0.05
Creatinin, mcmol/l	142.3 ± 3.3	129.5 ± 3.0	> 0.05	145.6 ± 2.8	140.2 ± 2.5	> 0.05
Urea, mmol/l	7.1 ± 0.5	6.7 ± 0.4	> 0.05	7.3 ± 0.6	7.1 ± 0.5	> 0.05
Thymol test, unit	6.7 ± 0.2	3.7 ± 0.1	< 0.05	6.8 ± 0.3	6.5 ± 0.3	> 0.05
Cholesterol, mmol/l	5.6 ± 0.4	3.9 ± 0.1	< 0.05	5.5 ± 0.7	5.2 ± 0.8	> 0.05
Glucosa in blood mmol/l	5.9 ± 0.3	3.5 ± 0.1	< 0.05	5.4 ± 0.3	5.2 ± 0.3	> 0.05
Alkaline phospatase, ME	297.3 ± 2.6	158.5 ± 2.1	< 0.05	293.8 ± 3.7	279.9 ± 3.4	> 0.05
GGTP, ME/l	65.1 ± 2.2	32.3 ± 1.9	< 0.05	66.2 ± 2.9	57.4 ± 2.4	> 0.05

Note: P — reliability of differences in the biochemical parameters before HAART onset and one month after HAART onset.

The table shows that at inclusion of the drug Phosphogliv into the basic therapy of patients on the background of HAART the positive dynamics was retraced in the biochemical parameters: there was noted reduction of the total bilirubin contents, activity of the hepatic enzymes — AlAT and AsAT, thymol test, alkaline phosphatase and γ-glutamiltranspeptidase (GGTP) There was noted insignificant decrease in the contents of cholesterol and glucose in the blood.

The values of thymol test in the patients of the studied group were reliably reduced (P < 0.05) even to the second week, that was not noted in the control group.

It is necessary to note though on the background of HAART the mean level of the AlAT and AsAT parameters reduced in the patients of control group to the normal values, in 23 % of patients in this group after prescription of ART there was noted increase in activity of these enzymes and contents of the total bilirubin in the blood, and in 3 patients there was found marked increase both in activity AlAT and the contents of total bilirubin with predominance of the direct bilirubin. Evidently, it was connected to early unfavorable adverse (hepatotoxic) effect of antiretroviral drugs on the enzymatic and pigment liver function.

Consequently, the use of hepatoprotectors at prescription of HAART for the patients with HIV-infection associated with chronic viral hepatitis C may be considered as rational due to clinical-laboratory efficacy.

Thus, there has been studied efficacy of the drug hepatoprotector "Phosphogliv" in the complex of specific HAART in the patients with HIV-infection associated with chronic viral hepatitis C, and it has been established that the positive dynamics has been noted as in relation to clinical symptoms (attenuation and/or elimination of clinical expressions of disorders in the hepatobiliary system), so as in the biochemical characteristics, which has been expressed by reduction in the contents of total bilirubin, activity of transaminases, thymol test, AP and GGTP, insignificant reduction of the contents of cholesterol and glucose in the blood. The above-described features indicated about advisability of application of drug Phosphogliv at prescription of HAART in the patients with HIV-infection associated with chronic viral hepatitis C in order to reduce hepatotoxic effect of the used antiretroviral preparations and to contribute to the improvement of the quality of life in the patients by HAART optimization.

Conclusions:

1. Use of drug Phosphogliv on the background of HAART provides for positive effect on the clinical and biochemical parameters, that is expressed by improvement of the general health state, elimination or attenuation of the clinical symptoms and reduction of the level of liver transaminases.

2. Phosphogliv as effective hepatoprotector serves as perspective addition to HAART in the patients with HIV-infection associated with chronic viral hepatitis C.

3. Application of Phosphogliv results in decrease in hepatotoxic manifestations of HAART in HIV + HCV co-infection.

4. The monthly monitoring of the biochemical blood characteristics on the basis of HAART in the patients with HIV-infection associated with chronic viral hepatitis C will allow improvement of the quality of life in these patients.

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Optimization of the surgical treatment for high cicatricle tracheal stenosis

Abstract: Benign cicatricle process of the breathing tube is often localized in the subplical area of the larynx and upper trachea and therefore, resection and anastomosis in the upper segment of the respiratory tract represent a separate problem. The

paper reflects the experience of treatment of 86 patients who underwent intubation, mechanical ventilation, tracheostomy in the intensive care units of the Tashkent Medical Academy. The integrity of the airway restored by imposing of the tracheal anastomosis in 54 (62.8 %) patients. Tracheolaryngeal anastomosis was imposed in 32 (37.2 %) patients. The clinic has been developed and applied in 17 patients a new method of imposing of the tracheolaryngeal anastomosis at high cicatricle tracheal stenosis, which allowed to reduce the number of complications in the early and late postoperative period in half.

Keywords: trachea, cicatricle tracheal and larungeal stenosis, tracheolaryngeal anastomosis.

The urgency of the problem. The incidence of cicatricial stenosis of the trachea after resuscitation, accompanied by long-term artificial lung ventilation (ALV), and later tracheostomy, continues to be high and, according to recent data, ranges from 0.2 to 25 % in comparison with other post-operative complications. But by the third day of mechanical ventilation in the cartilage of the trachea occur pathological processes which result in the loss of cartilage support function, which eventually leads to scarring and stenosis of the trachea [5; 11].

Further, causes of the tracheal stenosis may be surgery on the trachea or tumors of the trachea or surrounding organs and tissues, with invasion into the lumen of the respiratory tube, and injury of the neck organs [1; 6].

Some importance has increased activity of fibroblasts in patients with severe trauma, as well as individual features of connective tissue that contribute to the formation of rough scars, including on-site deep damage to the tracheal wall [12].

This group of patients requires complex and aggressive laryngo-tracheal plastic surgery up to the circular resection of the affected area of the trachea with the imposition of direct anastomosis "end to end" [8].

The analysis of published data and a review of the patent documentation has shown that the development of reconstructive and plastic surgery on the tracheobronchial tree is still an important issue today in pulmonary surgery. The most difficult problem of this section is surgery of trachea-tracheal formation, especially trachea-laryngeal anastomoses.

In this context, the aim of our study was, warning of the insufficiency of the trachea-laryngeal anastomosis and prevention of restenosis of the trachea by improving the technology of surgical treatment of cicatricial stenosis of the trachea and larynx.

Clinical material and methods of research. From 1984 to the present time in the clinic of the Tashkent Medical Academy (TMA) were treated 186 patients with the cicatricial stenosis of the trachea aged from 15 to 68 years. Among them were 112 male patients and 74 — female. Most patients, 172 patients (92.4 %), were young and middle-aged. Most often the stenosis of the trachea occurred after respiratory resuscitation in trauma patients, the frequency of which is higher in young and middle age, especially in males. In identifying the causes of cicatricial stenosis of the trachea has learned that, in the history of these patients had mechanical ventilation, tracheostomy, injuries or transferred inflammatory diseases of the trachea.

The most common mechanical ventilation was carried out at a craniocerebral trauma (35.2 %), the heart and internal organs operations (14.8 %), chest and abdominal trauma (8.8 %), neck injury (6.0 %), poisoning with chemicals (5.6 %), throat edema (5.3 %). The ventilation duration varied from a few hours to 25 days. Symptoms usually occur within the period of 7 to 60 days after removal of the tracheostomy or endotracheal tube. With a functioning tracheostomy hospitalized 87 (46.8 %) patients. Persistence stoma varied from several weeks to several years. Retracheostomy at different times after decannulation was performed at 23 (12.4 %) patients.

Most often, in 125 (67.2 %) of patients, the cicatricial stenosis was located in the cervical trachea, in 32 of these patients it was combined with narrowing of the subplical area of the larynx. The defeat of the cervical-thoracic trachea was observed in 45 (24.2 %) and breast — in 16 (8.6 %) patients. In 4 cases the SCT was complicated by esophageal-tracheal fistula at the level of cervical trachea, and in 2 of them are in the process of scar was involved lower larynx. The patients were mostly from the II–III rumen degree of airway narrowing. In 44 (23.6 %) patients on admission was marked stridor. Cicatricial-granulation tracheal stenosis was diagnosed in only 10 (5.4 %) patients. This type of contraction is considered as the early stage of cicatricial stenosis, when the granulation tissue is tender and has not yet been transformed into a rough coupling.

Indications for surgical treatment of cicatricial stenosis of the trachea established in 86 (46.2 %) patients. In 100 (53.8 %) patients were used endoscopic techniques to expand and maintain the tracheal lumen. Surgical treatment consisted of resection surgery (circular resection of the trachea or the larynx). In 10 patients at admission was diagnosed posttracheostomic cicatricial stenosis of the cervical trachea I and II degree, which does not cause difficulty in breathing and did not require surgical correction.

Results and discussion. Circular resection of the trachea with the anastomosis end-to-end is a radical operation that allows to remove the affected segment and restore the integrity of the airway. Arsenal of modern methods of ventilation (standard ventilation, shunt system — breathing, high frequency ventilation) allows to choose the most convenient for the surgeon and for the patient safe way to maintain gas exchange for each stage of surgery [3].

We produced 86 circular resection of the trachea. The indication for surgery was limited cicatricial stenosis of the trachea, when it was possible to restore the integrity of respiratory tract using anastomosis. The resection length varied from 2 to 12 cartilaginous half-rings. On average, it is safe to resect 3–4 cm. of the trachea, which is 5–8 cartilaginous half-rings. It is necessary to take into account the constitutional-anatomical features of the patient, technical capabilities, experience of the surgeon, as well as the previous intervention on the trachea.

The location and extent of cicatricial stenosis determined the choice of surgical approach. Surgical access is to create a user-friendly approach to the affected segment of the trachea, to ensure the implementation of its broad mobilization and anastomosis. In 65 patients used the isolated cervical access (cervicotomy by Kocher), in 21 — cervicotomy with the partial longitudinal-transverse sternotomy. The broad mobilization of the trachea reduces the tension of the linkable anastomosis edges. This is particularly important when combined thoracic tracheal stenosis with peritracheal cicatricial process in the neck after tracheostomy.

The integrity of the respiratory tract was restored by imposing the tracheal anastomosis in 54 (62.8 %) patients. The tracheo-laryngeal anastomosis was performed in 32 (37.2 %) patients. The indication for tracheo-laryngeal resection was cicatricial stenosis of the cervical trachea and larynx to the upper limit of scarring at least 1.5–2 cm. from the vocal folds while maintaining the latter function.

The tracheo-laryngeal resection is the most difficult in the trachea surgery. Since J. Gerwat [4] and F. Pearson [10] demonstrated the ability to secure th tracheo-laryngeal resection with anastomosis between the trachea and larynx, surgical approach for this

localization of stenosis has become more aggressive. The tracheo-laryngeal resection is dangerous because of possible damage to the recurrent laryngeal nerve with the post-operative paralysis of the larynx. This complication arises in the allocation of the posterolateral wall of the larynx and trachea from the surrounding tissues, which are recurrent and laryngeal nerves. It should be noted that the subplical diameter of the larynx is greater than the diameter of the cervical trachea, which is important in relation of the edges of tracheo-laryngeal anastomosis for prevention of restenosis.

At present, in the cases of non-compliance of the diameters of the resected ends of the breathing tube used different versions of the anastomosis. The principle of "telescope" when the cartilage of the smaller the diameter of the lumen of the trachea is held in most of the diameter of the larynx in the 1–2 mm., and membranous part sewn edge to edge. Sometimes, to adapt the different diameters of the resected portions of the trachea or the larynx using the so-called "rotary anastomosis" when the membranous part of the trachea and larynx are displaced relative to each other by 30–60 degrees. This makes it possible to stretch the portions to prevent the narrowing of the lumen of the anastomosis and reduce its tension [9].

Also discloses a method of comparing the airway with various diameters after the tracheo-laryngeal or tracheal resection. After resection of the breathing tube obliquely impose the direct snap to the excess portion. With the twisting of the wrist the captured cartilage are breaking. The clamp is removed. Sewn wedge-shaped portion of the cartilaginous and membranous tissue by placing side hardware seam clamp track. After that impose an anastomosis between the stumps [2].

Or, after resection of the trachea at the edge of the fibro-cartilage of the joints impose a single provisionally, and then sipping for them, impose a provisional continuous encircling stitch the entire membranous wall of the tracheal ends. Knotted first provisionally seam stitching and the same form all the fibro-cartilaginous portion of the anastomosis. Then, sipping the ends of the continuous seam and sealed correlate membranous wall of the anastomosis, knotting the ends of the ligatures with the ligatures of the first guide joints. The anastomosis line strengthened by suturing of the flap of mediastinal pleura [7].

The disadvantage of this method is the inability to use only continuous suture in the formation of the front and rear semiperimeter of the anastomosis when applying tracheo-laryngeal anastomosis due to the mismatch of diameters of the fragments, as well as the fact that the use of the flap mediastinal pleura to enhance tracheal sutures, as practice shows, is not able to reliably prevent the spread of purulent-inflammatory process in insolvency seams.

The clinic of the Tashkent Medical Academy developed and applied in 17 patients a new method of imposing of the tracheo-laryngeal anastomosis at high cicatricial stenosis of the trachea, which includes a comparison of the sutured fragments of anastomosis, the imposition of provisional stitches on anastomosis wall, tying the ends of ligatures proviosry seams and stitching, while the cross-linkable moieties anastomosis are the trachea and larynx. For comparison, the diameter of the trachea and larynx, first perform a longitudinal section of a length of 1–1.5 cm. in the caudal part of the anastomosis in the midline of the trachea cartilage semicircle, crossing the half-ring tracheal cartilage, and then on the walls of the anastomosis is applied provisionally sutures with Vicryl or PDS thread 2–0 or 3–0 with the atraumatic needle on individual seams through all layers. When suturing the front wall in the region of intersection of the cartilage stitched with the capture of the previous half-rings of the trachea, then the ends of provisional ligature knotted stitches alternately from the medial wall toward the side, first at the rear, then the front.

The laryngeal circumference is greater than the tracheal circumference and does not comply with the anastomosis, that's why we offer a change (increase) the configuration of the circumference of the anastomosis linkable edges after tracheal resection by crossing one half rings of cartilage anterior tracheal wall. After suturing and anastomotic matching edges, crossed tracheal cartilage is expanded in different directions, and the discrepancy of the circle of the larynx and trachea linkable wound edges. That is, when comparing the stitched edges of the anastomosis of the trachea crossed semicircle, pushing increases the inner circumference of the distal end of the anastomosis. As a result of this discrepancy is eliminated diameter loose-ends of the tracheo-laryngeal anastomosis, which is important in the prevention of insufficiency of the tracheo-laryngeal anastomosis and prevention of restenosis of the trachea in the early and late postoperative period.

Conclusions

1. In the application of the proposed method in patients with cicatricial stenosis of the upper respiratory tube the signs of anastomositis of the tracheo-laryngeal anastomosis and its insufficiency in the postoperative period were notobserved. In the control group of patients this complication observed in 2 cases.

2. The follow-up of patients in the period from 1 to 3 years, showed no signs of restenosis in all patients operated on the proposed method. While in the control group the signs of restenosis in the late postoperative period were observed in 2 patients.

Therefore, the resection of cervical trachea with the restoration of the integrity of the airway with anastomosis is well developed and, as a rule, do not cause trouble, when localization of the pathological process not in the tracheo-laryngeal segment. Despite the rapid development of technology and the anesthetic, the latest intervention more difficult in technical terms, as well as the possible development of postoperative complications and therefore even today the tracheo-laryngeal types of anastomoses in need of further research and discussion.

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Biochemical parameters of the effect of laser radiation in the experiment

Abstract: Was studied effect of different modes of photodynamic irradiation in 80 rats on indicators of endogenous intoxication in dynamics.

PDT in 300 mJ pulsed mode (630 nm. for 3 minutes) does not cause endogenous intoxication and intensification of lipids peroxidation (LPO), that allow to use the appropriate mode in the practice of ophthalmology. Using of 300 mJ pulse mode (890 nm. for 3 minutes), 60 J PD mode (630 nm, 15 seconds) and particularly 120 J PD mode (630 nm. for 30 seconds) leads to gradual accumulation of average-weight molecules (AWM) and intensification of LPO in the circulating blood of animals, that leads to development of endogenous intoxication, therefore such dosage cannot be used in vision organ.

Keywords: photodynamic therapy, photodynamic doses, experiment, endogenic intoxication, molecules of average molecular weight, malon dialdegidis.

Introduction. Achievements of photobiology laid a solid foundation for the development and practical application of lasers, including the field of ophthalmology. There are widely known stimulatory, microcirculatory and anti-inflammatory effects of therapeutic doses of radiation exposure. It is appropriate to mention that one of the promising areas in ophthalmology is photodynamic therapy based on the selective destruction of proliferating cells as a result of photochemical reactions caused by reacting of accumulating therein photosensitizer (PS) which is activated by the light of particular wavelength [4, 25–30; 9, 55–58; 10, 167; 11, 155–162].

The development and introduction of photodynamic therapy (PDT) and fluorescence diagnosis (PD) in the treatment of cancer has caused deep interest of researchers to the possibility of using these techniques in other fields of medicine and in particular in ophthalmology [7, 39–40; 8, 23–25;13, 45–51; 15, 740–746; 18, 228–232].

Today, the perspectives of PDT treatment are associated with treatment of choroidal neovascularization of various etiologies, especially in age-related macular degeneration, diabetic retinopathy, high myopia complicated and ocular oncologic diseases [2, 45–47; 3, 265; 12, 66–68; 14, 752–763; 15, 740–746; 17, 747–752].

Over the last 5 years, there are many publications concerning the use of PDT at non-cancer ophthalmic diseases, however, it should be noted that very few studies are devoted to the fundamental aspects of this trend [13, 45–51]. At the same time, such an important aspect as the impact of the so-called photodynamic doses (PDD) on biological tissues is not studied yet.

Having a cytotoxic effect PDT undoubtedly affects the processes of oxidative stress in the body. However, there is no information in the available literature on the study of the effects on the processes of lipid peroxidation (LPO), depending on the mode of action of PDT [5, 3–8; 6, 15–18].

The introduction of PDT in clinical practice of ophthalmology in Uzbekistan was significantly constrained by high cost of foreign trade photosensitizers (PS) and laser equipment.

In Uzbekistan there was developed an apparatus working in a range of 630 nm., output power up to 5 W. (Mavlyan-Khodzhaev R. Sh. and S. Sadykov R. A., 2009) and was used in purulent infected hardhealed wounds in surgery, dentistry and dermatology [9, 55–58; 10, 167].

However, there are still no works on the application of PDT in the treatment of eye diseases in Uzbekistan, using domestic laser systems.

Objective: To evaluate the effect of electromagnetic radiation on the eyes of rats at doses used for photodynamic therapy, on the level of malon dialdegidis (MDA) and its relationship with indicators of endogenous intoxication in rats in the experiment.

Material and methods

Research was conducted on 80 white mongrel rats. A burn of cornea had been performed to all the animals. Laser radiation was performed to the projection of the right eye (5 mm. aperture) daily by 7 irradiations per course, on the domestic ALT "East" equipment.

Depending on the dose of exposure the animals were divided into 5 groups of 10 animals each — control (intact animals) and 4 experimental groups:

1) 300 mJ pulse mode (control group — 890 nm, 3 min.);

2) 300 mJ pulse mode (630 nm. for 3 minutes);

3) 60 J PDD (630 nm. for 15 seconds);

4) 120 J PDD (630 nm. for 30 seconds).

Animals were sacrificed after 3, 7 and 14 days of application of PDT. All the experiments on animals were conducted in accordance with the recommendations of WHO's work with experimental animals, and with caution. An euthanasia was performed to rats when their condition was assessed as moribund.

Determining the level of the average molecular weight (AMW) in the serum was performed by the method of I. M. Korochkin et al. (1984) [5, 3–8]. To 0.2 ml. of the bioassay there was added 0.2 ml. of 16 % solution of trichloroacetic acid (TCA) and the proteins were precipitated by centrifugation. 2.7 ml. of distilled water was added to 0.3 ml of the supernatant and measured for UV absorption with a spectrophotometer at a wavelength of 254 nm. in quartz cuvettes with a pathlength of 1 cm. versus blank sample. In the blank sample 0.1 ml. of the TCA solution was added to 2.9 ml. of water. The level of AMW was expressed in units.

Determining the level of malon dialdehyde (MDA) in the serum was performed by the method of A. I. Andreeva et al. [1, 41–43].

Results and discussion

Studies have shown that in animals of the 1st group treated with 300 mJ pulse mode (890 nm. for 3 minutes), the level of MDA in serum increased to 3.17 times on the third day of exposure (Table. 1). Intensification of lipid peroxidation stayed further, only to the end of the experiment we observed a decrease in 2 times in comparison with the values of previous periods, but they significantly exceeded the indicators of intact rats in 1.5 times. The third group of animals irradiated with 60 J in PD mode (630 nm.) for 15 sec. however the content of MDA increased significantly early after exposure but in future we observed a significant increase of it in 1.47 times. Using a more powerful mode of exposure (Group 4) resulted in an intensification of lipid peroxidation: significant increase of the MDA level in 2.05; 1.97 and 1.98 times, respectively timing after 3, 7 and 14 days after irradiation.

Analyzing the results of endogenous intoxication, evaluated by the level of AWM ther should be noted the coincidence of the dynamics of its changes to the index of hyperlipoperoxidation. Thus, in the animals of the Group 1 the level of AWM in serum has increased sharply to 2.37 times on the 3rd day, further it gradually reduced, but still left higher than the values in intact rats (Table. 2).

In the 2nd group of indicators of endotoxemia were within the reference values. The third group of animals' indicators AWM in blood serum on the 3rd and 7th day were within normal values, but in the future we saw their increase. Using a more powerful mode of exposure (Group 4) resulted in a gradual accumulation of AWM in the circulating blood of animals.

Table 1. – Content of MDA in the blood serum of experimental animals, M ± m

Groups	Terms of the study, days		
	3	7	14
intact	5.12 ± 0.37		
1) 300 mJ pulse mode (890 nm. 3 min.)	16.24 ± 1.22***	15.38 ± 1.08***	7.69 ± 0.45**
2) 300 mJ pulse mode (630 nm. 3 min.)	6.55 ± 0.47**	5.13 ± 0.33	5.15 ± 0.28
3) 60 J PD mode (630 nm. 15 sec.)	6.12 ± 0.29**	5.59 ± 0.38	7.55 ± 0.33*
4) 120 J PD mode (630 nm. 30 sec.)	10.05 ± 0.54***	10.09 ± 0.41***	10.12 ± 0.32***

Note: * — accuracy of the relative indicators of intact rats (* — $p < 0.01$; ** — $p < 0.05$; *** — $P < 0.001$).

Table 2. – Content of AWM in the blood serum of experimental animals, according to doses of PDT, n = 6–7, M ± m

Groups	Terms of study, days		
	3	7	14
Intact	0.091 ± 0.007		
1) 300 mJ pulse mode (890 nm. 3 min.)	0.210 ± 0.012	0.187 ± 0.013	0.165 ± 0.009*
2) 300 mJ pulse mode (630 nm. 3 min.)	0.110 ± 0.008	0.102 ± 0.008	0.083 ± 0.007
3) 60 J PD mode (630 nm. 15 sec.)	0.092 ± 0.007	0.094 ± 0.008	0.116 ± 0.011*
4) 120 J PD mode (630 nm. 30 sec.)	0.122 ± 0.009	0.137 ± 0.010*	0.187 ± 0.012*

Note: * — the difference between the indices of intact and experimental groups reliable, $P < 0.05$.

Therefore, when using the pulse mode of PDT 300 mJ (630 nm. for 3 minutes) the intensification of peroxidation and the development of endogenous intoxication are not observed. Our results correspond to some extent to the results obtained by R. A. Sadykov et al. (2012), which have shown the reduction of leukocytes intoxication index (LII) from 6–8 conventional units to 1.95 conventional units in patients with purulent wounds after a course of PDT with MB after 3 days, to the 10th days of comprehensive treatment of the value of FRI meet regulatory [6, 15–18]. According to the authors, this condition is associated with the increase of nonspecific resistance of patients' organisms and the reduction of intoxication. There was also marked a decrease in terms of clearance of the wounds from the detritus and purulent fibrinous masses, appearance

of granulation and beginning of epithelialization. One of the mechanisms of such positive action is a maximum antibacterial effect against multi-drug resistant strains of microorganisms.

Based on these data, the following conclusions:

1. Application of PDT in 300 mJ pulse mode (630 nm. for 3 minutes) does not cause endogenous intoxication and intensification of lipid peroxidation.

2. PDT with high power leads to an intensification of lipid peroxidation, the severity of which depends on the duration of exposure. In the 300 mJ pulse mode (890 nm. for 3 minutes), 60 J PD mode (630 nm., 15 seconds) and 120 J PD mode for 30 minutes there observed the gradual accumulation of lipid peroxidation products and development of endogenous intoxication.

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The results of medicated decreasing of intraocular pressure at neovascular glaucoma

Abstract: The usage of combined fixed, hypotensive drug brimoptic in NVG leads to an authentic decrease IOP, especially in NVG second stage ($p < 0.05$). In third stage of NVG, given drug is recommended for decrease of IOP in preoperative period of fistulaized operation.

Keywords: intraocular pressure, neovascular glaucoma, brimoptic, fixed combine preparation.

Relevance

Neovascular glaucoma (NVG) is one of the severe and prognostic unfavorable form of secondary glaucoma that develops due to diabetes, atherosclerosis of carotid artery and chronic uveitis [1, 6–9; 2, 9–11; 3, 19–23]. In fact the pathogenic factor of given process is severe chronic ischemia of inner parts of the retina. Appeared hypoxic zones of the retina produce vasoproliferative agent during the process of revascularization, then it spreads to the anterior segment of the eye. As a result iris rubeosis and fibrovascular membrane occur at the angle of anterior chamber. Hurdles of outflow caused in open angle of anterior chamber can further lead to the secondary angle closure glaucoma that treatment is problematic. There are three stages of NVG according to M. B. Schields (1997) classification: first — iris rubeosis, initial rubeosis of angle of anterior chamber, IOP is normal; second — secondary glaucoma with open angle of anterior chamber and third stage — glaucoma with closed angle of anterior chamber.

The main method of treatment of NVG is surgical intervention that based on principles of pathogenesis (self-draining, fistulized and other) and in half cases connected with risk of operative and postoperative complications of hemorrhagic genesis. Because of cicatricial complications, the block of created zones of filtration is occurred by cicatricial tissue and IOP can be elevated [4, 129; 5, 346–351; 6, 26; 7, 24; 8, 161; 9, 143].

These days for prophylaxis of postoperative and intraoperative complications, some schemes of prepared treatment are acknowledged as effective: hypotensive preparation, anti-VEGF therapy, corticosteroid therapy, laser methods, cyclodestructions, cyclopotocoagulations, photodynamic therapy [10, 1695–1705; 11, 247–249; 12, 1695–1705]. For compensation of IOP in preoperative period, at present days in the pharmacologic market of Uzbekistan there are a plenty of preparations of β-blockers, ICA and α-agonists [13, 259–260; 14, 253–254]. However, previously their hypotensive effectiveness was studied only in POAG or examinations were carried out in different ethnic groups [15, 14–17].

The treatment of POAG was carried out with a new combined fixed preparation Brimoptic (Liquar, Armenia) in our ophthalmologic clinics of the Tashkent Medical Academy. Preparation contains two main ingredients: orimodin tartrat, that is considered to be a presenter of second generation of selective α 2 agonists, which selectivity is 30 times more than other presenters of given group, and timolol maleat — non-cardioselective β — adrenobloker. The mechanism of influence of brimonidin connects with restriction of production of fluid of anterior chamber and along with it accelerates uveoscleral outflow of intraocular fluid. The analysis of carried out clinic examinations illustrated the high initial hypotensive and vasoconstrictive effects of preparation in POAG. During the acute drug test that depends on initial level, IOP decreases by 6 –21 mm. Hg. in 91 % cases, does not influence on the size of pupil during the prolonged drops. Considering observed specialty of brimoptic, we thought appropriate to assess hypotensive activity of brimoptic in NVG, in its different manifestations, accompanied with elevated IOP.

Aim of research — to study effectiveness of combined fixed hypotensive preparation in NVG.

Materials and methods

Under our observation was 42 patients (42 eyes) with NVG, from them developed as a complication of thrombosis central vein of retinae — 15 patients (30 eyes), diabetic retinopathy — 20 patients (20 eyes) and chronic uveitis 7 patients (7 eyes). From them — 22 men and 20 women, age of whom made up 48–78 years. Patients were distributed into two groups depending on usage of hypotensive drops based on adequate etiological treatment: The main — patients dropped in brimoptic 1–2 drops 2 times per day and control group — with the same scheme hypotensive combined fixed preparation azarga (timolol + brinzolamid) was instilled. All groups were homogeneous in terms of stage of NVG with level of IOP (according to A. P. Nesterov classification, 1990). Patients with NVG — second stage (secondary open angle glaucoma) — 30 eyes and NVG third stage (secondary angle-closure glaucoma) — 12patients (12 eyes). All patients were underwent standard ophthalmologic examinations. Visual acuity from 0.05 to 0.2 with correction. The date of investigation made up 3 months.

Results and discussions

After dropping hypotensive preparation, there was a steady decrease in the level of IOP in both groups after 30 minutes and reached figure for (20.6 ± 2.69) after 2 hours. On the fifth day of treatment the level of IOP was stabilized almost in all patients with NVG of the second stage, except 1 case in control group, where the level of IOP increased to 26–27 mm. Hg. that was connected with progression of inflammation of uveal tract and prolonged scarring of angle of anterior chamber. In both groups of patients with NVG III stage the level of IOP was noncompensated and then after adequate preparation the fistulized operations were successfully performed.

In date to 3 months at 29 patients (29 eyes) with NVG the level of IOP stayed constantly within in normal ($p < 0.001$). A considerable improvement of visual functions was noticed from 0.14 –0.35 in the main group in comparison to visual functions in control group ($p < 0.05$) (table 1).

Peripheral borders of visual fields enlarged by 15 –20°, 56 % cases in control and by 12–18° at 50 % patients of control group ($p < 0.05$). Systematic usage of brimoptic in all date of observations decreased slightly arterial pressure of patients, (due to general hypotensive effect), that was optimal for general condition of patients with elevated AP. It is noted that hypotonic patient should be prescribed brimoptic with caution under control of AP.

Thus, the results of clinic examinations allowed to determine that drug therapy with combined fixed preparation brimoptic and azarga proved to be effective in NVG II stage. Prescription of brimoptic due to additional constrictional effect of brimonidin leads to normalization of IOP with first hours, by providing safety visual functions considerable more than compared drug. In case of NVG III stage brimoptic as a drug with high initial hypotensive position should be used at the stage of preparation to fistulized antiglaucomatous operations.

Table 1. – Dynamics of IOP during the treatment

Name of drug	Initial IOP	After 30 minutes	After 1 hour	After 2 hours	After 6 hours	After 12 hours	After 4 weeks	After 12 weeks
Brimoptic	29.13 ± 3.15	26.90 ± 3.72	23.2 ± 2.78	20.61 ± 2.71*	23.25 ± 2.55*	20.62 ± 2.59**	20.32 ± 2.11**	20.61 ± 2.71*
Azarga	29.18 ± 3.17	27.1 ± 4.14	23.0 ± 2.78	21.32 ± 2.28*	24.14 ± 2.53*	21.31 ± 2.69**	21.50 ± 2.28**	21.32 ± 2.28*

*Note: * — P < 0.05; ** — P < 0.001.*

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Results simultaneous operations in patients with adrenal tumors

Abstract: In the period from 2013 to 2015 the 2-clinic of Tashkent Medical Academy for examination and treatment were 46 patients with adrenal tumors. Simultaneous operations were performed in 6 patients, of whom 4 women and 2 men. A morphological study of adrenal tumors, we found: 2 — aldosteroma (33.3 %), 1 — pheochromocytoma (16.6 %), 1 — adrenal cyst (16.6 %), 2 — cortex adenoma (33.3 %). Of these, 50 % patients were with intsidentaloma (2 cortical adenoma and 1 adrenal cyst). Indications for simultaneous operations were a combination of adrenal tumors with cholelithiasis and umbilical hernia. At the same time in 4 (66.6 %) patients simultaneously conducted operations — right-sided laparoscopic adrenalectomy, and laparoscopic cholecystectomy, in 1 patient (16.6 %) — a left laparoscopic adrenalectomy and laparoscopic cholecystectomy and 1 (16.6 %) patient's after adrenalectomy surgery hernia repair is made to the type of allopath «on lay».

In postoperative period complications were not observed. On the next day after surgery drains removed and all patients are activated. Average bed day was 4 ± 1.71. Thus, the analysis of these patients treatment results showed that the duration of surgery and hospital stay do not differ from similar parameters specific to patients with isolated surgical pathology. Treatment simultaneously several surgical diseases liquidate of need for repeated operations and its risk of possible complications. All of the above underscores the feasibility and cost-effectiveness of performing simultaneous operations in patients with concomitant surgical pathology.

Keywords: tumor of adrenal glands, simultaneous operations, laparoscopic adrenalectomy.

About 20–30 % of the patients, who enter surgical departments, have 2 or 3 diseases, which ought to be operated. We analyzed 6 simultaneous operations performed with the patients, who suffered from both adrenal tumor and other kind of surgical disease. The approach choice and the order of stage during the operation are discussed.

Actual problems of modern surgery are the surgical treatment of arterial hypertension. At the moment 35 % of patients the cause of high blood pressure is symptomatic hypertension, of whom 15–25 %, it is the consequence of endocrine hypertension adrenal genesis [2; 6]. At the same time, timely diagnosis of these diseases and timely initiation of treatment in most cases leads to the recovery of patients [1; 9]. So far, 1/3 of patients diagnosed with symptomatic hypertension due to adrenal tumors, established no earlier than 5 years [7; 10]. This "delay" timing of treatment on the back of improved diagnostic capabilities of modern medical institutions leads to the fact that 20–30 % of patients admitted to a surgical hospital, diagnosed 2–3 diseases requiring surgical treatment [5; 9]. This situation is particularly relevant for patients with adrenal incidentaloma — formations found on imaging studies of the abdomen and retroperitoneal space over, not associated with adrenal pathology [3; 4; 8; 10]. Recent achievements in surgery and anesthesiology created real conditions for performing simultaneous operations allowing simultaneously hold multiple surgical correction of diseases in one patient. Thus, the surgeon naturally raises the question of the choice of adequate access and optimal phasing surgery [1; 2].

Objective: To study the ability to perform simultaneous operations in patients with adrenal tumors, during the early postoperative period; make recommendations about the choice of surgical tactics.

Materials and methods

In the period from 2013 to 2015 the 2-clinic of Tashkent Medical Academy for examination and treatment were 46 patients with adrenal tumors. Among them 34 women and 12 men aged 19 to 74 years. The mean age was 42.9 ± 2.6 years. All patients were operated. In order to clarify the hormonal activity of adrenal tumors in plasma and urine were determined catecholamine's and their metabolites, DGEA, cortisol, 17-OKS, 11-OKS, 17-KS, ACTH, androgens and estrogens, renin.

Simultaneous operations were performed in 6 patients, of whom 4 women and 2 men. A morphological study of adrenal tumors, we found: 2 — aldosteroma (33.3 %), 1 — pheochromocytoma (16.6 %), 1 — adrenal cyst (16.6 %), 2 — cortex adenoma (33.3 %). Of these, 50 % patients were with intsidentaloma (2 cortical adenoma and 1 adrenal cyst). Indications for simultaneous operations were a combination of adrenal tumors with cholelithiasis and umbilical hernia. At the same time in 4 (66.6 %) patients simultaneously conducted operations — right-sided laparoscopic adrenalectomy, and laparoscopic cholecystectomy, in 1 patient (16.6 %) — a left laparoscopic adrenalectomy and laparoscopic cholecystectomy and 1 (16.6 %) patient's after adrenalectomy surgery hernia repair is made to the type of allopath «on lay».

Results and discussion

In considering the possibility of conducting simultaneous operations in patients with tumor pathology of the adrenal glands, we used differential tactics. So if in patients with suspected pheochromocytoma in the during of adrenalectomy if we have observed pronounced hemodynamic disorders, in this case we refused from

simultaneous operations for fear of uncontrolled hypotension. In addition, when we are having plan for simultaneous operations on a mandatory basis were assessed operational risk. At the same time in patients with a high degree of operational risk by performing simultaneous operations rather give up and when the patients with a low and moderate degree of operational risk of appropriateness of simultaneous operations is not in doubt.

At the stage of preparation of patients for surgery therapeutic activities included: correction of blood pressure and treatment of heart disease, compensation of carbohydrate and electrolyte metabolism, treatment of opportunistic diseases and sanitation of the chronic centers of infection. In all cases, the determining factors of priority of surgical intervention are compliance with the principles of asepsis, antisepsis and ablation. When performing simultaneous operations, it is desirable in the first place to carry out the most "pure" and most difficult stage of the operation. The most common comorbidities about which made simultaneous operations were chronic calculus cholecystitis. When we have performed laparoscopic adrenalectomy and laparoscopic cholecystectomy the first phase of the operation began with adrenalectomy, regardless of the side of the adrenal lesions.

Adrenalectomy was performed by transabdominal lateral access, and pneumoperitoneum imposed on safe methods. In 3 cases, after right-sided adrenalectomy position patients and place trocars has not changed, in one case because of the technical difficulties of the patient is laid on his back and carried cholecystectomy surgery. Mean operative time was 139 ± 9.5 min. Only in one case produced simultaneous laparoscopic left adrenalectomy and cholecystectomy, when it became necessary to change the position of patient and install a few extra "ports". There operative time was 151 minutes.

In postoperative period complications were not observed. On the next day after surgery drains removed and all patients are activated. Average bed day was 4 ± 1.71. Thus, the analysis of these patients treatment results showed that the duration of surgery and hospital stay do not differ from similar parameters specific to patients with isolated surgical pathology. Treatment simultaneously several surgical diseases liquidate of need for repeated operations and its risk of possible complications. All of the above underscores the feasibility and cost-effectiveness of performing simultaneous operations in patients with concomitant surgical pathology.

Conclusions

1. In patients with adrenal tumors and concomitant surgical pathology possible to carry out simultaneous operations, with the prerequisite of their implementation should be an assessment of the operational and anesthesia's risk before surgery.
2. When performing surgical intervention on the abdominal organs and retroperitoneal space in a patient with adrenal tumors advisable to perform adrenal surgery the first stage.
3. Stages perform surgery is an important factor in the success of simultaneous treatment of several pathologies in patients with adrenal tumors.
4. Simultaneous operations are cost-effective, allowed for patients during the one hospitalization and one general anesthesia to relieve from two or three diseases.

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Posttraumatic rhinosinusitis in patients with cranio-facial injuries

Abstract: Post-traumatic sinusitis develops due to combined craniofacial injuries and is accompanied by brain damage, skull, orbit. Post-traumatic inflammation of the frontal sinus is in the first place among post-traumatic lesions of the paranasal sinuses, while the rarest post-traumatic sinusitis after trauma of the facial skeleton is an inflammation of the sphenoid sinus. We have examined 216 patients with cranio-facial injuries. Patients were carried out the following methods of research: rhinoscopy, X-ray, MRI, MSCT of PNS, sinusal probing, diagnostic puncture, in open fractures — revision of the sinuses. According to our data post-traumatic sinusitis amount to 9.7 % of the total number of cranio-facial injuries. When ongoing hemosinus more than 5 days it is necessary to conduct active anti-inflammatory, anti-edematous, biodegradable and mucolytic treatment.

Keywords: Post-traumatic sinusitis, craniofacial injuries, hemosinus, treatment of acute sinusitis.

Post-traumatic sinusitis develops due to combined craniofacial injuries and is accompanied by brain damage, skull, orbit. Damages of the front group of the paranasal sinuses (PNS) develop as a result of injury of the facial skeleton, eye socket, while the post-traumatic sinusitis of the back groups of PNS occur in fractures of the skull base, as well as the long-term presence of a nasogastric tube, nasotracheal and endotracheal tubes [1; 4].

A characteristic feature of post-traumatic sinusitis is the presence of hemosinus, obstruction of the natural sinus by thrombosis, bone fragments, foreign bodies, damage of the mucous membrane etc. [2; 5].

Post-traumatic inflammation of the frontal sinus is in the first place among post-traumatic lesions of the paranasal sinuses, which is due to its anatomical features: a narrow nasofrontal channel, an exserted front wall, the large volume of the frontal sinus than the other paranasal sinuses. Injuries of the frontal sinuses can be penetrating and nonpenetrating to the cranial cavity, open and closed. Posttraumatic purulent frontal sinusitis is a frequent serious complication of traumatic brain injury.

The rarest post-traumatic sinusitis after trauma of the facial skeleton is an inflammation of the sphenoid sinus, because sphenoid sinus locates deep and has a protective anatomical structure, so this sinus damages are rare. However, inflammation of the sinuses is more common in fractures of the skull base, as well as in nosocomial sphenoiditis when, due to the serious condition of the patient a nasogastric tube or conduct artificial pulmonary ventilation by endotracheal tube is installed. The cause of inflammation of the sphenoid sinus is in violation of ciliated airway epithelium function, leading to inflammation in the sphenoid sinus [2; 3].

The hospitalization for the purpose of examination and prescription of preventive therapy is indicated for the patients with post-traumatic hematosinus even when drainage function is safe [2; 6; 8].

Complications of traumatic sinusitis are: nasal septum abscess, osteomyelitis, frontoorbital fistula, orbital cellulitis, epidural abscess, sepsis.

The aim of this study was to examine the state of PNS in patients with cranio-facial injuries.

Material and Methods: the work is done in the Department of Neurosurgery and Maxillofacial Surgery, ENT department for adults of the II clinic of the Tashkent Medical Academy. During the period from 2014 to 2015 we examined 216 patients with cranio-facial injuries, from which there were 180 (83.3 %) males, 36 (16.7 %) women. The age of patients ranged from 18 to 70 years (mean age 44 years).

Causes of injury were as follows: sports injury, a car accident, home accidents, falls from height, etc. During the survey patients were consulted by maxillofacial surgeon, otorhinolaryngologist, neurosurgeon, resuscitation specialist, traumatologist, surgeon. All the patients at admission were provided medical care (cessation of bleeding, symptomatic treatment, resuscitation if necessary). Patients were undergone clinical-laboratory and additional methods of research as well as computed tomography (CT), multislice tomography (CT), magnetic resonance imaging (MRI). All patients with injuries of PNS were examined at the day of admission and at 4–5 days of treatment. Patients were carried out the following methods of research: rhinoscopy, X-ray, MRI, MSCT of PNS, sinusal probing, diagnostic puncture, in open fractures — revision of the sinuses. One of the first signs of PNS damage was the presence of hemosinus. The presence of blood in the sinuses was set according to the radiologic diagnostics and diagnostic puncture. 92 (42.6 %) patients had fractures of PNS walls from the 216 cases of facial injuries. The presence of blood in sinuses was detected only in 68 (31.4 %) patients.

Table 1. – Distribution of patients with cranio-facial injuries depending on the localization of the injury

№	Anatomical structures	Number of patients	%
1.	Fracture of the nose	96	44.4
2.	Fracture of the walls of ethmoid sinuses	12	55.5
3.	Fracture of the walls of the frontal sinus	44	20.4
4.	Fracture of the walls of the maxillary sinus	28	13
5.	Fracture of the walls of the sphenoid sinus	8	3.7
6.	Combined fracture of the facial skeleton	40	18.5
7.	Fracture of orbit walls	18	8.3
8.	Fracture of the zygomatic bone	14	6.5
	Total	216	100

As its seen in Table 1, among the surveyed there was noted the frequent damage of the walls of the frontal sinus — in 44 patients (20.4 %), followed by the maxillary — in 28 (13 %) and ethmoid sinuses — in 12 (55.5 %) patients. However, these data are relative, since during the sinus damage the adjacent part of the face also injures. In the category of combined injuries of facial skeleton were included damages of 2 or more anatomical structures of the face. According to our data, combined fractures occurred in 40 patients, accounting for 18.5 %.

All patients were divided into 2 groups: 1st group of 47 patients with no infection hemosinus; 2nd group with 21 patients with infection hemosinus.

Table 2. – Distribution of patients according to the number of identified hemosinuses

№	Name of the sinnus	Quantity of diagnosed sinus fractures	%	The number of identified hemosinuses	%
1.	Frontal	44	47.8	32	34.8
2.	Maxillary	28	30.4	22	23.9
3.	Ethmoid	12	13	8	8.7
4.	Sphenoid	8	8.7	6	6.5
	Total	92	100	68	73.9

Results and discussion

Results of the study of the group 1 showed that complete clearance of PNS from the blood occur at 8–10 days after injury. Complaints of patients were not observed. Results of the study of the group 2 showed that the evacuation of the blood contents from sinus is labored because of infection of sinus or non-operational fistula. In open fractures infection of PNS occured exogenously. According to our observations, suppuration of hemosinus is 31.4 % of the total number of cranio-facial injuries. In cases of hemosinus not disappearing at the 5th day after injury previously the emergence of post-traumatic sinusitis can be expected and it is necessary to begin treatment of acute sinusitis.

Table 3. – Frequency of hemosinuses and sinusitis in patients with fractures of the PNS walls

№	Name of the sinnus	Number of fractures		Number of hemosinuses		Number of sinusitis	
		Abs.	%	Abs.	%	Abs.	%
1.	Frontal	44	47.8	32	34.8	9	9.8
2.	Maxillary	28	30.4	22	23.9	6	6.5
3.	Ethmoid	8	8.7	6	6.5	3	3.3
4.	Sphenoid	12	13	8	8.7	4	4.3
	Total	92	100	68	73.9	21	22.8

According to data given in Table 3, post-traumatic inflammation of PNS ranges from 3.3 % to 9.8 %. Such a large range associated with different frequency of PNS injury, i. e. frontal sinuses are injured in most cases and post-traumatic frontitis also takes a leading place among the other post-traumatic sinusitis. Equally important is the overall status of the patient, i. e. reactivity, presence of chronic diseases as well as age. According to our observations, chronic diseases such as diabetes, anemia, chronic pneumonia were identified in 8 % of cases.

This diagram (fig. 1) shows the comparison of the age of post-traumatic sinusitis.
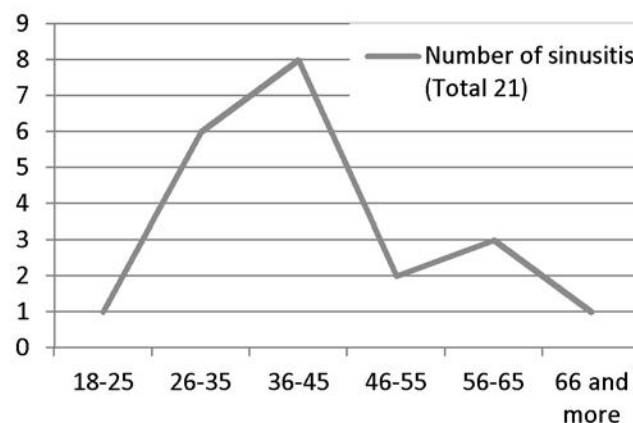
Fig. 1. Comparison of the age of post-traumatic sinusitis

Thus, according to our data post-traumatic sinusitis amount to 9.7 % of the total number of cranio-facial injuries. When ongoing hemosinus more than 5 days it is necessary to conduct active anti-inflammatory, anti-edematous, biodegradable and mucolytic treatment.

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Dysfunctional state kidney during postnatal adaptation in the newborn

Abstract: In differentiating renal function in newborns found that the severity and duration of oliguria, the duration of conservation fermeture, poor baby, accompanied by the increase of the pathological condition, i.e ischemic nephropathy varying degrees.

Keywords: neonates, renal dysfunction, fermeture.

Relevance

According to various population-based studies of diseases of bodies of uric system at children is quite widespread (from 29 to 40 per 1,000 child population), tend to grow and tend to the progression [1; 6]. According to most authors, many kidney diseases have their origins in the antenatal period [2]. However, a significant number of antenatal arisen renal disease remains undiagnosed in the neonatal period, often diagnosed only at the maximum severity. Few symptoms and the specific clinical manifestations of diseases of kidneys and urinary tract in newborns and children of first three years of life hinders timely diagnosis, which contributes to chronic process due to late adequate therapeutic correction [4].

Newborn children were more likely to meet the latent form of the nephropathy diagnosed sooner and later lead to the development of chronic kidney disease and disabilities. The most common manifestation of renal damage in the neonatal period is ischemic nephropathy (IN) [7].

It is therefore necessary in the early period of adaptation to predict and diagnose dysfunctional state of the kidneys in newborns. The absence, often, significant clinical signs of nephropathy in newborns due to their nonspecific, requires new informative diagnostic tests, indicating the development of pathological process in the renal tissue.

The identification of renal disease in infants with the use of informative non-invasive diagnostic tests, necessary for the implementation of early diagnosis has been the **aim** of our study.

Materials and methods

Clinical examination of the newborn was conducted in the early neonatal period is known in neonatology techniques. Identified functional abnormalities of the kidneys in 46 newborn infants. Transient conditions in 26.1 % of children, dysfunctional standing at 56.5 % per cent of children, abnormal standing at 17.4 % of the children. Biochemical study included indicators that change during ischemia and impaired renal function (alkaline phosphatase and cholinester-

ase in the urine). Analyses were determined on semiautomatic biochemical analyzer lyzer Huma-2000 (Germany) using reagents firm "DiaSys" (Germany). The obtained data were subjected to statistical processing on a personal computer Pentium-IV with the software package Microsoft Office Excel 2003, including the use of built-in functions for statistical processing and Bio Stat for Windows (version 2007). Used the methods of calculus of parametric and non-parametric statistics with calculation of the arithmetic mean of the studied parameter (M), the mean-square deviation (σ), standard error of the mean (m), relative values (frequency, %). The statistical significance of the obtained measurements comparison of average quantitative variables was determined by student's criterion (t) with the computation of error probability (P) when checking the normal distribution (by the criterion of kurtosis) and equality of General dispersions (F — criterion of Fisher). Statistical significance for qualitative variables were calculated using the χ^2 criterion (Chi-square) (Glants, 1998, Aviva Petrie, Caroline Sabin, 2009) according to the following formula:

$$z = (p_1 - p_2)\sqrt{\frac{n_1 \cdot n_2}{p(1-p)\cdot(n_1 + n_2)}},$$

where $p_1 = \mu_1/n_1$ and $p_2 = \mu_2/n_2$ compare the experimental frequency, and $p = (\mu_1 \cdot \mu_2)/(n_1 \cdot n_2)$, the average frequency of occurrence of the trait in both groups.

The results of the study and their discussion

Suspected violations of the kidney served as oliguria (less than 15 ml/kg per day) and edematous syndrome. Draws attention to the development of moderate edema syndrome, slowing of urination. Analysis of the duration of signs, has helped us to differentiate the violation of the kidney (Fig. 1).

While maintaining the characteristics of transition States in 7-day-old and older infants, you must treat them as the human kidney and to conduct an additional survey to determine the nature of a nephropathy.
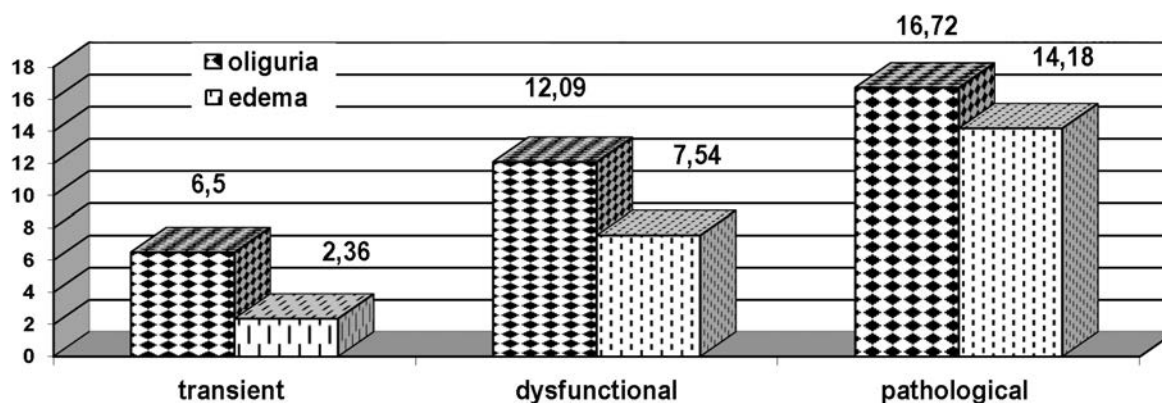
Fig. 1. Duration of preservation of signs that day

Table 1. – Dysfunction of the kidneys in neonatal period

Diagnostic criteria	Transient States	Dysfunctional States	Pathological conditions
Oliguria: – appears – duration – increase	in the first 3 days on 6–7th day of Life no	in the first 3 days 10–14 days of life. moderately	at birth, the first 24 hours, in the 2nd week more than 10 days moderately or intensively
Swelling*: – appears – duration – increase	the first 3 days 2–3 days no	the first 3 days in the course of 2 weeks not growing or moderately	at birth, in the first 24 h. in the 2nd week maybe more than 2 weeks moderately or intensely, starts on face and spreads to the whole body, is maintained
the general condition of the newborn	satisfactory	satisfactory	unsatisfactory
Alkaline phosphatase ↑	≤ 200 μmol/l	≤ 200 μmol/l	≥ 200 μmol/l
The cholinesterase ↑	≤ 8 U/mg of creatinine	≥ 10 U/mg of creatinine	≥10 U/mg of creatinine

*Note: * — by increasing the volume of interstitial fluid in less than 15 % of normal, edema clinically, as a rule, are not detected, i. e. they are hidden. When interstitial fluid volume increases by approximately 15 % or more, the swelling becomes obvious [8].*

The clinical picture of the dysfunctional state of the kidneys was characterized by edema, which is manifested in the first three days of life, with a maximum of manifestations in the first week, continuing until the end of the first or second weeks of life and decreased urine output, continuing until the end of the second or third weeks of life.

The identification of renal disease in infants with the use of informative non-invasive diagnostic tests, necessary for the implementation of early diagnosis. The study prospectively fermeture mainly for the diagnosis of diseases of the kidneys, as the main source of fermeture are the cells of the nephrothelium [5].

Table 2. – Enzyme activity in urine of neonates with impaired renal function

Indicator, U/mg creatinine	Age	Transient condition (n = 20)	Dysfunctional state (n = 26)	Pathological condition (n = 8)
Alkaline phosphatase	5–7 days	115.2 ± 2.4	142.3 ± 1.3***	178.2 ± 1.9***
	2 weeks	89.1 ± 2.8	163.7 ± 2.1***	202.4 ± 1.3***
	1 month	37.3 ± 2.7	189.5 ± 1.1***	228.2 ± 1.9***
The cholinesterase	5–7 days	7.6 ± 0.3*	8.8 ± 0.4*	14.9 ± 0.5*
	2 weeks	6.9 ± 0.4*	10.9 ± 0.22*	19.7 ± 0.41*
	1 month	3.6 ± 0.2 *	11.8 ± 0.2 **	47.8 ± 4.2**

*Note: * — differences with respect to the reflected data are significant (* — P < 0.05; ** — P < 0.01; *** — P < 0.001).*

All children with a high level of alkaline phosphatase (115.2 ± 2.4; 142.3 ± 1.3; 178.2 ± 1.9 U/mg of creatinine) the urine was noted at $5^{th} – 7^{th}$ day of life. Data E. N. Balbarino (1999), O. L. Chugunova, N. Kulikova Yu (2010) and G. L. Churkina (2011) show that normalization of fermenture in children with ischemic (hypoxic-transient) nephropathy occurred at $5^{th} – 7^{th}$ day of life.

According to our data, the decline in these indicators was noted by the end of the second week of life, normalization of indicators — by the end of the month of life in children with dysfunctional condition. By the end of early neonatal period activity of alkaline phosphatase in the urine was increased in newborns with a pathological condition of the kidney (P ≤ 0.001) than in healthy children, respectively in 6.2 times.

The cholinesterase is the only enzyme, reflecting the lesion of the glomerular apparatus [3]. We established an increase in the activity of cholinesterase in the urine of examined infants all groups: at $5^{th} – 7^{th}$ day of life in newborns with a pathological condition (14.9 ± 0.5 Units/mg creatinine, P≤0.001) in 5.7 times, compared with healthy children (7.6 ± 0.3 IU/mg creatinine, P ≤ 0.001),

3.6 times compared with children with DFS (8.8 ± 0.4 U/mg creatinine, P ≤ 0.001). When the dysfunctional state of kidney, the duration of saving giperfermentemii is probably explained by morphological and functional immaturity of the neonatal kidney, predominantly tubular division. By the end of the neonatal period, cholinesterase activity in newborns with a pathological condition was higher than in healthy children in 8.5 times, and DFS — 2 times. In addition, the clinical picture in these children have found symptoms of intoxication: pallor, lethargy, fatigue sucking, impaired microcirculation.

Conclusions

When differentiation of the functional state of the kidneys in neonates have found that the severity and duration of oliguria, the duration of saving giperfermentemii, the unsatisfactory condition of the baby, accompanied by increase in pathological conditions, i. e., ischemic nephropathy of different degrees. These diagnostic criteria (tab. 1), reflecting the degree of renal dysfunction, has an informative value for predicting the development and progression of ischemic nephropathy. The severity and duration of oliguria and edema syndrome contributes to an increase in the severity of ischemic nephropathy.

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Concomitant intestinal parasitic diseases in pulmonary tuberculosis patients: influence on some immunological indices

Abstract: Impact of concomitant intestinal parasitic diseases on immune state of patients with infiltrative pulmonary tuberculosis (IPT) was studied. Patients with IPT free of intestinal parasites were characterized by significant decrease of relative frequencies of CD3+, CD4+, CD8+-lymphocytes and increase of the level of total serum IgE in comparison with healthy control. Concomitant ascariasis and giardiasis decreased frequencies of CD3+, CD4+, CD8+-lymphocytes and increased level total serum IgE for certainty when compared with IPT patients free of parasites. Blastocystosis decreased frequencies of CD3+, CD4+-lymphocytes and increased level total serum IgE for certainty. Concomitant enterobiasis didn't influence significantly on immunological parameters. Efficient treatment of parasitic diseases increased frequency of CD3+-, CD4+- and CD8+-lymphocytes, decreased concentration of total serum IgE, improved patients condition and tolerance of antituberculosis therapy.

Keywords: infiltrative pulmonary tuberculosis, ascariasis, giardiasis, blastocystosis, enterobiasis, immune state.

Absence of significant successes in control of pulmonary tuberculosis (PT) to a great extent is connected with increase of the number of Mycobacterium tuberculosis strains multiresistant to antituberculosis drugs and disintegration of immune system resulting in domination of Th2-response whereas protection against Mycobacterium tuberculosis is associated with Th1-response. Only 10 % of cases of PT infection progress to active disease, indicating to efficient immune response in most infected individual [15, 6–24].

Macrophages activated by IFN-γ play a key role in protection against intracellular microorganisms. The main source of IFN-γ is Th1-lymphocytes. Stimulation of Th2-response could inhibit protective reactions of Th1-type [17, 1768–1775]. This fact is of special importance for regions endemic on intestinal parasitic diseases due to the property of helminthes to stimulate chiefly Th2-response and consequently could inhibit Th1-response. Uzbekistan in endemic on intestinal parasitic diseases [1, 16–17]. Previously we found that prevalence of Ascaris lumbricoides and Blastocystis hominis in patients with PT was respectively 5 and 3 times as high as in population. Prevalence of Enterobius vermicularis and Giardia lamblia was at the level of population or lower [10, 3126]. So it was of interest to determine the influence of concomitant intestinal parasitic diseases on a typical for PT immunological imbalance.

Materials and methods. Patients with IPT dominated among individuals under examination and a maximal prevalence of intestinal parasites was found in this cohort, so we detected immune state in these patients. We examined 15 healthy individuals (control), 15 patients with ITL free of parasites, 17 patients with IPT with concomitant ascariasis, 15 patients with IPT and giardiasis, 15 IPT patients with blastocystosis, 15 patients with IPT and enterobiasis. All the patients were at the age of 17–47 years and admitted to Republican specialized scientific research medical center of phthisiology and pulmonology. All the patients received conventional antituberculosis therapy: isoniazide, ethambutol, pirazinamide, rifampicin, streptomycin.

For diagnosis of intestinal parasites triple coproscopy was used. Stool samples were taken with 1–3 days intervals. In detection of antiparasitic therapy efficiency method of formalin-ether enrichment technique was used additionally.

Ascariasis and enterobiasis were treated respectively with albendazole (a single dose of 400 mg.) and mebendazole (100 mg. daily for 3 days) [8, 804–805]. For treatment of guiardiasis ecdysten was used (20–25 mg. daily for 10 days). Blastocystosis was treated with metronidazole (500 mg. four times a day for 10 days). The aim of the antiparasitic therapy in ascariasis, giardiasis and enterobiasis was elimination of parasites, in blastocystosis — to decrease of the infection intensity.

Ecdysten is the preparation from the class of phytoecdysteroids with diverse biological activity, including adaptogenic, hepatoprotective, immunomoduilating and other properties; it is produced at the Institute of Chemistry of Plant Substances of Academy of Sciences of the Republic of Uzbekistan [12, 61–65]. Besides ecdysten possesses ability to eliminate Giardia lamblia including cases resistant to conventional antigiardial preparations [7, 14–17]. Choice of ecdysten was stipulated by a high level of Giardia lamblia resistance to metronidazole, found in $43.3 \pm 9.0\%$ of patients with pulmonary tuberculosis with concomitant giardiasis [5, 70–73].

Subpopulations of lymphocytes in peripheric blood were detected in the reaction of indirect rosette formation with monoclonal antibodies to CD3+-, CD4+-, CD8+-, and CD20+-lymphocytes, production of LLC "Medbiospecter", Moscow; level of total serum IgE was detected by the ELISA method with test-system of LLC "Vector Best", Novosibirsk, Russia.

Immunological indices were detected before antiparasitic therapy and in 18–20 days after its completion.

All results were as mean ± SE. Compare between indices under investigation were made using Student's t-test. The significance was determined at P < 0.05.

Results and discussion. Manifestation of intestinal parasitic diseases in patients with PT was a moderate character, its activity was evaluated by improvement of patients state after parasites elimination, because some signs coincide with symptoms of PT and side effects of antituberculosis therapy. Main manifestations were: augmentation of weakness, irritability, fatigability, headache, deterioration of antituberculosis drugs tolerance, unsteady weak pains in epigastria and right hypochondria, anorexia, frequent episodes of nausea, flatulence, rapid loss of weight. 8 patients complained of vomiting appearance. 8 from 15 patients with enterobiasis complained of itching in perianal zone. Allergic rush appeared in 5 patient with concomitant giardiasis.

Subpopulations of lymphocytes of peripheral blood are represented in table 1. Patients with IPT free of intestinal parasites were characterized by significant decrease of relative frequencies of CD3+, CD4+, CD8+-lymphocytes and increase of the level of total serum IgE in comparison with healthy control, content CD20+-lymphocytes wasn't changed. Our data on character of T-subpopulations imbalance are consistent with results of V. V. Noviyzkiy et al. (2007) and T. E. Tyulkova et al. (2008) [9, 27–30; 13, 48–55], but V. V. Noviyzkiy et al. (2007) observed a significant increase of CD20+- lymphocytes whereas we noticed only a tendency to increase of the index.

Influence of concomitant parasitic diseases on T-lymphocytes subpopulations depended on the species of parasite. Relative frequencies of CD3+-, CD4+- и CD8+- lymphocytes from IPT patients with concomitant ascariasis and giardiasis were significantly decreased when compared to IPT patients without parasites (P < 0.05). Concomitant blastocystosis induced significantly decrease only CD3+- and CD4+-lymphocytes in comparison with patients with IPT without parasites. Concomitant enterobiasis had no impact on T-lymphocytes subpopulations in patients with IPT.

Concomitant parasitic diseases significantly increase CD20+-lymphocytes in all the patients in comparison with healthy control, tendency to increase of this index was noticed when compared with patients with IPT without parasites (table 1).

Table 1. – Indices of cellular immunity in patients with IPT with parasites before and after antiparasitic therapy (M ± m, %).

Cohort under study	CD3+		CD4+		CD8+		CD20+	
	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
Healthy individuals (n=15)	59.1 ± 0.7		38.4 ± 1.6		23.5 ± 0.9		23.3 ± 0.9	
IPT patients free of parasites (n=15)	41.2 ± 1.4*		29.2 ± 1.0*		18.8 ± 0.6*		25.6 ± 0.9	
IPT patients +ascariasis (n=17)	31.3 ± 1.4* **	40.4 ± 1.2* ***	22.1 ± 1.1* **	31.5 ± 1.0* ***	16.1 ± 0.4* **	20.7 ± 0.7* ** ***	28.3 ± 1.3*	26.4 ± 1.0*
IPT patients +giardiasis (n=15)	27.0 ± 1.3* **	37.4 ± 1.8* ***	20.4 ± 0.9* **	28.6 ± 1.8* ***	16.4 ± 0.7* **	19.5 ± 1.0* ***	27.0 ± 0.9*	25.1 ± 0.9
IPT patients + blastocystosis (n=15)	33.2 ± 1.4* **	43.5 ± 1.2* ***	21.8 ± 1.0* **	29.8 ± 1.7* ***	17.3 ± 0.6*	19.9 ± 0.8*	25.9 ± 0.7*	25.2 ± 1.2
IPT patients + enterobiasis (n=15)	39.6 ± 1.5*	41.2 ± 1.5*	26.8 ± 1.5*	29.6 ± 1.7*	18.9 ± 0.8*	19.5 ± 0.7*	27.7 ± 1.0*	26.1 ± 1.1

*Note: * — significant difference with healthy individuals; ** — significant difference with IPT patients without parasites; *** — significant difference with data before treatment.*

Elimination of parasites was achieved in al the cases of ascariasis, enterobiasis and giardiasis. In patients with blastocytosis a significant decrease of infection intensity was observed. Efficiency of antiparasitic therapy was controlled by repeated parasitological examinations for 2 weeks after the treatment completion.

Level of CD3+-, CD4+- and CD8+-lymphocytes after treatment of ascariasis and giardiasis was significantly increased, after the treatment of blastocystosis significant increase was observed only for CD3+- and CD4+-lymphocytes. Elimination of Enterobius vermicularis didn't exert any effect on lymphocyte subpopulations. Changes in the level of CD20+-lymphocytes were insignificant (table 1).

Results of detection of the level of total serum IgE are represented in table 2. Concentration of total serum IgE in patients with IPT without parasites is significantly higher than in healthy in-

dividuals. Our data are in accordance with results of Ohrui et al. [16, 13–15] and Cozmei et al. [14, 702–709], who also found essential enhancement of IgE level in patients with PT without concomitant diseases. These changes seem to be a manifestation of immunological imbalance typical for PT and a marker of activation of Th2-response.

Concomitant ascariasis, giardiasis and blastocystosis enhances activation of Th2-response: level of total serum IgE in patients with IPT with these parasites was significantly higher than in patients with IPT free of parasites. Enterobiasis didn't enhance level of IgE and elimination of Enterobius vermicularis didn't impact considerably on the value of the index.

After antiparasitic treatment level of total serum IgE significantly decreased, after elimination of Giardia lamblia and decrease if intensity of Blastocystis hominis infection value of serum IgE approached to values in patients with IPT without parasites. Concomitant ascariasis exerted more expressed influence on the IgE level: it was 2.5 times as high as in patients with IPT without parasites, after elimination of A. lumbricoides concentration of IgE decreased as 1.4 low as initial value. Evidently negative influence of ascariasis on immune state of patients with PT is expressed more than in other parasitic diseases and it was expressed in intensity of shifts of cellular immunity indices (table 1). Possibly detection of IgE level at later terms after parasites elimination would show further decrease of IgE level.

Table 2. – Level of total serum IgE in patients with IPT
with parasites and after antiparasitic therapy (M ± m)

Cohort under study	IgE (IU/ml)	
	Before treatment	After treatment
Healthy individuals (n = 15)	55.7 ± 9.0	
IPT patients free of parasites (n = 15)	161.4 ± 18.5*	
IPT patients + ascariasis (n = 17)	415.7 ± 32.7 * **	281.2 ± 18.6* ** ***
IPT patients + giardiasis (n = 15)	366.3 ± 20.2 * **	205.0 ± 12.7 * ***
IPT patients + blastocystosis (n = 15)	298.8 ± 22.1 * **	185.0 ± 12.5 * ***
IPT patients + enterobiasis (n = 15)	178.2 ± 13.8 *	164.2 ± 11.5 * ***

Note: * — *significant difference with healthy individuals;* ** — *significant difference with IPT patients free of parasites;* *** — *significant difference with data before treatment.*

Significant increase of IgE concentration after treatment of parasitic diseases indicates to favorable shift in immune response of patients with PT directing to weakening of Th2-response and correspondingly strengthening of Th1-response.

Thus from parasites diagnosed in patients with PT enterobiasis significantly didn't influence immune state of the patients it concerned indices of cellular as well as humoral immunity. Impact of Enterobius vermicularis on immune system is considerably weaker, than of Ascaris lumbricoides, Giardia lamblia and Blastocystis hominis. It can be connected with less impact of the parasites and its metabolites on a macro-organism due to its biological features and shorter duration of the disease.

Treatment of concomitant parasitic diseases in all the patients with IPT resulted in considerable improvement of patients condition. It was expressed in diminution of weakness, better tolerance of antituberculosis drugs, disappearance of abdominal pains, nausea and vomiting, improvement of appetite, gain weight. Positive dynamics of tuberculosis process displayed in disappearance of symptoms of intoxication (sweating, subfebrile temperature, malaise) in 82 % of the cases. Regression of bronchopulmonary symptoms (cough with expectoration, dyspnea, chest pain) was observed in 74 % of patients.

Conclusion. A deep immunological imbalance in patients with PT is known to be the basis for development and including into complex therapy of PT various preparations with immunomodulating properties which could optimize specific therapy at the expense of correction of immunological disorders: licopidum [11, 59–62], polyoxidonium [2, 35–38], glutoxim [3, 160], baktisporin, immureg [4, 38–44], immunomodulators of mural peptide series [6, 121–122]. However even the wide choice of preparations points to insufficient efficiency of these preparations or they are not always effective. Evidently before application of immunodulators it is expedient to diagnose concomitant diseases that could aggravate immunological imbalance. Intestinal parasitoses belong to such diseases and their efficient treatment could correct some aspects of immunological imbalance in patients with PT: increase frequency of CD3+-, CD4+- and CD8+-lymphocytes and decrease the level of total serum IgE, improve condition of the patients and tolerance of antituberculosis therapy.

It is difficult to suspect intestinal parasitic diseases in patients with PT on the basis of clinical data due to common character of some signs of parasitosis, PT and side effects of antituberculosis preparations. So adequate parasitological diagnosis (triple coproscopy, use of enrichment methods) is of special importance in regions endemic on intestinal parasitic diseases.

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Influence of intestinal parasites on cytokine profile of patients with pulmonary tuberculosis, including cases complicated with aspergillosis

Abstract: influence of intestinal parasites on immune imbalance in pulmonary tuberculosis (PT), including cases complicated by pulmonary aspergillosis (PA) was studied. 300 and 111 patients with active PT were examined for intestinal parasites. Group of comparison: 200 residents of Tashkent and Tashkent region. The group of 111 patients was examined for PA (clinical, X-ray, mycological and serological data). Serum IFN-γ and IL-4 were assessed by ELISA. Ascariasis was found in patients with PT and PT with invasive PA respectively 5 and 12 times as frequent as in population. Decrease of IFN-γ and increase of IL-4 level ($P < 0.05$) was observed in these groups in comparison with healthy individuals and patients with PT free of intestinal parasites and PA. Conclusion: Ascariasis as a concomitant disease enhances immune imbalance, typical for PT and PT + invasive PA.

Keywords: Ascariasis, pulmonary tuberculosis, intestinal parasites, aspergillosis, cytokines.

Control of Mycobacterium tuberculosis replication is mainly mediated by production of Th1-cytokines IFN-γ and TNF-α and cytotoxicity of CD8+-lymphocytes, directed against infected macrophages. Control efficiency is specified by the balance of Th1-and Th2-response (IL4, IL-10, IL-13) [7, 694–701]. Protective immu-nity in helminthiasis is mediated by Th2-response [6, 459–466]. Protective mechanisms in pulmonary tuberculosis (PT) and as-pergillosis are similar and are based on elevated IFN-γ produc-tion [5, 403–413]. Our previous study showed that pulmonary aspergillosis (PA) complicates course of the disease in 40 % of the

patients with PT and the majority of Aspergillus spp. strains were resistant to widely applied antimycotics. Maximal susceptibility was detected to voriconazole [2, 113–118]. It was of interest to study influence of intestinal parasites on immune imbalance specific for active PT, including cases complicated by PA under conditions of the region endemic on intestinal parasitic diseases.

The purpose of the communication is to determine level of serum cytokines IFN- γ and IL-4 in patients with PT including cases with concomitant intestinal parasitic diseases and complicated with PA.

Materials and methods. Two groups of patients with active PT, hospitalized at Republican specialized scientific research medical center of phthisiology and pulmonology of the Ministry of Public Health of the Republic of Uzbekistan (respectively included 300 and 111 patients) were examined, the last group was additionally examined for PA. Patients with infiltrative PT dominated in both groups. Diagnosis of PT was based on clinical, X-ray and bacteriological data. HIV-infected and individuals with viral hepatitis were excluded. All the patients were at the age of 18–64 and received standard antituberculosis therapy: isoniazid, rifampicin, pyrazinamide, ethambutol, streptomycin.

Group of comparison included 200 inhabitants of Tashkent city and Tashkent region. Family where patients with PT, HIV-infected individuals and patients with chronic viral hepatitis were excluded. Control groups for IgG to Aspergillus spp. and cytokines detection consisted of 30 and 20 healthy persons respectively. Sexual and age structure of groups of comparison were analogous to the patients with PT and PA.

Intestinal parasites were diagnosed by the triple coproscopy, stool samples were collected with 2–3 days interval.

The cause for examination for PA was sudden aggravation of patients condition against the background of antituberculosis therapy or torpidly current tuberculosis.

Diagnosis of PA was based on clinical, radiological (**chest computerized tomography (CT) scan**), and laboratory findings: isolation of Aspergillus spp. of sputum, bronchoalveolar lavage and blood samples, detection of IgG antibodies to Aspergillus spp. by ELISA (kits from LLC Vector-Best, Novosibirsk, Russian Federation).

We used as differential diagnostic sign a rapid improvement of patient's condition on the 3rd – 5th day of empiric therapy: decrease of temperature, relief of dyspnea, significant diminution of weakness in the cases without mycological confirmation (absence of sputum and bronchoalveolar lavage refusal) and nonspecific results of CT (progression of infiltrative process) against the background of clinical impairment and positive serology.

Blood samples for mycological study were taken at fever period once a day (5–7 ml.) for 3 days. For prevention of contamination we used flasks of the system HiSafe, Hi-Media, India, with diphase system Hi-Combi for fungi with CC addition). In 2, 5 and 10 days blood samples from flasks were inoculated on Petri dishes with Sabouraud agar which were incubated at 37 °C up to 3 days, Sabouraud agar with glucose (pH 5.0), (Hi-Media, India) was used for inoculation of sputum and bronchoalveolar lavage samples.

IFN-γ and IL-4 in serum samples were assessed using commercially available enzyme-linked immunosorbent assay (ELISA) kits from LLC Vector-Best, Novosibirsk, Russian Federation.

Statistics. Comparison between indices under investigation were made using Student's t-test. The significance was determined at $P < 0.05$.

Results. Results of intestinal parasites diagnosis in patients with PT are represented in table 1. Ascariasis was diagnosed in

$10.0 \pm 1.7\%$ of patients with PT but in $2.0 \pm 0.9\%$ of population ($P < 0.001$). This index was even higher in patients with infiltrative PT: in 23 ($12.3 \pm 2.4\%$) of 187 patients.

Table 1. – Prevalence of intestinal parasites in patients with PT (n/M ± m)

Parasites	Patients with PT (n = 300)	Population of Tashkent city and Tashkent region (n = 200)
Ascaris lumbricoides	30/10.0 ± 1.7*	4/2.0 ± 0.9
Enterobius vermicularis	14/4.7 ± 1.2	9/4.5 ± 1.4
Giardia lamblia	14/4.7 ± 1.2*	32/16.0 ± 2.6
Blastocystis hominis	161/53.7 ± 2.8*	36/18.0 ± 2.7

*Note: * — significant difference between patients with PT and population (P < 0.05).*

Prevalence of Enterobius vermicularis in patients with PT and population was the same in spite of more efficient mode of transmission in enterobiasis, belonging to contact parasitic diseases.

Morbidity with giardiasis in patients with PT was 4 fold lower, than in population. This phenomenon appears to be stipulated by the influence of antituberculosis therapy. Aminoglycosides are known to possess a limited antigiardial activity (paromomycin) [9, 8–10], probably other antituberculosis preparations exert analogous effect.

Prevalence of Blastocystis hominis was 3 fold higher than in population. It seems to can be connected with an expressed immune imbalance and decrease of activity of local immunity to control the B. hominis number. It is confirmed by analogous tendency in HIV-infected individuals, a high intensity of B. hominis infection (≥ 5–6 parasites in a field of view, oc × 10, ob × 40) being detected only in patients with PT and HIV-infected individuals, not in healthy persons and patients with various pathology of gastrointestinal tract (gastritis, enterocolitis, cholecystitis) [3, 8–11].

Table 2. – Level of serum IFN-γ and IL-4 in patients with PT, invasive PA and intestinal parasites (pg/ml)

Cohort under study	IFN-γ	IL-4
Healthy individuals (n = 20)	125.7 ± 6.7	2.6 ± 0.7
Patients with PT without intestinal parasites and aspergillosis (n = 15)	70.0 ± 6.1*	8.0 ± 2.1*
Patients with PT and ascariasis (n = 17)	54.6 ± 2.8* **	18.2 ± 3.0* **
Patients with PT and enterobiasis (n = 14)	69.3 ± 3.8*	9.3 ± 1.8*
Patients with PT and invasive PA (n = 12)	41.6 ± 3.1* **	27.6 ± 4.7* **
Patients with PT, ascariasis and invasive PA (n = 4)	22.8 ± 4.7* **	31.7 ± 4.9* **
Patients with PT and giardiasis (n = 12)	58.7 ± 3.8*	15.4 ± 2.4*
Patients with PT and blastocytosis (n = 12)	62.8 ± 3.8*	22.4 ± 5.7* **

*Note: * — significant difference with healthy individuals (P < 0.05); ** — significant difference in comparison with patients with PT without intestinal parasites and aspergillosis (P < 0.05).*

PA was diagnosed in 44 ($39.6 \pm 4.6\%$) from 111 patients with PT, 16 of them suffered from invasive PA. Aspergillus fumigatus were isolated from blood samples of 2 patients and from sputum and bronchoalveolar lavage samples of 10 patients. Invasive PA was diagnosed in 4 patients on the base of significant impairment of condition and progression infiltrative process against back-

ground of antituberculosis therapy (increase of temperature up to 38.5–39.9 °C, appearance/intensification of dyspnea and appearance of blood streaked sputum, progressing of infiltrative process (CT), high level of IgG to Aspergillus spp. and rapid positive effect of voriconazole therapy. Other cases were presented by aspergilloma. We consider positive serology as a test orienting to the disease, because In total positive serology was observed in 4 (20 %) from healthy individuals of control group. Positive results were obtained in 1 (5 %) from 20 nonsmokers and 3 (15 %) from 20 smokers, all three smokers have A. fumigatus colonization of upper part of respiratory tract. Diagnostic level of IgG to A. fumigatus was determined in 31 (70.4 %) patients with PA.

Results of serum cytokines detection are represented in table 2.

Level of serum IFN-γ in patients with PT without intestinal parasites and PA was significantly lower, than in healthy individuals ($P < 0.05$). This index in patients with PT and ascariasis was even lower, and is significantly different from control values as well as values, obtained in patients with PT and without parasites and PA ($P < 0.05$). Enterobiasis didn't induce significant changes in IFN-γ concentration in patients with PT. Invasive PA, diagnosed in 12 patients with PT, was developed against a background of low level of serum IFN-γ: 41.6 ± 3.1 pg/ml; ascariasis diagnosed in 4 patients with PT and invasive PA induced even more expressed decrease of IFN-γ: 22.8 ± 4.7 pg/ml.

Level of serum IL-4 was significantly higher in all groups under study in comparison with control value. The highest IL-4 level was detected in patients with PT + invasive PA + ascariasis and PT + invasive PA and PT + ascariasis, respectively 31.7 ± 4.9 pg/ml; 27.6 ± 4.7 pg/ml и 18.2 ± 3.0 pg/ml. In patients with PT without parasites and PT with enterobiasis IL-4 level was similar and significantly higher than in control group.

Significantly higher prevalence of A. lumbricoides in patients with PT can be considered as a factor provoking manifestation or exacerbation of tuberculosis process due to augmentation of IFN-γ and IL-4 imbalance. Larvae migration stage through respiratory tree is of importance due to direct affection of lung tissue and probably activation and spreading of mycobacterial infection. Data of J. Potian et al. [8, 1863–1874] indicate to such possibility.

They showed in experiment with mice, infected with Nippostrongylus brasiliensis (model equivalent ascariasis in human) and M. tuberculosis that Th2 response can enhance the intracellular persistence of M. tuberculosis, in part by mediating the alternative activation of macrophages via the IL-4Rα signaling pathway unlike classic one, mediating by IFN-γ. May be ascariasis triggers other mechanisms. Diniz L. M. et al. (2010) [4, 142–150] found A. lumbricoides in 12 % of patients with tuberculoid lepra and in 2 % of individuals who were in contact with patients but were not sick. These numbers are completely in agreement with our data. Although tuberculosis and lepra characterized by different target organs the infection gate (respiratory tract) are similar at these infections. Diniz et al. (2010) received analogous dynamics of IFN-γ and IL-4 in patients with lepra and concomitant ascariasis and without it [4, 142–150]. Thus we can conclude with good grounds that ascariasis influences susceptibility to Mycobacterium and course of mycobacterial infections. Our data are consistent with results of Abate et al. (2012), showed that one third of bacteriological positive PT patients in Ethiopia are infected by helminths and this level is significant higher than in population [1].

Ascariasis seems to influence development of invasive PA in patients with PT. Absence of significant shifts in the level of IFN-γ and IL-4 in patients with PT and concomitant enterobiasis and similar prevalence of E. vermicularis in patients with PT and population point to lack of enterobiasis effect on susceptibility to M. tuberculosis and course of PT. Influence of concomitant giardiasis and blastocystosis (patients only with high intensity of infection were considered) on the level of serum IFN-γ was essentially weaker: in significant decrease in comparison with control value, differences with patients with PT without parasites and PA were negligible ($P > 0.05$). Some other regularities were elucidated in IL-4 detection: if its values in patients with PT + giardiasis and PT without parasites and PA were similar, blastocystosis resulted in a significant increase of IL-4 level (table 2). Thus influence of protozoan infections on cytokine profile of patients with PT is insignificant.

Conclusion

Ascariasis as a concomitant disease influences development of PA due to worsening immune imbalance typical for PT.

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Influence factors of the environment on the state of health of the population at the regional level

Abstract: Environmental factors are one of the leading factors that have an impact on the health and well-being of the population.

Keywords: fertility age, reproductive health, nutrition, pregnancy, tuberculosis, morbidity, mortality.

Relevance of the work

Several studies have established a very low level of the state as the somatic and reproductive health of women, as evidenced by the huge number of complications of pregnancy, childbirth, the continuing high level of gynecological morbidity, significant of the spread the infertility and pregnancy loss [1]. Nutritional factors are one of the leading factors affecting the health and well-being of the population, especially for vulnerable groups such as women of childbearing age [5]. Therefore, this factor is of general human, social and political importance and closely linked with the problems of demography, reproductive health, economy and culture [3].

In the modern period, one-third of the world's population is infected with the causative agent of tuberculosis, of which 5–10 % is patients [2].

Despite the vast experience of mankind in the fight against tuberculosis, including affordable and effective treatment annually worldwide registered 9 million new TB cases and nearly 2 million have died of it. The burden of TB is closely connected not only with huge pressures on the health care system, but also losses in the country's economy, because, basically, tuberculosis affects working-age population. In accordance with the Resolution of the World Health Organization (Resolution WHA 44.8/2004) declared TB as a major global public health problem [4].

Purpose of the study

The study of the influence of environmental factors on the health of the population at the regional level of the Republic of Uzbekistan and the development of complex event to reduce the negative impact of these factors on the human body.

Materials and methods

Actual power orphanages studied in layouts menu. The study was conducted over three consecutive days: at the beginning, middle and end of each month by seasons. The content of the nutrients and energy was calculated from the table of the chemical composition of food Pokrovsky A. A. (B. L. Smolyanskii, Z. I. Abramova/on therapeutic nutrition Guide, 1985). The results were compared with average daily recommended food consumption norms for calculation of minimum consumer budget of Uzbekistan's population (Sanitary rules and norms № 0135–03).

The first stage of the study was to survey respondents, which was conducted in the clinic and the hospital "The TB dispensary" in Ferghana. All of the respondents as the primary clinical diagnosis at the time of the study, exhibited diagnosed pulmonary tuberculosis. The presence of the respondent concomitant chronic disease (without exacerbation) does not prevent its inclusion in the group of patients. For the study, we used a questionnaire adapted to the conditions of the Republic of Uzbekistan. This is a general questionnaire for group comparisons, which recommended the Health of the Republic of Uzbekistan for Biomedical Research of the adult population.

The results were processed by variation statistics calculating the average error (m), the confidence coefficient (t) and the probability of error (P). Mathematical treatment of the material was carried out on a PC in Windows 95, Microsoft Excel, version 7.0.

Results and discussion

The study was carried out of the actual power supply in rural areas in the Fergana region. The study content of basic food ingredients (proteins, fats and carbohydrates) has been studied, some vitamins and minerals in the daily diets of 2,000 women of childbearing age from 15 to 49 years, taking into account climatic conditions. It revealed the actual imbalance of power of women of childbearing age. 61 % of women established fed 4 times daily, 47 % — 3 times, 9 % of women — 5 % and 7 times — 2 times. The study showed that 95 % of women of childbearing age, mainly feed on the house where the food, in most cases, is made irrationally. It should be noted that 26.6 % of women complain about the poor state of health, and in the proportion of morbidity prevalent mental stress. Among surveyed from 26–33 % have hair loss, at 37–40 % — blurred vision, from 27–46.6 % — violation of the capillary resistance, at 20–23 % — bleeding gums, at 6.6 % — petechial, have 30 % — dry skin, 10 % — cheilosis, 10 % — pale tongue. Marked by a very low level of consumption of fish products, and in the spring — reduced consumption of fresh vegetables, fruits and berries. However, in some excess consumed cereals, pasta and bakery products. The content of the nutrients, particularly animal proteins constitute 61 % and the amount of vitamin C, B1, B2, B6, and minerals potassium, calcium, magnesium, phosphorus, iron, copper, manganese women food rations spring is lower than the fall and did not meet the physiological needs. Accordingly, the detected seasonal variations of some parameters of cellular and humoral immunity. Reduction of T-lymphocyte, immunoglobulin, preferably of class G and the number of CEC in the spring compared to autumn, combined with a significant increase in the relative and absolute number of B-lymphocyte.

It is known that good nutrition for pregnant and lactating mothers includes providing a body of the fetus and the baby all the necessary nutrients, proteins, fats, carbohydrates, macro and micronutrients, vitamins. Deficiencies of nutrients at certain stages of fetal development can lead to the formation of organic pathology, and even fetal death.

The results of our study showed that a daily diet of protein deficiency are installed in 15 % of fat deficit — 20–25 %, especially polyunsaturated fatty acids, vitamin deficiency A, C, P, B1, B6, B12, excessive consumption of carbohydrates: sucrose — 40 %, at the expense of grain products in the daily diet of micronutrient deficiencies.

We carried out a medical examination of women of childbearing age in the city Kuvasay. Studies have shown that in the group of 80 surveyed women of childbearing age, 12 is detected tachycardia, 9 — hepatomegaly, 30 girls and women — dull, thinning and hair loss, pale mucous conjunctiva, 54 — pale face, as well as in 8 — xerosis conjunctiva, 11 — angular stomatitis, 9 — cheilosis, 13 — swelling of the tongue, 16 — the phenomenon of periodontal disease, in 56 surveyed admitted functional changes in the nervous system, 9 — parotid glands, 16 — an increase in thyroid size 1-n degrees. The combination of 2 or more abnormalities found in 45 % of the surveyed girls and women of childbearing age.

In 2000–2010 yy. the Republic of Uzbekistan and the Fergana Valley incidence rates of tuberculosis have been studied. In Fergana region incidence rate it was in 2000 — 50.6 (in the country — 64.5), in 2001 — 60.0 (in the country — 72.4), in 2003 — 70.0 (in republic — 77.1). The highest rate of tuberculosis in the Fergana region made in 2010 — 67.4 (in the country — 73.5), ie, if we compare 2000 and 2010, we see that in 10 years the incidence rate increased by 16.8.

Due to the unfavourable housing situation TB was: the population — 62 %, in boarding schools — 56 %, in the receivers — 70 %, among the orphans — 67 %, among the migrants — 65 %. In connection with alcoholism tuberculosis is: the population — 61 %, in boarding — 9 %, receivers — 14 %, among the orphans — 71 %, among the migrants — 43 %. In connection with the tobacco tuberculosis is: the population — 61 %, in boarding schools — 67 %, receivers — 71 %, among the orphans — 64 %, among the migrants — 78 %. In connection with the environmental factors of tuberculosis was: the population — 24 %, in boarding schools — 45 %, receivers — 42 %, among the orphans — 38 %, among the migrants — 35 %. In connection with the nutritional status of tuberculosis is: the population — 65 %, in boarding schools — 64 %, receivers — 62 %, among the orphans — 65 %, among the migrants — 34 %. Due to the unknown ethology was tuberculosis: the population — 28 %, in boarding schools — 31 %, receivers — 31 %, among the orphans — 25 %, among the migrants — 21 %, among the homeless — 34 %.

Conclusions:

1. Character nutritional status of women of childbearing age of the rural population of Fergana region is unbalanced, due to the shortage of proteins, fats and carbohydrates. Disrupted formula of balanced nutrition.
2. For the normalization of immune parameters, anemia, iodine deficiency, vitamins, trace elements, as well as raising the level of food culture among women of childbearing age, we can recommend a diet based on traditional cooking methods, including a food additive, "Tabib-1".
3. Tuberculosis is a social and hygienic problem and requires a series of necessary preventive measures to reduce it.

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The role of viral etiology in the development of acute gastroenteritis in children in Uzbekistan

Abstract: To achieve the objectives prospective epidemiological study was organized, which included a study of children under 5 years of age (from 0 to 59 months) admitted with a diagnosis of acute gastroenteritis in the Department of intestinal infections of Research Institute Virology in the period from January 1, 2013 to January 31, 2014. The study shows a significant prevalence of viral infection of bacterial infection that necessitates a change to the approach in the treatment of gastroenteritis. Featured prevalence, seasonal and age distribution, as well as the characterization of the clinical manifestations may serve as a guide for practitioners in terms of laboratory diagnostics failure.
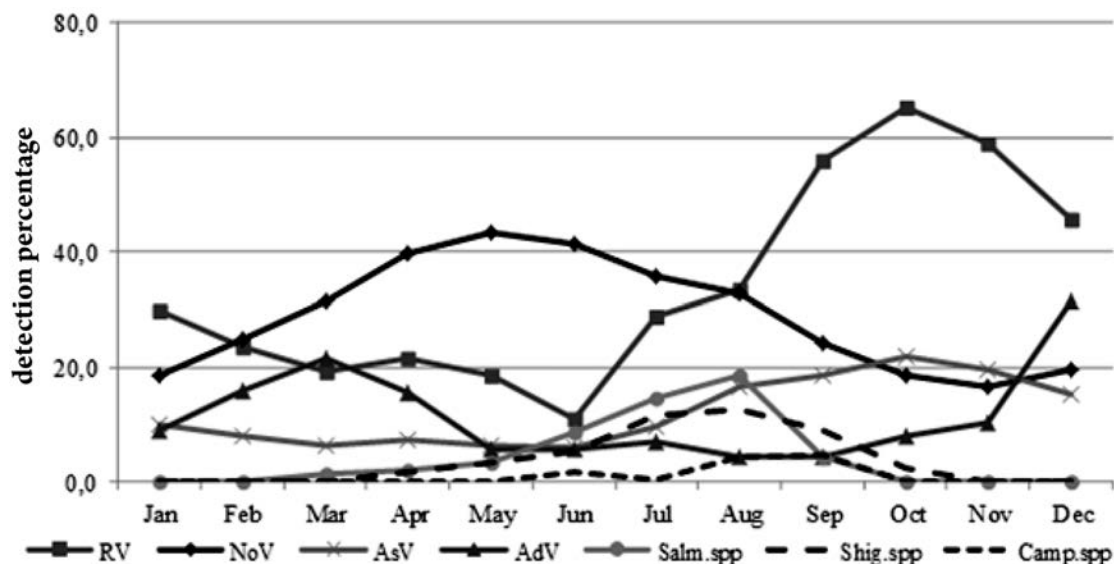
Keywords: polymerase chain reaction (PCR), hybridization with fluorescence detection, microorganisms of the genus Shigella (Sh.spp.), Salmonella (Sal.spp.), Campylobacter (Cam.spp.), Adenoviruses group F (AdV) and RNA of group a rotavirus (RV), genotype 2 noroviruses (NoV), astroviruses (AsV).

Introduction

According to the World Health Organization, diarrhea remains a significant cause of the morbidity and mortality among children in developing countries [1]. Despite ongoing efforts, from diarrhea die each year more than 1.3 million children under the age of 5 years [1; 2]. The etiological structure of infectious diarrhea is different in different parts of the globe, but still remains the dominant bacteria and viruses [3; 4]. To carry out effective preventive

measures and the adoption of policies to combat diarrheal diseases, it is important to study the structure of the etiological causes of acute gastroenteritis in children under 5 years.

The aim of this study was to investigate the etiological structure of diarrheal diseases and the role in the development of viral etiology of acute gastroenteritis in children in the Republic of Uzbekistan, the description of the epidemiology and clinical characteristics of pathogens.

Materials and methods

To achieve the objectives prospective epidemiological study was organized, which included a study of children under 5 years of age (from 0 to 59 months) admitted with a diagnosis of acute gastroenteritis in the Department of intestinal infections of Research Institute Virology in the period from January 1, 2013 to January 31, 2014. All data is entered into an electronic database and subsequently processed by the statistical program SPSS 16.

The etiological transcript was carried out using the test system "AmpliSens® OCI screen-FL" intended for the detection and differentiation of DNA microorganisms of the genus Shigella (Sh. spp.), Salmonella (Sal. spp.) And thermophilic Campylobacter (Cam. spp.), Adenoviruses group F (AdV) and RNA of group a rotavirus (RV), genotype 2 noroviruses (NoV), astroviruses (AsV) by polymerase chain reaction (PCR), hybridization with fluorescence detection. A similar test system was used to study Podkolzin et al., 2015 [5].

Results

In total during the study period in the Department of intestinal infections in 1050 patients received. All 1050 stool samples were tested for the presence of pathogens and 7 825 (78.6 ± 1.4 %) patients, one or more agents (Table 1) has been identified. The bulk of the pathogens viruses accounted for 667 cases (80.8 ± 1.5 %), while the bacteria were much smaller proportion of established cases — 177 (21.5 ± 3.1 %). The most common rotavirus was 41.1 ± 2.4 %, then followed by norovirus 32.6 ± 2.5 %, astroviruses and adenovirus were less widespread viral pathogens and constituted 12.9 ± 2.9 % and 12.7 ± 2.9 %, respectively. Among the most common bacterial infection have been established Salmonella and Shigella (6.2 ± 2.8 % and 5.7 ± 2.8 %, respectively).

Among the cases with established etiology mono infection was observed in 595 cases (72.1 ± 1.8 %). In the remaining 230 cases (27.9 ± 3.0 %) infection was observed by two or more agents. The most frequently noted as mono infection rotavirus 82.3 ± 1.8 % and norovirus 67.0 ± 2.2 %. Astroviruses and adenoviruses met as mono infection about a third of cases. Bacterial infection occurs mainly in combination with other infections ranging from 51.3 % to 95.0 %. Combination rotavirus the most frequent among mixed infection with norovirus (12.8 ± 3.2 %), followed by a combination of rotavirus and adenovirus (3.5 ± 3.5 %). The combination of other infections has not more than 3 %, the combination of bacterial infection is not higher than 1 %.

It should be noted that hospitalizations for acute gastroenteritis were observed throughout the year, with the vast majority of cases (84 %) were observed during the period from June to November. Negotiability peak is in August, the minimum number of references pointed out in February. With regard to entities that seasonal distribution is less clear (Fig. 1). Since rotavirus had a pronounced fall-winter active of the peak in the month of October, and the minimum level in June. A similar, but less pronounced distribution noted in astroviruses. Norovirus, on the contrary, observed mostly between April and July months. Adenovirus was observed more pronounced in the winter-spring period. Bacterial infections have approximately the same seasonal distribution. The growing number of bacterial infections began in late spring, during the summer continued to grow, reaching a peak in August, then decline observed during the autumn.

The bulk of cases falls on the age of 2 years, by the end of the second year of life is celebrated more than 80 % (from 65 % to 94 %) of all cases, with about half of the cases of ill before the age of 1 year. Cases diseases under the age of 3 months is less than 3 %.

Discussion

Total etiologic agent was identified in 78.6 %, which is typical for the use of molecular-genetic methods of diagnosis [6]. Among all hospitalized cases in 63.5 % of cases, the cause of acute gastroenteritis contact viral infection has been established, and only 17 %, cause bacterial installed. Among the etiologic agents identified in 41.1 % of cases, contact was established rotavirus. This fully corresponds with the data of supervision of rotavirus infection in Europe, America and Asia [7], including neighboring Tajikistan, where the rate of rotavirus infection was 39 %. A similar level was detected in 44 % of Russia [8]. The second most common cause of diarrhea in our study was the Norovirus infection (32.6 %). This is consistent with numerous publications, pointing to a significant incidence (6–48 %) noroviruses in children with acute gastroenteritis [9]. Occurrence astroviruses and adenoviruses was approximately the same and amounted to 12.7 % and 12.9 %, respectively. According to the World Literature astroviruses and adenoviruses prevalence ranging from 5 % to 16 % globally [10; 11; 12], our results fit into the frame. Bacterial infections occupy a much smaller role in the occurrence of gastroenteritis and did not exceed 17 %. However, this is consistent with reported prevalence of these agents in the world [3; 13; 14].

Seasonal fluctuations vary considerably, which may be an indirect reference point for practitioners and will reduce the frequency of unjustified use of antibiotics, which in practice are used in more than 90 % of cases.

Thus, the study shows a significant prevalence of viral infection of bacterial infection that necessitates a change to the approach in the treatment of gastroenteritis. Featured prevalence, seasonal and age distribution, as well as the characterization of the clinical manifestations may serve as a guide for practitioners in terms of laboratory diagnostics failure.

Table 1. – The detection of infectious pathogens in children with acute gastroenteritis in children less than 5 years (N = 1050)

Pathogen	Total		Mono infection		Mixed infection	
	n	% (SE)	n	% (SE)	n	% (SE)
Rotavirus A	432	41.1 (2.4)	352	81.6 (2.1)	80	18.4 (4.3)
Norovirus 2	342	32.6 (2.5)	229	67.0 (3.1)	113	33.0 (4.4)
Astrovirus	133	12.7 (2.9)	38	28.4 (7.3)	95	71.6 (4.6)
Adenovirus F	135	12.9 (2.9)	45	33.6 (7.0)	90	66.2 (5.0)
Salmonella spp.	60	5.7 (3.0)	22	37.1 (10.3)	38	62.9 (7.8)
Shigella spp.	65	6.2 (3.0)	31	48.7 (9.0)	34	51.3 (8.6)
Campylobacter spp.	44	4.2 (3.0)	4	7.8 (13.4)	40	92.2 (4.3)

Fig. 1. Seasonal distribution of acute gastroenteritis among children under the age of 5 years, depending on the pathogen

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Medical and biological assessment of the fluoride content of bottled water

Abstact: It has been established that the fluoride content of bottled water with concentration of 0.7–1.0 mg/L is not toxic, it does not cause irritation action to the skin and mucous membranes of the eyes, has no cumulation and sensitizing properties. Bottled water containing fluoride concentration of 0.7 and 1.0 mg/l, can be attributed to non-toxic and low- hazard products.

Keywords: bottled water, toxicology, food safety.

Background

The biological role of fluoride in the body is determined by its ability to regulate the processes associated with tissue calcification. The normal content of fluoride in the body creates (mineralizes) the tooth bone, enamel and dentine [1]. Nearly the whole body fluoride (99 %) is localized in solid tissues [2]. Its higher concentration in the soft tissues such as in vascular walls indicates their pathological calcification. It has been found that about 75 % of alimentary fluoride comes from drinking water, beverages and liquid food [3]. The fluoride content in the drinking water of cold and moderate climate zones is normalized at the level of 1.2–1.5 mg/l, and in hot regions — 0.7 mg/l. [6]. When the fluoride content in drinking water is below 0.5 mg/l, it requires water fluorination to prevent the lack of fluoride conditions and, in the first place, tooth decay.

It is normally used the soluble compounds of the element: NaF and Na_2SiF_6 for fluorinating r [6; 7]. In recent years, there is the practice of fluoride enrichment of salt (with iodine): 1 g. of salt contained 0.25 mg. of fluoride. Such salt can be effectively used in the regions where the primary source of drinking water has a low fluoride level and there is no practice of its fluorination [7]. At the same time, should be necessary to balance the fluoride body intake considering the real possibility of development of dental fluorosis — microelementosis that is associated with hyper fluorosis. Specialists of the National Academy of Sciences of the USA suggest that daily safe dose is from 1.5 to 4 mg. of fluoride [7; 8]. Excessive body intake of fluoride develops fluorosis, which is clinically expressed as erosive pigmentary tooth lesions and skeletal deformities.

The overwhelming majority of the population of the Republic of Uzbekistan lives in low and non-fluoridated areas and at high risk of developing tooth decay. In order to prevent the developing tooth decay it is necessary to carry out the artificial enrichment of organism with fluoride, the safer, convenient, effective way is water fluoridation of drinking water. Water that contains an adequate amount of fluoride helps prevent tooth decay and build strong teeth. As shown by recent studies, the high dental disease in the Republic of Uzbekistan presents the real threat to the health of younger generation. According to A. S. Yuldashkhanova et al. (2005), on the territory of the Republic, among preschool children who are living in the city, the prevalence of tooth decays has been 87.76 %, with the intensity of 3.96, and among preschool children who are living in the rural areas, the prevalence of tooth decay has been 80.91 % with an intensity of 3.3 [5]. Tashkent city tap water fluoride concentration is 0.36 mg/dm³ (very low fluoride concentration in water). In this regard, the development of fluoridated bottled water is very important.

We designed the bottled water enriched with fluoride in collaboration with technologists of Republican Association "Montello" As an evaluation criterion for daily dose of fluoride intake of preschool age children they used "Conservative age-limits of daily fluoride intakes" worked out by T. M. Martaler (1992). According to these limits, the level of fluoride income in the organism of preschool children should be 0.8–1.75 mg. per day, which is justified by the high energy consumption of this age period. There used sodium fluoride to prepare bottled water.

The above has been the basis for toxicological studies of the fluoride content of bottled water in concentration of 1.0 mg/L — the study of systemic toxicity with the assessment of the possible irritant effect on the mucous membranes as well as its potential cumulative effects and allergenic activity.

Aim of the research

Toxicological evaluation of the fluoride content of bottled water in concentration of 1.0 mg/L after intragastric administration of putative toxic dose to laboratory animals with further follow-up within the experiment to determine the clinical signs of intoxication.

Objects of research

The fluoride content of bottled water in concentrations 0.7 and 1.0 mg/L.

Materials and methods of research

Experimental studies were performed on 36 white mongrel male rats with body mass 130–160 g. and 36 pregnant females weighing 207–241 g. that were kept separately in vivarium Interuniversity Research Laboratory (IRL) of the Tashkent Medical Academy on balanced diet for the content of proteins, fats and carbohydrates. All animals had been receiving bottled fluoridated water for 90 days [3; 4]. 36 male rats were divided into 3 groups. Group 1 animals were administered 3.0 ml. of 0.0001 % (fluoride concentration is 1.0 mg/l, equivalent dose 0.12–0.14 mg/kg) fluoridated water per 100 g. of body weight daily two times a day. Group 2 animals were administered 3.0 ml. of 0.00007 % (fluorine concentration is 0.7 mg/l, equivalent dose of 0.084–0.098 mg/kg) fluoridated water two times a day per 100 g. of body weight. Taking into account that the rats with 200 g. body mass consume on average 30–35 ml. of fluid per day, the rest of fluoridated water the animals took on their own from the drinkers. Group 3 was used as a control. The same way was distributed 36 female rats. Study of the acute toxicity of the fluoride content of bottled water concentrations of 0.7 and 1.0 mg/l (equivalent doses 0.084–0.098 and 0.12–0.14 mg/kg body weight, respectively) was performed on sexually mature white male rats with an initial weight of 130 –160 g. Three experimental groups included 6 animals in each group. Fluoridated water injected daily, morning and evening doubly per os at 3.0 mL. per 100 g. body mass. 20–25 ml. of fluoridated water was left in the open drinkers. After 3–4 hours after introduction of fluoridated water the animals were given organic and briquette food. The follow-up of experimental animals was being carried out for 90 days [3–4].On the expiry of 90 days 36 rat females after mating were divided into 3 groups. Pregnant females of 1 group daily 2 times a day were being injected 3.0 ml. 0.0001 % (equivalent dose 0.12–0.14 mg/kg) of fluoridated water per 100 g. of body weight. Group 2 animals daily two times a day were being administered 3.0 ml. of 0.00007 % (equivalent dose 0.084–0.098 mg/kg) of fluoridated water per 100 g. of body weight. Taking into account that the rats with 200 g. body mass consume on average 30–35 ml. of fluid per day, the rest of fluoridated water the animals took on their own from the drinkers.

Newborn rats on the 3rd, 7th, 10th and 14th day were carried out histomorphological studies of the thyroid gland and femur osteogenesis. Study model of osteogenesis of little rats' teeth was rejected due to the fact that rats could get fluoride from their mother's milk. In this case, the teeth in varying degrees expose residual quantities of fluoride in milk.

Clinical analyzes of rat blood was performed according to standard procedures [6; 7]. Biochemical indices of blood serum were determined with uniform methods: total protein — biuretic, albumin — bromo cresol, glucose — glucose oxidase, aspartate aminotransferase (ACAT) and alanine aminotransferase (ALT) — standardized methods by Reitman-Frankel, alkaline phosphatase — standardized method using nitrophenylphosphate (sets of chemicals of company CYPRESS Diagnostics, Belgium) [15]. Statistical analysis was conducted to determine the reliability of the criteria for laboratory research on methodical recommendations "Use of the principles of evidence-based medicine in organizing and conducting health studies" on the basis of the Word 2003.

The results of their own research

Observation of experimental animals was being carried out for 90 days. The symptoms of intoxication and death of animals was not recorded. The experimental animals remained active, neat, readily ate the food, wool was smooth, shiny, react to external stimuli adequately. In the absence of the death of experimental animals, and symptoms of intoxication, to calculate the mid-lethal dose (LD_{50}) was not possible.

Thus, in the absence of toxic symptoms and death of the animals in acute trials the fluoride content of bottled water in concentration 0.7 and 1.0 mg/L by the parameters of toxicity degree can be related to class 4 — low-toxic substance.

The next step, we studied the local skin and skin- resorption effect of the fluoride content of bottled water. Studying of topical fluoride content of bottled water in concentrations 0.7 and 1.0 mg/L on the skin and mucous membrane of eyes as well as the ability to penetrate intact skin were conducted on white male rats. Fluoridated water was applied the skin of the experimental animals at the rate of 20 mg/cm². Skin reaction was recorded after 4-hour exposure after 1 and 16 hours after a single application. It was found that bottled water containing 0.7 and 1.0 mg/l of fluoride does not cause irritation of the skin.

It was studied the toxicity of multiple exposure to the skin of white rats treated with 20 cutaneous applications of fluoridated water. It is established that during the whole experiment period the death of the animals and clinical signs of toxicity was no observed.

To identify the skin-resorption effect white rats were fixed in special machines. Tails of experimental animals were dipped in the tubes with fluoridated water for 4 hours at 36–37°C. After ending the experiment the skin tails were washed with soap and water. No death and signs of intoxication of experimental animals were observed within 3 week-follow-up.

Thus, the study results allow stating the lack of bottled water containing fluoride concentrations of 0.7 and 1.0 mg/l of local skin and skin-resorption effect.

The further step we studied the effect of bottled fluoridated water on mucous membrane of the eyes. In conjunctival sac of the right eye of rats was added one time 2 drops of bottled water containing fluoride concentration of 0.7 and 1.0 mg/l, the left eye was as control. No changes revealed of the water exposure to fluoride concentration of 0.7 mg/L. It was marked lacrimation under the influence of fluoride concentration of 1.0 mg/L after 2 minutes. After 3–3.5 minutes this phenomenon was completely disappeared. Consequently, the obtained findings showed that bottled fluoridated water under investigation in concentrations close to the technological use has no irritant effect on mucous membranes.

The ability to cumulation of bottled fluoridated water was studied by Lima subchronic toxicity under repeated intragastric administration to white rats. It was used white male rats weighing 130–160 g. in the experiment. Bottled fluoridated water had been administered intragastrically 2 times a day within 4 weeks. Control animals received distilled water in equal volume. As indicators of the functional state of the animals they used: survival during the experiment, general state, animal activity, dynamics of body weight, morphological composition of peripheral blood, the content of total protein, albumin, glucose, ALT, AST, alkaline phosphatase activity.

No behavioral deviations and general condition in animals within the follow-up period were observed. No signs of toxicity and deaths were noted. The dynamics of body weight growth of white rats has been shown in Table 1.

As it is seen from the data presented in Table 1 the statistically significant delays of body weight growth no found.

Consequently, these results indicate the absence of the negative effect of fluorinated water on physiological growth in laboratory animals.

Table 1. – Dynamics white rats body weight at intragastrical multiple-dose introduction of bottled water with fluoride content of 0.7 and 1.0 mg/l within a month

Name of animal groups	Doses mg/kg	Statistics	Animal weight, g.		Amount of growth in %
			Initial	On the day of slaughter	
Control	–	M ± m	137.0 ± 2.9	162.0 ± 1.6	182
Bottled fluoridated water (0.7 mg/l)	0.084	M ± m	143.7 ± 4.4	156.3 ± 5.0	6.1
	0.098	M ± m	128.2 ± 2.5	155.3 ± 3.1	17.4
Bottled fluoridated water (1.0 mg/l)	0.12	M ± m	133.2 ± 1.4	155.0 ± 2.1	16.4
	0.14	M ± m	135.7 ± 4.4	165.3 ± 5.0	21.8

In terms of chronic experience the toxicity of bottled fluoridated water was studied with the introduction of water to white rats per os 2 times a day within 90 days. The experiment was used white male rats weighing 130–160 g. Study of the dynamics of the content of hemoglobin, erythrocytes, leukocytes, eosinophils, lymphocytes, monocytes, platelets, and segmented, color index and ESR in the peripheral blood revealed no revealed statistically significant differences in the treated group of animals compared with control data (Table 2–5). Analysis of study results revealed that the group of animals exposed to water with fluoride concentration of 1.0 mg/L, the values were similar to control parameters, whereas, the exposure of fluoride with concentration 0.7 mg/l was slightly below controls.

Table 2. – Hemoglobin, erythrocytes and leukocytes in peripheral blood of white rats after intragastric administration of bottled fluoridated water within a month

Name of animal groups	Doses, mg/kg	Statistics	Hematological indices		
			Hemoglobin content, g/l	Erythrocyte content, g/l	Leukocyte content, g/l
Control	–	M ± m	136.3 ± 4.4	4.43 ± 0.13	4.93 ± 0.43
Bottled fluoridated water (0.7 mg/l)	0.084	M ± m	128.3 ± 2.3	4.7 ± 0.2	4.32 ± 0.31
	0.098	M ± m	130.7 ± 2.4	3.80 ± 0.3	4.51 ± 0.62
Bottled fluoridated water (1.0 mg/l)	0.12	M ± m	137.3 ± 3.3	4.4 ± 0.13	4.77 ± 0.38
	0.14	M ± m	135.7±4.4	4.38 ± 0.12	4.92 ± 0.45

Table 3. – Color index, platelets and segmented content in peripheral blood of white rats
after intragastric administration of bottled fluorinated water within a month

Name of animal groups	Doses? mg/kg	Statistics	Hematological indices		
			Color index	Platelet content, 10^9/l	Segmented, %
Control	–	M ± m	0.92 ± 0.03	27.7 ± 15.0	52.7 ± 3.7
Bottled fluoridated water (0.7 mg/l)	0.084	M ± m	0.76 ± 0.04	255.8 ± 10.8	50.7 ± 2.2
	0.098	M ± m	0.75 ± 0.03	265.4 ± 12.0	54.5 ± 3.6
Bottled fluoridated water (1.0 mg/l)	0.12	M ± m	0.88 ± 0.02	265.7 ± 11.2	52.5 ± 3.2
	0.14	M ± m	0.85 ± 0.02	275.6 ± 14.2	51.7 ± 4.6

Table 4. – Content of eosinophils, lymphocytes, monocytes and ESR in peripheral blood of white rats
after intragastric administration of bottled fluorinated water within a month Hematological indices

Name of animal groups	Doses, mg/kg	Statistics stics	Hematological indices			
			Eosinophils, %	lymphocytes, %	Monocytes, %	ESR, mm/h
Control	–	M ± m	1.17 ± 0.17	37.3 ± 2.8	5.8 ± 0.6	5.8 ± 0.9
Bottled fluoridated water (0.7 mg/l)	0084	M ± m	1.33 ± 0.21	41.2 ± 4.0	6.5 ± 0.8	5.7 ± 1.2
	0.098	M ± m	1.17 ± 0.22	36.8 ± 3.5	6.3 ± 1.1	6.3 ± 0.7
Bottled fluoridated water (1.0 mg/l)	0.12	M ± m	1.21 ± 0.3	37.8 ± 4.0	5.9 ± 0.4	5.9 ± 0.10
	0.14	M ± m	1.26 ± 0.43	36.6 ± 1.5	6.2 ± 0.9	6.5 ± 1.5

Table 5. – Biochemical indices of white rats after 90 day-intragastric administration of bottled fluoridated water

Groups	Doses, mg/kg	Total protein, g/l	Albumin, g/l	Glucose, U/l	ALT, U/l	AST, U/l	Alkaline phosphatase, U/l
Intact	–	73.41 ± 2.29	42.08 ± 0.86	5.71 ± 0.67	27.33 ± 6.26	26.66 ± 5.33	33.01 ± 4.02
Bottled fluoridated water (0.7 mg/l)	0.084	72.94 ± 0.82	44.2 ± 1.0	5.8 ± 0.9	26.4 ± 3.03	28.8 ± 2.45	33.6 ± 2.1
	0.098	70.4 ± 1.5	46.0 ± 1.9	5.5 ± 0.9	25.8 ± 2.6	29.5 ± 2.8	35.6 ± 2.30
Bottled fluoridated water (1.0 mg/l)	0.12	72.94 ± 2.77	41.13 ± 1.33	5.15 ± 0.58	26.58 ± 5.68	28.25 ± 5.80	34.86 ± 4.00
	0.14	74.36 ± 1.22	43.43 ± 0.98	5.68 ± 0.68	24.83 ± 4.97	30.06 ± 5.06	37.16 ± 3.76

Thus, values of hemoglobin, erythrocytes, leukocytes, eosinophils, lymphocytes, monocytes, platelets, and segmented, color index and ESR in the peripheral blood of animals are closer to the control digits, which suggest that the fluoride concentration of 1.0 mg/l is optimal.

Study results of some biochemical parameters of blood serum (total protein, albumin, glucose, ALT, AST, alkaline phosphatase) of experimental and control animals are shown in Table 6. Analysis of the data showed that the values of total protein indicators, albumin, glucose, transaminase enzymes (ALT, AST) and alkaline phosphatase activity in blood of experimental animals were not significantly different from control values.

Thus, the study results of biochemical blood indices in experimental animals exposed to bottled water in fluoride doses 0.084, 0.098, 0.12 and 0.14 mg/kg animal weight are fluctuated within physiological norms and do not differ from the controls.

When choosing the optimal concentration of fluoride in bottled water it is also need to be considered climatic conditions, i. e., to follow seasonal principle of water fluoridation. For summer time when the temperature is above 26.2 °C – 30 °C, it is preferably to give children the bottled water with concentration of 0.7 ± 0.1 mg/L, and for autumn and winter time — with fluoride concentration of 1.0 ± 0.1 mg/L due to reduced water consumption by children this time. Along with this, it is necessary to take into account the number of consumed milk, vegetables and other dietary habits.

Thus, the use of bottled fluoridated water with optimal selected fluoride concentration of 0.7 and 1.0 mg/L depending on the season allows for the most effective prevention of tooth decay and osteoporosis, both at the individual and social levels.

Conclusions:

1. Bottled water containing fluoride concentrations of 0.7 and 1.0 mg/L is to be non-toxic, does not cause irritant action to the skin and mucous membranes of the eyes, has no cumulation and sensitizing properties.
2. Bottled water containing fluoride concentrations of 0.7 and 1.0 mg/L can be attributed to non-toxic (relatively harmless by S. D. Zaugolnikov) and low-hazard (1V) class of hazard (GOST12,1.007) for foods.

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The influence of active inflammation on parameters of central hemodynamics in pregnant women with rheumatic heart defects

Abstract: The functional state of the cardiovascular system in women with rheumatic heart defect in conjunction with the activity of rheumatic process has been studied thoroughly. The results have revealed a higher frequency of heart contractions, the prevalence of ectopic activity in pregnant women with active rheumatic process. The activity and effectiveness of rheumatic process has also caused the slowing of the pulse conducts in myocardium of atria and ventricles, increasing of both linear and volumetric parameters of heart.

Keywords: pregnancy, rheumatic heart defects, rheumatic process activity, functional state of the cardiovascular system.

The cardiovascular system defects (CSD) in pregnant women continue to occupy the leading position within the structure of extra genital pathology and appear to be an important issuedue totheir prevalence, as well as the influence on maternal and perinatal mortality. During manydecades the rheumatic defects were frequent extra genital pathology in pregnant women [7]. But in recent decades, the incidence of the above mentioned defectin pregnant womenhas been declined due to the successful prevention of rheumatic fever [4]. It was established that 0.1–0.3 % of people, predominantly youth age, and women more often than men, are suffering from rheumatism. Moreover, 90 % of acquired heart defects have rheumatic etiology. Theheart disordersare referred to the group of high risk cardiovascular complications and make up 5–10 % of all cardiovascular defects (CVD) [3]. There has been recently observed an increase in the number of pregnant women and mothers suffering from heart defects, which is explained bya number of reasons: the early diagnosis of such defects; the possibility of pregnancy maintenance in cases which were previously impossible; an increase in the number of women who have had a heart surgery, and the number of seriously ill women who are either by doctors'permission, or independently themselves decide to continue the pregnancy, being confident in the success of medical science and practice. The exacerbation of rheumatoid process affects the fetal developmentadversely, increases the risk of developing of complications from mother's side during pregnancy, as well as childbirth and postpartum period. This is explained by the fact that pregnancy increases the load on cardiovascular system, even in healthy women, while at risk of hemodynamic changes due to existing defects, the load increase many times многократно [5]. Fetal hypoxia, fetal death, malnutrition, prematurity, neonatal asphyxia, malformationsare common cases [6].

Objective: The identification of the influence of an active inflammatory process on parameters of central hemodynamics in pregnant women with rheumatic heart defect.

Research methods and materials

The study involved 70 pregnant women with rheumatic heart defectat the age of 19–35 years, in 2 and 3 trimester of gestation. Along with collecting the complaints and anamnesis data, the physical examination was also conducted during pregnancy. The evaluation of the functional state of the cardiovascular system was carried out comprehensively, taking into account the electrocardiographic and hemodynamic parameters. The electrocardiographic (ECG) indicators included: ECG in 12 standard leads. The assessment of hemodynamic parameters includedthe analysis of heart rate (HR); the level of blood pressure (BP), measured due to the standard method of Korotkov. For studying the intracardiac hemodynamics, the echocardiography method was appliedby device "SONOLINE VERZA PRO" («Siemens», Germany), in accordance with the recommendations of the American Association of Echocardiography in M and B modes (Sahn D. J. et al. 198.) The image was obtained using the M-method, which allows to record the movement of reflective surfaces and provides an opportunity to measure the distance changing over the time. The measurements in M-mode were carried out via the parasternal access along the axis of the left ventricle in accordance with the recommendations of the Penn Convention Method.

The laboratory blood tests included complete blood count (CBC), the revmo sample definition (RS) and prothrombin index. According to the results of the CBC and the RS, the surveyed patients were divided into 2 groups: 1st group — 50 pregnant women (71.4 %) with the presence of active rheumatic process; 2nd group — 20 pregnant women (28.6 %) without activity of rheumatic process.

The research results were subjected to statistical processing based on BIOSTAT program for Windows (version 4.03). The sample mean (X) and the sample standard deviation (SD) was determined. The reliability of intergroup differences was assessed by Student's T-test. For all types of analysis, the p-value < 0.05 was considered as statistically significant.

Theresearch results

The mean age in 1st and 2nd groups amounted to 27.36 ± 4.68 years, and in 2nd group — 27.3 ± 5.68 years. The data did not vary between the groups due to gestational date, which amounted to 26.54 ± 7.62 weeks in 1st group, and 225.2 ± 7.9 weeks in 2nd one (r > 0.05). In 1st group the number of births reached 2.16 ± 0.96, and in 2nd group — 2.1 ± 0.97; the number of pregnancies in the 1st group was 2.65 ± 1.63, while in 2nd group it was — 2.55 ± 1.5. The analysis of physical examination showed that the presence of active rheumatoid HR process in pregnant women is higher compared to pregnant women without its activity, 98.6 ± 12.4 beats/min, against 91.5 ± 9,87 beats/min (p = 0.025) respectively. Thus the level of sistolic arterial pressure (SAP) and diastolic arterial pressure (DAP) in subgroups did not differ: SAP in 1st group was 101.35 ± 11.19 mm. Hg., in 2nd group — 94.3 ± 24.05 mm. Hg. (R > 0.05); DAP in 1st group was 64.2 ± 8.04 mm. Hg., and in the 2nd group — 66.2 ± 11.4 mm. Hg. (R > 0.05).

The analysis of hemogram, revmo sample and coagulation indicated a high importance of prevalence of the changes in blood parameters in the group with active inflammation, which contributed to an increase in its coagulation activity (Table 1).

Table 1. – Comparative evaluation of blood parameters in pregnant women having heart defects with and without the rheumatic process activity

Parameters	Active inflammation n = 50	P	Inactive inflammation n = 50
Leukocytes (109/l)	9.3 ± 3.1	0.042	7.78 ± 1.66
Hemoglobin (g/l)	106.64 ± 11.12	> 0.05	105.4 ± 7.6
ESR (mm/h)	26.8 ± 9.08	0.01	20.9 ± 6.43
RF (IU/ml)	11 ± 2.07	0.013	10 ± 0.7
CRP (mg/l)	12.83 ± 14.4	0.029	5.59 ± 1.58
ACΛO (IU/ml)	354.4 ± 118.02	0.000	170.3 ± 69.53
PI (%)	96.57 ± 9.2	0.038	91.67 ± 7.39
PR	1.01 ± 0.06	0.000	1.07 ± 0.05
INR	1.02 ± 0.07	0.000	1.08 ± 0.06
PT	13.87 ± 0.76	0.002	14.53 ± 0.76

According to the ECG data, low atrial rhythm was observed in 2 pregnant women (4 %) of 1st group, and the blockade of the right bundle branch block was observed in 8 pregnant women (16 %) of 1st group and 5 pregnant women (25 %) of 2nd group. In 22 pregnant women (44 %) of 1st group was revealed cardiac arrhythmias in the form of ventricular premature beats (VPB), whereas in 2nd group the VPB ($x^2 = 5.898$, p = 0.015) was observed only in 2 pregnant women (10 %). The supraventricular arrhythmias (SA) was detected in 10 surveyed patients of 1st group and only in 1 pregnant woman of 2nd group ($x^2 = 1.426$, p = 0.232). The violations of repolarization processeswas observed in 28 pregnant women (56 %) of 1st group, and in 2 pregnant women (10 %) of 2nd group ($x^2 = 10.537$, p = 0.001). The comparative analysis of the electrocardiogram showed that the presence of inflammatory process activity causes the deceleration of the impulses through the cardiac conduction system, extending the PQ, QRS, QT intervals. Thus, the PQ interval in 1st group amounted to 15 ± 0.1 sec., in 2nd group — 4 ± 0.1 sec. (p = 0.000); the QRS interval in 1st group reached to 9 ± 0.01 seconds, in 2nd group — 8 ± 0.01 sec. (p = 0.000); the duration of the QT interval in 13 group was 35 ± 0.2 sec, in 2nd group was — 33 ± 0.2 sec. (p = 0.000).

The investigation of central hemodynamic parameters indicated an increase of heart size (mostly leftist sections), the frequency of pericardial effusion occurrence, as well as significant tendencyto reduction of the left ventricular myocardium contractility in pregnant women with active rheumatoid process (Table 2).

Table 2. – Comparative evaluation of central hemodynamics parameters in pregnant women having heart defects with and without rheumatic process activity

Parameters	Active inflammation n = 50	P	Inactive inflammation n = 20
Ao (mm)	28.9 ± 3.07	0.025	27.15 ± 2.32
LA (mm)	33.74 ± 4.65	> 0.05	31.6 ± 6.55
LVEDD (mm)	53.44 ± 3.9	0.000	48.1 ± 2.9
LVESD (mm)	33.24 ± 3.53	0.000	29.6 ± 2.96
IVS (mm)	8.24 ± 0.66	0.029	7.82 ± 0.83
PW (mm)	7.46 ± 0.67	> 0.05	7.19 ± 0.66
RV (mm)	21.5 ± 3.86	> 0.05	21.7 ± 2.95
LV mass (g)	145.3 ± 25.3	0.000	118.4 ± 23.87
EDV (ml)	136.34 ± 27.37	0.000	110.71 ± 15.78
ESV (ml)	48.24 ± 15.92	0.001	35.58 ± 7.2
EF (%)	63.7 ± 4.5	0.002	67.4 ± 3.54
E/A	1.42 ± 0.27	> 0.05	1.62 ± 0.52
The fluid in the pericardial cavity (amount)	18	$x^2 = 5.463$ p = 0.019	1

The received data testify that active inflammatory process in women with rheumatic heart defects is associated with a moderate sympathetic-adrenal activation, which is evidenced by statistically meaningful increase in heart rate without a significant effect on SAP and DAP [1]. However, in this situation, the inflammation activity, along with an increase of the myocardial hypoxia degree, clinically manifested in authentic fourfold prevalence of cardiac arrhythmias (especially ventricular arrhythmia), the repolarization process disturbances and significant trend to decelerate conduction of impulses in the myocardium of the atria and ventricles, in a minute, as well as volumetric parameters of heart, especially its leftistsections, the misbalance of diastolic myocardial function and statistically significant trend to increase [2]. In addition, the blood coagulation activity in the group of women with active inflammation was slightly, but statistically significantly increased.

Thus, the presence of an active inflammatory process in women with rheumatic heart defects requires a careful analysis of clinical, functional and laboratory parameters. It is not excluded, that the monitoring of the above mentioned indicators of pregnant women in the dynamics, allows enough time to prevent the development of serious complications.

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Efficiency expectant management in women with premature rupture of membranes

Abstract: The aim of this study is to evaluate the effectiveness of the monitoring of pregnant women with preterm rupture of membranes, including the determination of the level of white blood cells, ESR in the blood, assessment of vaginal flora and the presence of elements of amniotic fluid in vaginal discharge (every 12 hours), thermometry (every 3 hours). Also assessed the condition of the fetus: Doppler and cardiotocography utero-placental and fetal blood flow.

Keywords: premature labor, premature rupture of membranes, pregnancy, expectant management.

Premature rupture of membranes (PROM) — a complication of pregnancy, often enough entailing a number of perinatal and obstetric problems, especially in preterm pregnancy. waters of the waste at one time in large numbers, and diagnosis of PROM is not difficult, but in 47 % of cases, when there are microcracks or lateral rupture of membranes without the massive outpouring, doctors doubt the correct diagnosis, which threatens to overdiagnosis and unnecessary hospitalizations or vice versa infectious complications of late detection. If uterine activity PROM is correct, choose watchful waiting [1].

The aim of our study was to evaluate the effectiveness of expectant management in women with PROM, depending on gestational age.

Material and methods. We examined 203 pregnant women with premature rupture of membranes are divided into 3 groups according to the duration of anhydrous period:

– group 1 of 75 (35.9 %) of women with premature rupture of membranes who underwent pregnancy prolongation in a dry period, the duration of which amounted to 24 hours;

– group 2 — 69 (33.0 %) of women with premature rupture of membranes who underwent pregnancy prolongation in a dry period, the duration of which amounted to 72 hours.

– group 3 — 59 (28.2 %) of women with premature rupture of membranes who underwent pregnancy prolongation in a dry period, the duration of which accounted for more than 72 hours.

Results and its discussion

Analysis of examination of pregnant women by age showed that the vast majority of women in all three groups (68.3 %, 53.0 % and 65.0 % respectively in groups) experienced premature rupture of membranes in the period from 20 to 25 years primigravidae 1 group was slightly more than half (51.2 %); in group 2 — 41.9 %; in group 3 — 65.0 %. Primigravidae in group 1 were slightly more than half (51.2 %); in group 2 — 41.9 %; in group 3 — 65.0 %.

In somatic history of childhood infections occurred in 16 (39.6 %) of pregnant women group 1, 19 — (44.2 %) and 5 (12.5 %) — 3 groups. Frequent SARS to present pregnancy

occurred in 33 (80.5 %) of pregnant women 1 group, 24 (55.8 %) — 2 group and in 10 (25.0 %) — 3 groups.

The index of an illness in group 1 was 1.9, in group 2 — 1.6 in group 3 — 1.2, indicating that the connection between the frequency and timing of an illness prolongation. Apparently, this dependence is the result of reduction of immunity in women with a history burdened. Diseases of the liver and biliary tract, thyroid, respiratory and urinary system is not common, and in rare cases. PROM during previous pregnancy, not to full-term period of time (the risk of "relapse" is 16–32 %, which is 8.4 times higher than in women without a history of PROM — 4 %); uterine bleeding during the current pregnancy — 18 (24.0 %), 6 (8.7 %) and 0, respectively, groups; systemic connective tissue disorders (Ehlers-Danlos syndrome, systemic lupus erythematosus) — 2 (2.7 %), 2 (2.9 %), 1 (2.5 %), respectively, groups; blunt abdominal trauma — 1 (1.3 %), 1 (1.4 %), and 0; premature birth — 6 (8.0 %), 3 (4.3 %), 2 (5.0 %); bad habits: smoking; drug addiction (cocaine) — 3 (4.0 %), 1 (1.4 %) and 0; anemia — 38 (50.7 %), 40 (58.0 %) and 39 (97.5 %); underweight before pregnancy (BMI < 19.8 kg/m^2) 2 (2.7 %), 0 and 0; moreover inadequate intake of copper and ascorbic acid, and low socio-economic status.

When PROM pregnant complained of liquid discharge from the genital tract. In marked leakage of amniotic fluid decreases the volume and height of the belly of a pregnant uterus is reduced. Joining chorioamnionitis is characterized by symptoms of intoxication: chills, fever.

The course of this pregnancy was complicated by the threat of an interruption in the early and late stages. All pregnant women with PROM used expectant management of labor management, which consisted in the rejection of induction of labor in the absence of the evidence. All pregnant women carried out a monitoring control: determination of white blood cell count, erythrocyte sedimentation rate in blood, assessment of vaginal flora and the presence of amniotic fluid cells in vaginal discharge (every 12 hours), thermometry (every 3 hours). Also assessed the condition of the fetus: Doppler and cardiotocography utero-placental and fetal blood flowWhen PROM pregnant complained of liquid discharge from the genital tract. In marked leakage of amniotic fluid decreases the volume and height of the belly of a pregnant uterus is reduced. Joining chorioamnionitis is characterized by symptoms of intoxication: chills, fever.

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from 24 to 48 hours was 20.8 % of women. Of these, 3 pregnant women noted the growth of white blood cells and hyperthermia, in 2 women — violation of utero-placental circulation II stage, which was the justification for induction of labor and delivery is urgent. In 5 pregnant women who had signs of horeoamnionita, antibiotic therapy was started [2].

In our studies of pregnant women born 203, 147 (72.4 %) living children immediately after birth, 57 (27.6 %) died in the antenatal and intrapartum periods. Anthropometric data of newborns, including deaths in antenatal and intrapartum periods, groups are statistically indistinguishable, no significant changes. In our study, antenatal fetal death occurred only in 2 (5.0 %) cases, and the fruits were killed in prolonging pregnancy over 72 hours to 12 hours — 5 (12.2 %), and 25 to 72 hours — 3 (7.0 %). With the extension of the prolonged period of more than 72 hours, we found no increase in the frequency of antenatal fetal death, when PROM in terms of 22–27 weeks.

Childbirth in intrapartum period in group 1 and in group 2 died on the 2 (4.9 % and 4.7 %, respectively) infants.

The frequency of intrapartum fetal death in pregnant women undergoing pregnancy prolongation was 2.5 times lower than those who gave birth immediately. In the group where it was possible to prolong pregnancy for more than 72 hours, there is the significant reduction in intrapartum mortality — 2.5 times. In assessing the state of infants in both groups surveyed were identified that were born in a state of asphyxia 33.3 % (8) infants in the 1st group and 8.3 % (2) newborn — in the 2nd group. The highest percentage of early neonatal mortality 6 (14.6 %) were in the group, where the duration of the prolonged period was less than 12 hours. Less all died in the early neonatal period, only those infants who were in a prolonged period of more than 72 hours.

In prolongation of pregnancy complicated missile defense more than 72 hours, there is a fairly significant reduction in child mortality — 5 times. But the prolongation of pregnancy less than 72 hours, the infant mortality rate is comparable to 1 group.

If you move to a common denominator of all mortality rates fetuses and newborns with premature rupture of membranes, in terms of gestation 22–27 weeks, it should be possible to prolong pregnancy, at least 8 days, since the only way to reduce the overall mortality rate from 83.3 to 19.2 %.

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Conclusion

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Morphological changes of newborns coronary vessels in preeclampsia in mothers

Abstract: In this work we made heart measuring, tissue measuring of coronary vessels and their walls in newborns born from mothers with preeclampsia. Heart weight is decreased when the edematous form of preeclampsia is present. Heart weight is increased with vessels number multiplication when the hypertensive form of preeclampsia is present. Walls of small arteries (SA) and arterioles (Ar) tunica media area is increased in 1.7 times, a major artery (MaA) in 1.2 times and a middle artery (MiA) in 1.3 times in comparison with the control values. The wall thickness and sectional area of the tunica media, the size of the lumen of the coronary arteries of all sizes have changed ambiguously. Thus in MaA and MiA the wall thickness and sectional area of the tunica media is increased, and in SA and Ar is decreased.

Keywords: preeclampsia, heart, newborn, coronary vessels, tissue measuring.

Relevance of the topic

Changes in a woman's body in pre-eclampsia, studied much better than the body of children born to mothers with a history of preeclampsia during pregnancy. The mother base body pathologies of the cardiovascular system of a spasm of blood vessels, reduction in circulating blood volume, a change in blood clotting and flow, disturbance of microcirculation. The defeat of the inner lining of vessels — the endothelium leads to increase vascular permeability and exudation of fluid into the tissues, the yield change, viscosity and clotting, susceptibility to blood clots in the bloodstream. Furthermore, in preeclampsia there is a weakening of the heart and a reduction in the circulating blood. All this leads to a significant reduction of blood supply to tissues with the development of degenerative changes in them up to tissue destruction. The organs most sensitive to the lack of blood supply, are the heart, kidneys, liver and brain [1; 2; 5]. When preeclampsia pregnant structural and functional abnormalities in the internal organs: violation of microcirculation, blood clots, degenerative changes in parenchymal cells, the development of punctate or small focal hemorrhage, increased intracranial pressure.

The placenta, mostly made up of vessels that underwent characteristic for preeclampsia change, can not cope with its core function of ensuring the exchange of oxygen and nutrients between mother and fetus, causing the defeat of the cardiovascular system of the fetus and the intrauterine and the formation of a heart, and cardiovascular system of the fetus.

Objective. In order to identify pathological changes in coronary vessels by us laws hearts studied 27 infants died in the neonatal period born to mothers with preeclampsia.

Material and methods

They were measured and separately weighing the modified method [3; 4; 9]. Heart filmed as a whole, and after the division into departments. Pieces of myocardium was excised for histological examination in accordance with the existing guidelines Avtandilov G. G. The material was fixed in 10 % neutral formalin and embedded in paraffin. Histological sections stained with hematoxylin and eosin, by van Gieson. To determine the density of myocardial blood vessels counted in their number to 1.72 mm^2 cut area not less than 20 sites. Coronary artery divided major artery (MaA) (more than 115 microns), middle artery (MiA) (35–115 microns), small arteries (SA) (25–35 microns) and arterioles (Ar). Measurements were carried out screw ocular micrometer MOV-1–15*. In each vessel was determined diameter, width and thickness of the wall of the lumen [6; 7; 8]. Media cross-sectional area was calculated by the formula: $0.785 (ab - a_1b_1)$, where a, b and a_1 and b_1 — large and small, respectively, the outer and inner diameters of the shell. Also, in the media wall of the coronary vessels to count the number of smooth muscle cells. All digital material was subjected to statistical analysis. To determine the reliability of the data used t-test.

Results of the study

The results showed that the presence of maternal edematous forms preeclampsia neonatal noted a slight decrease in heart weight, on average to 23.4 ± 1.3 g. (rate of 26.6 ± 1.5 g.) of ventricular wall thickening due to edema endocardium, pericardial and myocardial interstitium. Hypertensive form of preeclampsia was accompanied by a narrowing of the lumen of the coronary vessels,

increase in heart weight (29.8 ± 1.72 g.) due to compaction and low ventricular hypertrophy infarction. The increase in heart weight was associated with vascular infarction area pronounced changes. What confirmed the data of counting the number of vessels on the standard cut-off area, attesting to the fact that their number increased from 6.2 ± 0.3 to 8.7 ± 0.4 (r ≤ 0.001).

The results are set morphometric study showed, that the wall thickness of the coronary arteries we selected all calibres increased that increasing combined cross-sectional area tunica vessel walls (see table). In particular, in the SA and Ar is increased by 1.7 times compared to control values in MaA — 1.2 times, MiA — 1.3 times, respectively. It was found that the number of smooth muscle cells (SMC) in medium-sectional area of SA increased from 4.6 ± 0.3 to 6.5 ± 0.4 (p ≤ 0.05), the area of their nuclei decreased from 20.4 ± 0.7 to 18. 9 ± 0.6 mcm^2, and the volume — with 36.7 ± 3.4 to 33.4 ± 2.7 mcm^3 (p ≤ 0.05), indicating pycnosis both nuclei and cytoplasm SMC due to interstitial edema vascular walls. In contrast to the wall thickness of the shell and medium-sectional area, the amount of data vascular lumen changed differently. Thus, in MaA and MiA it was increased, and SA and Ar it was decreased. The latter was accompanied by the strengthening of the internal elastic membrane folding and rounding of endothelial cells of the intima, which in the form of a picket fence lined the lumen of blood vessels, indicating their compression narrowing due to edema of perivascular adventitia (Fig. 1a). Along with the above described modifications of the circular muscle of arteries in the heart newborns to mothers with preeclampsia in the arterial wall bundle SMC arranged unevenly in one end wall of the vessel they are flattened, in other thick with rounded nuclei (Fig. 1b), wherein in the control material indicated uniform the location of the SMC. Thus in some arterial vessels, these cells in the inner shell housed in several rows (Fig. 1c), observed in other vessels, and loosening of uneven thickening of elastic fibers (Fig. 1d). Thus, it may be noted that in the arterial wall with well-developed smooth muscle cells, elastic fibers are thin and discontinuous, where the elastic fibers have a thick layer, SMC thin and spindly.
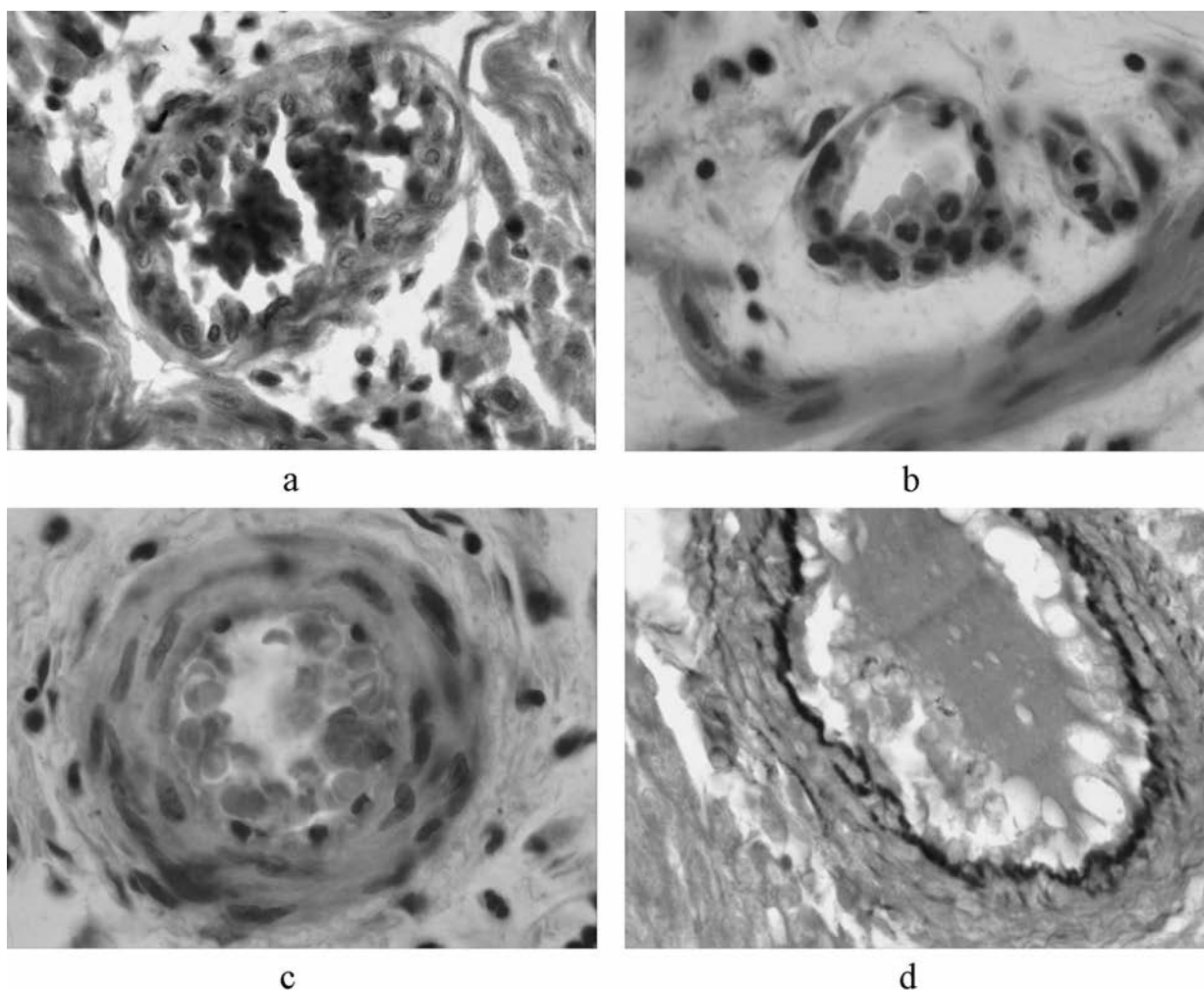
Fig. 1. Adaptive changes of the coronary arteries of the dead children from mothers with preeclampsia:
a — the average compression narrowing artery; b — uneven thinning of the walls of small arteries;
c — tonic contraction of the middle artery; d — irregular thickening of the major artery elastic membranes.
Painting: a, b, c — hematoxylin and eosin; d — by Weigert. Resolution: ocular 10, objective 90

The results of the morphological study of arterial wall based on caliber vessels showed that all satellites represented by cell wall fiber components and layers. Thus, the endothelial layer is in one place only a few hyperchromatic cells. Basal membrane is not determined SMC have several rows, which are scattered into separate beams and elongate and are composed of spindle-shaped cells (Fig. 2a). Adventitia edematous, it loosened and decomposed fiber, has a unit pyknotic connective tissue cells. Medium type Artery somewhat expanded endothelial layer is well developed, it mostly flattened cells, only in certain areas defined desquamation. Smooth muscle layer is thick kind of densely arranged in two rows, their nuclei round and oval shapes, mostly hyperchromatic (Fig. 2b). Adventitia extended due to the accumulation of the protein in its homogeneous mass, which is apparently the result of edema and plasmorrhages. Small arteries and arterioles

are narrowed due to the disorganization of the fibrous structures of the inner layers of cells hypertrophy and adventitial edema. Wall SA is represented by two endothelial cells thick basement membrane and a

layer of SMC, and edematous adventitia (Fig. 2c). Especially narrowed arterioles due to hypertrophy and endothelial hyperchromasia, SMC and pronounced swelling of the adventitia (Fig. 2d).
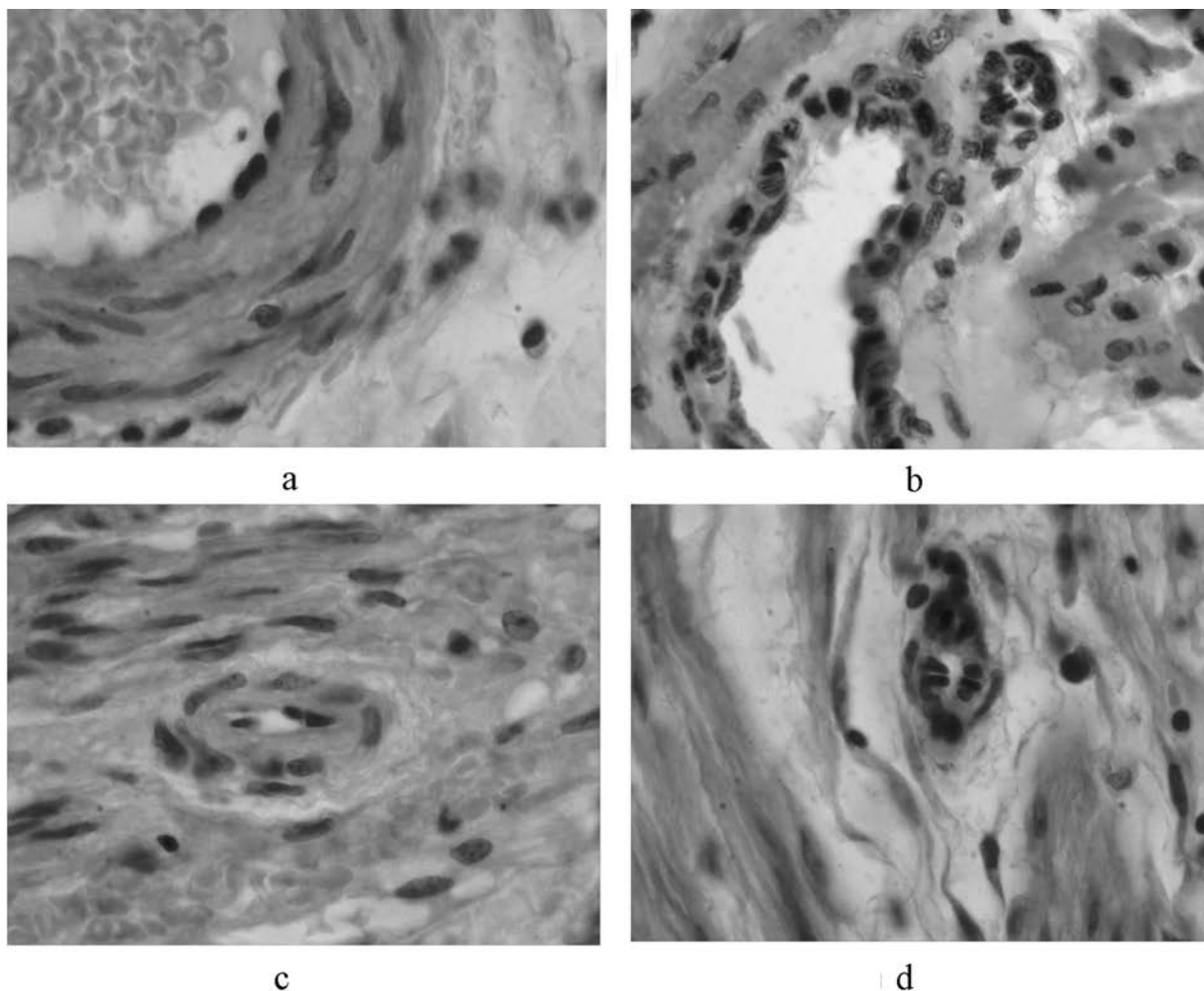
Fig. 2. Pathological changes of the coronary arteries of all sizes of children born to mothers with preeclampsia: a — endothelial desquamation, loosening SMC major artery; b — the expansion of the lumen, the average plasmorrhages adventitia artery; c — the narrowing of the lumen of small arteries; d — a spasm of arteriolar lumen. Painting: hematoxylin and eosin. Resolution: ocular 10, objective 90

Conclusions

Edematous form accompanied by a decrease in preeclampsia, hypertensive form — an increase in heart mass due to ventricular hypertrophy, in which the part vessels mentioned increase in the number of them in a standard cut-off area.

Morphometric parameters of middle membrane walls of small arteries and arterioles increased by 1.7 times, a major artery — 1.2 times, the average artery — in 1.3 times in comparison with the control values.

The wall thickness and sectional area of the middle shell, the size of the lumen of the coronary arteries of all sizes have changed neodnotipno. Thus, in MaA and MiA increased, and SA and Ar decreased.

Preeclampsia mother accompanied by the development of pathological changes in the coronary arteries of all sizes: in the MaA noted desquamation endothelial loosening MMC; in MiA endothelial hypertrophy and MMC, as well as plasmorrhages adventitia; in SA and Ar narrowing by a hypertrophy of the cells and adventitial edema.

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Role of polymorphism RS1800629 gene proinflammatory cytokine TNF-α in the development and clinical course of leukemia

Abstract: To evaluate the significance of genotypic variants of the poly-morphism rs1800629 gene pro-inflammatory cytokine TNF-α in the development of leukemia and associating them with complications of viral infections Epstein-Barr. Thus, we found statistically significant differences in the prevalence of genotypes of rs1800629 polymorphic variant in a gene TNFα between subgroups of the study sample. Not been identified genotype demonstrated significantly adverse effect with respect to the risk of EBV. Studies have shown that heterozygous polymorphism was more frequent $(p = 0.01)$ in patients with hematological malignancies.

Keywords: leukemia, polymorphism 308 G/A gene TNF-α, Epstein-Barr virus.

Relevance

It is known that functional polymorphisms in the gene for pro-inflammatory cytokine TNF-α can significantly affect their production and therefore, the severity and chronicity of infection with EBV. There are many studies about role of polymorphisms of genes INF-γ, TNF-alpha, IL-1 RA in various diseases. The main mediator of inflammation is a TNF-α, stimulating immune system in many of its links, controls the expression of many cytokines and growth factors. An increased TNF-alpha production by B-lymphocytes in response to the action of EBV [1; 3]. M. S. Wu et al. studies, showed the presence of significant association of allele A at position — rs1800629 gene of EBV-associated gastric carcinoma [2; 4].

Increased secretion of inflammatory factors associated with latent Epstein-Barr virus (EBV) infection and pathology of EBV-associated diseases; However, knowledge of the inflammatory response and its biological significance for EBV lytic cycle remains elusive [4; 7]. BZLF1 the Early activator of proinflammatory transcription factor inhibits tumor necrosis factor alpha (TNF-alpha) by binding to the TNF-alpha promoter, and preventing the activation of NF-kV. BZLF1Δ207–210 deletion mutant 4 amino acids (aa) in the binding of protein-protein domain was not capable of inhibiting proinflammatory factors TNF-α and interferon-gamma (IFN-γ) and reduced viral DNA replication with full transcriptional activity during lytic gene expression of EBV. Depletion of TNF-α restored virus replication mediated BZLF1Δ207–210. Furthermore, the combination BETA-α- and γ-IFN neutralizing antibodies recovered BZLF1Δ207–210-mediated replication of the virus, indicating that the antiviral response is attenuated BZLF1 aid optimal lytic replication primarily by inhibiting TNF-alpha and IFN-γ secretion in during the lytic cycle. These results indicate that EBV BZLF1 attenuates pro-inflammatory responses to facilitate viral replication [5; 6; 8].

However, information about the role of cytokine gene polymorphism in the development of leukemia and associating them with complications of viral infection Epstein -Barr virtually nonexistent.

Objective

To evaluate the significance of genotypic variants of the polymorphism rs1800629 gene pro-inflammatory cytokine TNF-α in the development of leukemia and associating them with complications of viral infections Epstein–Barr.

Materials and Methods

The object and subject of the study were patients with leukemia (CML and AL), DNA samples from patients and 110 healthy volunteers, TNF-α gene (6r21.3) nucleotide substitution G > A at position –308.

The study included 114 patients with AML and CML in age from 15 to 79 years, the median age was 37.8 ± 2.34 years, observed on the basis of clinic Institute of Hematology and Blood Transfusion of the Ministry of Health of Uzbekistan. The diagnosis of leukemia is based on a set of clinic, clinical, laboratory and instrumental data according to WHO criteria.

Isolation of DNA from nuclei of lymphocytes was carried out according to standard methods with some modifications (Sambrook et al., 1989). The concentration and purity of the isolated DNA were estimated by measuring the optical density of the DNA-containing solutions at a wavelength of 260 nm. and 280 nm. on a spectrophotometer against TE NanoDrop 2000 (USA). Genotyping polymorphism 308G > A TNF-α gene was performed by polymerase chain reaction on a programmable thermal cycler CG-1–96 «Corbett Research» (Australia) in 2720 and "an Applied Biosystems" (USA), with NGOs "Liteh" test systems (Russia) according to the manufacturer's instructions.

Statistical treatment

Study Design: Case-control, ie, by comparing the frequency of genotypes distribution among the sick and the healthy, the case-the case, by comparing the data among patients subgroups.

Evaluation of deviation of the distribution of genotypes from the canonical distribution of Hardy-Weinberg equilibrium (RCE) was performed using the computer program "GenePop" ("Genetics of Population"). The frequency of allele and genotype variants (f) is calculated using the formula:

$$f = n/2N \text{ and } f = n/N,$$

where n — the occurrence of variant (allele or genotype), N — sample size.

To calculate the ratio, "the ratio of chance" (OR — odds ratio) with 95 % confidence intervals (CI — confidence interval), χ^2 and p values used package «OpenEpi 2009, Version 2.3» statistical programs.

The relative deviation of expected heterozygosity from watching-my (D) was calculated according to the formula:

$$D = (h_{obs} - h_{exp})/h_{exp},$$

where h_{obs} and h_{exp} — the expected and observed heterozygosity, respectively.

The predictive efficacy (AUC-qualifier) studied at the E-genetic markers was determined by the standard formula:

$$AUC = (Se + Sp)/2,$$

where Se and Sp — the sensitivity and specificity of a genetic marker, respectively. If the index AUC < 0.5, the marker — the occasional qualifier; AUC = 0.5–0.6 — bad; AUC = 0.6–0.7 — medium; AUC = 0.7–0.8 — good; AUC > 0.8 — great classifier (Hosmer D. W., Lemeshow S. et al, 2000.).

Results and discussion

When comparing samples between patients with CML and AL identified Article cally no significant differences in the distribution of TNF-α genotype frequencies of rs1800629 polymorphism of the gene. Therefore, in the future it will only go for the combined group.

An analysis of the frequency distribution of genotypes of rs1800629 polymorphism of TNF-α gene and their compliance with population-balance RCE Group leukemia patients and healthy donors were carried out separately. As expected, in the groups of patients and control the distribution of genotypes of polymorphic loci on the corresponded RCE. In the studied groups — patients and controls, the mean value of the observed heterozygote (Hobs) was equal to 0.28 and 14.55 respectively and above average, theoretically expected heterozygote (Hexp = 0.24 and 13.5 %, respectively). Thus, in patients and control groups, the amount of actual deviation from a theoretical ratio of heterozygote at the level of > 0, as indicated by a positive value and Wright fixation index (D = 0.2 and 0.08, respectively).

Table 1. – The coefficients of the deviation
of the actual heterozygote Theoretical

	Group	n	The frequency of alleles				The frequency distribution of genotypes					
			G		A		G/G		G/A		A/A	
			N	%	n	%	n	%	n	%	n	%
1	Basic group	114	196	86.0	32	14.0	82	71.9	32	28.1	–	0
2	Control group	110	204	92.7	16	7.3	94	85.4	16	14.5	–	0

Indicators SS and SP of the genetic marker among the studied groups corresponded to 0.28 and 0.85. The calculated predictive efficiency of this marker was AUC = 0.57. These data show not very high indicator Classifier polymorphism rs1800629, on what basis can make a pre-theoretical conclusion that the genetic mutation 308G > A is not a high-performance classifier for predicting the development of leukemia.

To estimate the contribution of the genetic marker 308G > A gene TNF-α in the pathogenesis of leukemia, we conducted a comparative analysis of the occurrence frequencies of alleles and genotypes in patients and leukemia group of healthy controls.

Analysis of the distribution of alleles of polymorphic variants of 308G > A gene TNF-α showed that the distribution of allele frequencies in patients was significantly different from the control group (P < 0.05). In both groups, the prevalence rate was observed wild (normal) allele "G" while reducing the incidence of a rare, functionally defective allele "A". The prevalence of alleles in a population sample was as follows: "A" — 7.3 % (16/220), "G" — 14.0 % (16/220); in patients: "A" — 14.0 % (32/228), "G" — 86.0 % (196/228). According to the calculated ratio odds ratio, carrier of a rare allele "A" polymorphism 308G > A TNF-α gene by more than 2 times significantly increases the risk of developing leukemia ($\chi^2 = 5.3$; p = 0.02; OR = 2.1; 95 % CI 1.107, 3.914).

Statistically significant differences were found when comparing the frequencies of detection of genotypes of rs1800629 polymorphism in the gene TNF- α (P < 0.05). Among the surveyed groups of patients had an increase in the proportion of homozygous genotype G/G (71.9 %), by reducing the frequency straight and homozygous genotypes (28.1 % and 0.0 %, respectively). The frequency distribution of "G/G" and "A/G" genotypes was 85.4 % in the control group (32/114) and 14.5 % (16/110), respectively. According to the calculated ratio chance genotype of the ratio "A/G" significantly increases the risk of leukemia in more than 2 times ($\chi^2 = 6.1$; p = 0.01; OR = 2.3; 95 % CI 1.174, 4.477).

It should be emphasized that the polymorphism 308G > A gene in TNF-α A/A homozygote or in patients nor in the control group was not detected.

Thus, the polymorphism rs1800629 gene TNF-α is of some importance in the development of leukemia, which suggests the need to continue a comprehensive study of the role of gene families of cytokines in the pathogenesis of leukemia. These data can complement the overall picture of the genetic basis of susceptibility to these diseases.

Table 2. – The frequency distribution of allele and genotype polymorphism
rs1800629 TNF-α gene in a group of patients and controls

	Groups	n	The frequency of alleles				The frequency distribution of genotypes					
			G		A		G/G		G/A		A/A	
			N	%	n	%	n	%	n	%	n	%
1	Basic group	114	196	86.0	32	14.0	82	71.9	32	28.1	-	0
2	Control group	110	204	92.7	16	7.3	94	85.4	16	14.5	-	0

The next stage of our study was to analyze the association of rs1800629 polymorphism genotypic variants of the gene TNF-α complications of viral infection with Epstein-Barr virus. Frequencies of genotype studied genes in subgroups of patients with and without EBV are presented in Table 3.

Table 3. – Frequency distribution of genotypes in patients with and without EBV

Geno-types	Epstein-Barr virus		OR	χ^2	P
	Positive n = 12	Negative n = 102			
G/G	10	82			
G/A	2	20	0.8	0.02	> 0.05
A/A	0	0			
ALL	12	102			

Among the 114 patients studied, 12 patients were carriers of EBV, which amounted to 10.5 %. Analysis of the distribution of genotypes of the studied polymorphisms showed that among these carriers significantly more frequently detected wild genotype G/G, than among patients without EBV (83.3 % vs. 80.4 %, respectively). Patients with heterozygous G/A genotype was 16.7 % (2/12). It is interesting to note that among the patients without EBV this genotype was detected more frequently than in patients with EBV (20/102; 19.6 % vs. 16.7 %, respectively). Accordingly, the calculation of odds ratios also showed a negative association unfavorable genotype G/A carriage with VEB ($\chi^2 = 6.1$; p = 0.01; OR = 2.3; 95 % CI 1.174–4.477).

Thus, we found statistically significant differences in the prevalence of genotypes of rs1800629 polymorphic variant in a gene TNFα between subgroups of the study sample. Not been identified genotype demonstrated significantly adverse effect with respect to the risk of EBV. Studies have shown that heterozygous polymorphism was more frequent (p = 0.01) in patients with hematological malignancies. This fact can be concluded that the gene polymorphism of TNF alpha by disturbances in the immune regulation could play a role in the formation of leukemia. Despite the differences found among the patients showed no significant differences, indicating that changes in one-pointedness of humoral immunity and points to a comprehensive study of all the links of pro- and anti-inflammatory cytokines.

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Studying frequency of CTLA4 gene polymorphism in patients with hematological malignancies

Abstract: To study the frequency of the gene polymorphism of CTLA 4 49G > A in patients with hematological malignancies. These indicators show an extremely low degree of predictions of the studied polymorphism rs231775 CTLA4 gene. Studying cytokines, one might think that an isolated form, they are not involved in immune responses may interact with each other, can not only create the optimal immune responses, but also in using this approach, you can answer the fundamental questions of modern tumor immunology and the interaction of immune and neoplastic cells

Keywords: hematological malignances, cytokine polymorphisms, of CTLA4.

Despite advances in diagnosis and treatment, which allowed considered hemoblastoses potentially curable disease still remain many questions about diagnosis, pathogenesis of leukemia and complications from systemic inflammation position. According to some authors, in the development of malignancy is a violation of the interaction of the tumor cells and cells of the immune system,

which is accompanied by involvement in systemic inflammation cytokines, imbalances manifest production and regulation of these biologically active substances [1; 4]. Cellular immune required costimulatory activity to initiate or inhibit antigen-specific T- cell response. CTLA-4 is expressed in the inhibitory receptor and activated regulatory T-cells. Single nucleotide polymorphism (SNP), + 49 A/G gene CTLA-4 alters the intracellular distribution of CTLA-4, interleukin-2, and, as a consequence, the proliferation of T-cells [9]. CTLA4 is an inhibitory receptor expressed on a subset of T-lymphocytes. Single nucleotide polymorphisms CTLA4 gene involved in autoimmune diseases, inverted, CTLA4 variations associated with chronic infections such as herpes virus infection [10].

Objective

To study the frequency of the gene polymorphism of CTLA 4 49G > A in patients with hematological malignances.

Materials and methods

The object and subject of the study were patients with leukemia (CML and AL), DNA samples from patients and 110 healthy blood donors, gene CTLA4 49G > A (6r21.3) nucleotide substitution G > A at position – 308. The study were included 114 patients with AML and CML in age from 15 to 79 years, the median age was 37.8 ± 2.34 years, observed on the basis of clinic Institute of Hematology and Blood Transfusion of the Ministry of Health of Uzbekistan.

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Statistical processing

Study Design: Case — control, i.e, by comparing the frequency of genotypes distribution among the sick and the healthy, the case-the case, by comparing the data among patients subgroups.

Evaluation of deviation of the distribution of genotypes from the canonical distribution of Hardy-Weinberg equilibrium (RCE) was performed using the computer program "GenePop" ("Genetics of Population").

To calculate the ratio, "the ratio of chance" (OR — odds ratio) with 95 % confidence intervals (CI — confidence interval), χ^2 and p-values used package «OpenEpi 2009, Version 2.3» statistical programs.

The predictive efficacy (AUC-qualifier) we studied genetic markers was determined by the standard formula:

$$AUC = (Se + Sp)/2,$$

where Se and Sp — the sensitivity and specificity of the genetic marker, respectively. If the index AUC < 0.5, the marker — the occasional qualifier; AUC = 0.5–0.6 — bad; AUC = 0.6–0.7 — medium; AUC = 0.7–0.8 — good; AUC > 0,8 — great classifier (Hosmer D. W., Lemeshow S. et al., 2000).

Results

Patients included in the study were diagnosed on clinical signs, as the morphology of bone marrow cells as well as molecular, immunophenotypic, and cytogenetic data. When studying the expected and observed genotypes frequency distribution of patients no significant differences were detected (P = 0.24).

Evaluation of gene CTLA 4 polymorphism rs231775 in both examined groups the observed distribution of genotypes of polymorphism rs231775 CTLA4 gene, consistent with the expected law on the Hardy-Weinberg equilibrium (P > 0.05). The proportion of heterozygous polymorphism rs231775 gene CTLA4 in the population, for each locus were calculated observed heterozygosity (Hobs), expected heterozygosity (Hexp) and the coefficient of variation of Hexp Hobs (F).

Table 1. – Estimated and observed frequency distribution genotype RH in the group of patients

Genotypes	genotype frequency		χ^2	P
	expected	observed		
A/A	40.45	42.98	0.181	
A/G	46.30	41.23	0.634	0.24
G/G	13.25	15.79	0.554	
Total	**100.00**	**100.00**	**1.369**	

For the polymorphism rs231775 gene CTLA4 in the study group demonstrated a positive value relative deviation F = 0.1 with the observed frequency of the minor allele is lower than expected — 0.46 and 0.41 respectively. Polymorphism of CTLA +49 A/G is an important genetic factor associated with risk or protection against the development of various diseases and has an impact in the pathogenesis of autoimmune diseases. However, other closely linked candidate genes in equilibrium with the clutch CTLA4, such as CD28 and ICOS, may be associated with the development of autoimmune and infectious diseases [2]. Literary analysis results suggest that at position +49 CTLA4 gene can significantly increase the risk of chronic viral infection, while G in position +49 can positively affect viral clearance [3].

The effectiveness of the gene polymorphism rs231775 CTLA4 as an independent marker is low. SE is median corresponds to 0.57, the SP is equal to 0.33, and the assessment of the likelihood that this marker can be distinguished from a healthy patient the AUC, is very low and is equal to AUC = 0.45 (random token). These indicators show an extremely low degree of predictions of the studied polymorphism rs231775 CTLA4 gene. Studying cytokines, one might think that an isolated form, they are not involved in immune responses may interact with each other, can not only create the optimal immune responses, but also in using this approach, you can answer the fundamental questions of modern tumor immunology and the interaction of immune and neoplastic cells [7].

Studies on the analysis of the distribution of frequencies of alleles and genotypes of polymorphic variants show that homozygous AA genotype in patients meets 43.0 % (49/114), while the control group, 32.7 % (36/114), respectively. This chance ratio (χ^2 = 2.5; P = 0.1; OR = 1.5; 95 % CI 0.8993–2.67). Heterozygous AG genotype in the control group was 50.0 %, 47 cases, patients with less than 9 % (41.0 %) of 55 cases, respectively (χ^2 = 1.7; P = 0.2; OR = 0.7; 95 % CI 0.4138–1.189), results were statistically unreliable. Homozygous GG genotype in the control and in the group of patients met about the same amount, and statistical differences were found, was 17.3 % and 15.8 %, respectively. At the same time OR odds ratio was 0.6 (χ^2 = 2.5; P = 0.1; OR = 0.6; 95 % CI 0.3745–1.112), respectively.

Conclusion

The first studies of the effect of blocking CTLA-4 to enhance the immune response were carried out in 1995 by a group M. K. Jenkins [5; 6]. Based on the data obtained, the authors suggested that the use of blocking antibodies against CTLA-4 can reactivate the antigen-specific T-cell response in the tumor, contributing to its

destruction [7; 8]. The modern anti-cancer therapy is based on the targeted therapy or the new generation Immuno drugs that may enhance the anti-tumor immune response. The results show that the polymorphism rs231775 CTLA4 gene not found significant differences in the distribution of genotypes and allele frequencies between the main group and the control group. However, there is a slight tendency to increase the number of heterozygous A/G and A allele of rs231775 * in the control group compared to patients (50.0% and 41.2%, respectively) that requires confirmation on larger sample of patients. Also, the study of interactive regulation of systemic inflammation cytokines to create new approaches treat hematological diseases.
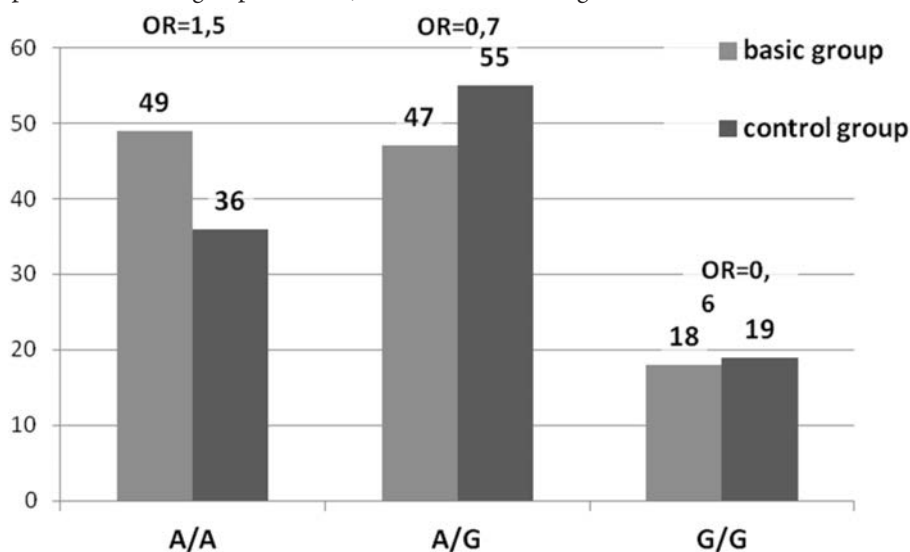
Fig. 1. The frequency of alleles and genotypes distribution of polymorphism A49G gene CTLA 4 in the groups of patients

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Evaluation of endpoints in patients with myocardial infarction

Abstract: the aim of the study of evaluation of endpoints in patients with myocardial infarction. Determination of early predictors of poor prognosis in patients with myocardial infarction identifies patients at high cardiovascular risk and poor prognosis.

Keywords: myocardial infarction, prognosis, endpoints.

High mortality of patients, as well as the fact that a significant part of them subsequently developed heart failure, cardiac arrhythmias, reinfarction, renewed angina, which degrade the quality of life and limit disabled patients [1; 2] is determined by the social significance of suffering a acute myocardial infarction (AMI). Such a high medical and social significance of myocardial infarction (MI) requires further improvement of its methods of early diagnosis, effective treatment and secondary prevention [3]. The ability to predict the nature of the adverse postinfarction LV remodeling is tantamount to identify opportunities in the early period of myocardial infarction at high risk for cardiovascular events and cardiac death in long-term period. There are a number of indicators that show a high probability of poor prognosis after myocardial infarction: patient's age, the presence of myocardial infarction, disturbance of systolic and diastolic function of the left ventricle (LV), ventricular arrhythmias in the history of ventricular fibrillation, the front or anterior-inferior myocardial infarction, unstable angina, the progression of heart failure. Several multicenter clinical and retrospective studies have demonstrated the diversity and complexity of the factors determining the prognosis of AMI [4; 5].

Purpose of research was to study of evaluation of endpoints in patients with myocardial infarction.

Material and methods

The study included 76 male patients with primary Q-wave MI, not older than 10 days between the ages of 29 to 60 years. Diagnosis is based on the WHO criteria for the presence of the following symptoms: typical anginal pain attack or its equivalent for at least 30 minutes; appearance of pathological Q waves or QS in two or more ECG leads. The stationary phase of AMI treatment was carried out in accordance with recommendations for management of patients with myocardial infarction with elevation segment ST (ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation; 2012) and included thrombolytic therapy if indicated, early administration of beta-blockers, antiplatelet agents, anticoagulants, as well as nitrates (including intravenously), statins, ACE inhibitors, diuretics. According to the study plan, the final analysis included data of patients who within one year from the start of them to develop meaningful clinical outcomes: death, recurrent nonfatal MI; occurrence or progression of heart failure or coronary artery disease destabilization that required hospitalization. All patients were informed about the protocol and agreed to participate in the study. Exclusion criteria included: age over 60 years; permanent form of atrial fibrillation; hypotension (blood pressure < 100/60 mm. Hg.); comorbidities that can independently affect the prognosis of life or remodeling of the left ventricle (heart defects, severe and malignant hypertension, cancer, lung disease, liver and kidney dysfunction of these organs; severe or decompensated diabetes, the effects of acute stroke; symptoms of circulatory failure in history).

Results and Discussion

We have evaluated the forecast in the studied groups of patients. The analysis showed that in 1 years of follow-noted development reinfarction in 14 (18.4%) cases, including 5 (6.6%) fatal and nonfatal — 9 (11.8%), and 6 (7.9%) cases of sudden death (Fig. 1). Depending on the development of reinfarction analysis on various factors showed that recurrent MI was significantly more likely to develop at the rear location of the primary IM ($\chi^2 = 13.25$; P = 0.001), and the statistical significance of this distribution is preserved as in the case of a fatal ($\chi^2 = 20.1$; P = 0.0001), and nonfatal MI ($\chi^2 = 18.366$; P = 0.001).

Availability initially cardiac arrhythmia also significantly influences the development of reinfarction: in the group with cardiac arrhythmia in 10.5% of cases developed reinfarction (P < 0.001). Analysis of prognostic parameters showed that patients who developed adverse outcomes for extended surveillance had a greater number of heart rate, lower left ventricular ejection fraction less than 40%.

Conclusion. Determination of early predictors of poor prognosis in patients with myocardial infarction identifies patients at high cardiovascular risk.
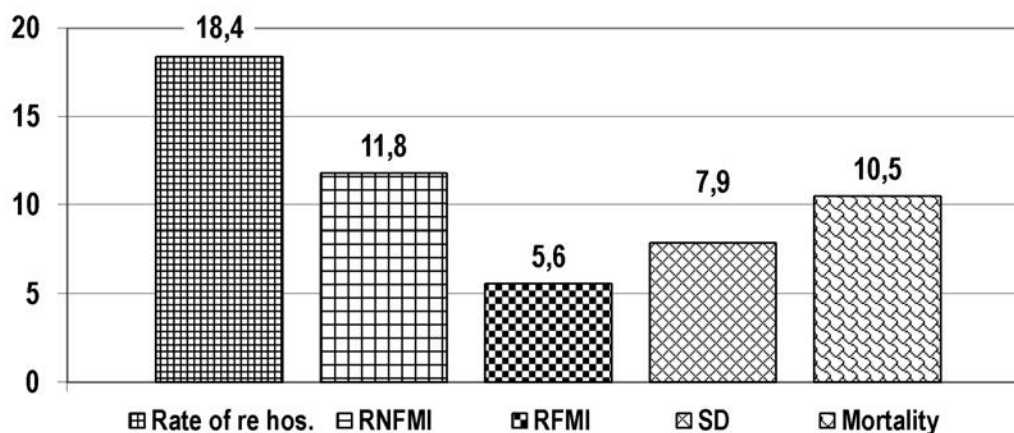
Fig. 1. The endpoints after 1 years

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Clinical population evaluation of the modern course of acute coronary syndrome in the indigenous inhabitants of the Fergana valley in Uzbekistan

Abstract: A two year register of ACS in 658 patients was drawn in the conditions of the Fergana valley in Uzbekistan. It was proved that the register helps objectively view the problems of the approach to treatment and «saving» prevention of the patients with acute coronary syndrome (ACS) and find solutions for them. In the conditions of the research region, they are acceptable, cost-effective and efficient in optimization of methods of early detection and treatment of ACS.

Keywords: acute coronary syndrome, register, the Fergana valley.

As it is known, the differences between the national and foreign researches also cover etiology of acute coronary syndromes (ACS) and occurrence of different variants of their course [1; 2; 3]. In this respect, the study of a clinical course of ACS with a verification of the diagnosis based on standardized evaluation of clinical symptoms, ECG and EchoCG in the conditions of the Fergana valley in Uzbekistan is relevant.

Materials and methods

A two year register of ACS in 658 patients, males (414) and females (198), aged 26 to 88, was drawn. Information about the cases of factual and suspicious for acute myocardial infarction (AMI) was collected for analysis from medical documents of emergency medicine, polyclinics, cardio-health center and in-patient facilities of Andijan in the Fergana valley. Each patient with a suspicion for ACS was drawn a special record of primary registration that included all available information about the patient (questionnaire, physical examination, out-patient card information, history of disease).

In the event of a patient's death, the questioning was conducted; protocols of anatomic-pathological researches and acts of medical legal autopsy were analyzed. All registered cases, except for lethal ones, were controlled in 6 and 12 months from the onset of the disease. ACS diagnosis was established as «definite» and «possible» with the use of standard criteria of ACC/AHA (2002) and VNOK, all-Russia scientific society of cardiologists (2007) (clinical picture of the disease, changed in ECG, increase of the levels of myocardial necrosis markers and information obtained with the help of visualization methods), and, in the event of death, the data of morphological changes in myocardium and coronary vessels was used.

Statistical processing of the data was conducted with the use of STATISTICA 6.0 program and Microsoft Excel 2003. Comparison of discreet values was conducted with the use of criterion χ^2 with Yates' correction for continuity. If the number of cases in one of the compared groups was 5, Fisher two-tailed criterion (F-criterion) was applied.

Results and their discussion

Results dedicated to the analysis of frequency of associated clinical conditions according to the anamnestic data in patients with ACS are generalized in Table 1.

Table 1. – Frequency of associated clinical conditions in patients with ACS

Associated clinical conditions according to the anamnesis data		Total number of ACS patients (n = 612)	
		Number of co-occurring clinical conditions (abstract number)	%
Angina (1)		444	72.5
Myocardial infarction (2)		168	27.4
Chronic cardiac failure (3)		106	17.3
Chronic kidney disease (4)		118	19.3
Atrial fibrillation (5)		23	3.8
Statistics of differentiation according to t-criterion (P)	< 0.05	2–3, 2–4	
	< 0.01	1–2	
	< 0.001	1–3, 1–4, 1–5, 2–5, 4–5	

It was noted (Tab. 1) that ACS is comparatively frequently developed and clinically manifested, according to anamnesis data, against the background of angina (in 72.5 % of cases, $P < 0.001$), MI — in 27.4 % of cases ($P < 0.05$), chronic cardiac failure — in 17.3 % of cases ($P < 0.05$) and atrial fibrillation — in 3.8 % of cases ($P < 0.05$).

There are relatively more patients with angina in the anamnesis ($P < 0.001$) and chronic kidney disease ($P < 0.05$) in the studied group of patients in Andijan compared to the patients from European registers [4; 5]. Tachycardia was rarely noted. Also, it should be specified that among the patients included in our register, the average age was 58.2 ± 11.3, and minimal and maximal age was 26 and 88 years old respectively.

If we compare the data of ACS patients with the same from other countries and Russia, the age in the studied group will be by 4–8 years less at average [6].

The main clinical data obtained in ACS patients at the moment of admission to the hospital, according to the register, is presented in Table 2.

Table 2. – The main clinical data obtained in ACS patients at the moment of admission to the hospital

Complaints	n (%)	Clinical data	n (%)
Chest pain	570 (93.1)	Median time from the onset of symptoms to admission — 2.25 hours	612 (100)
Shortness of breath	42 (6.9)	Hospitalization by emergency medicine service	385 (62.9)
Asphyxia	47 (7.7)	Hospitalization without medical order	220 (35.9)
Heart beating	461 (75.3)	Admission by way of transfer	7 (1.1)
Intermission	23 (3.8)	Admission to cardio ICU	180 (29.4)
Weakness, general anxiety, cough	118 (19.3)	Hospitalization to a regular department	432 (70.6)

As it can be seen from Table 2, the main symptom that allowed the suspicion for ACS in the research group of patients was chest pain (in 93.1 %) and heart beating (in 75.3 %). Other main complaints included shortness of breath (6.9 %), asphyxia (7.7 %), intermissions (3.8 %), general anxiety with cough and sudden weakness (19.3 %).

The data about the time of the onset of ACS symptoms is presented for 96.4 % of patients. Median time from the onset of symptoms to admission (hospitalization) was 2.25 hours (1st and 3rd quartile of distribution — 1.50–4.00 hours). There were no signs of cardiac failure (grade according to Killip = 1) in 565 patients (86.6 %) and there were signs of cardiac failure in 47 patients (7.7 %).

A relatively big number of patients are admitted with ACS diagnosis avoiding «Emergency aid» (35.9 %). This is apparently a peculiarity of healthcare and mentality of the population that has to be explained, because, traditionally, the ambulance brings not less than 90 % of ACS patients. Same is for the hospitalization of patients, not to the ICU or cardio ICU (70.6 %), but to a common ward.

ACS patients also had peculiarities in hemodynamic parameters at the time of admission. Thus, mean systolic BP was 140.9 ± 28.2 mm. Mercury (minimal SBP was 60 mm. Mercury and maximal DBP was 110 mm. Mercury). Mean diastolic BP at admission was 81.9 ± 14.7 mm. Mercury (minimum–maximum — 20–110 mm. Mercury) and mean heart rate was 92.5 beats/min (minimum–maximum — 58–170 beats/min).

Table 3 present ECG data of ACS patients at the time of admission.

Table 3. – Comparative characteristics of ECG data in ACS patients at the time of admission

№	Change of ECG at admission of the patients	N	Indicators of occurrence of ECG changes	
			Abs.	%
1	Elevation of segment ST (1)	612	90	14.7
2	Depression of segment ST (2)	612	299	48.9
3	New pathologic wave Q (3)	612	82	13.4
4	New negative wave T (4)	612	600	98.0
5	«Front» localization of changes in ECG (in diversions V_1–V_3) (5)	612	228	37.3
6	Change of ECG in other diversions (6)	612	382	62.4
7	New complete left bundle branch block (7)	612	5	0.8
8	Signs of left ventricle hypertrophy (8)	612	234	38.2
Statistics of differences according to t-criterion (P)	< 0.05		2–1, 5–3, 5–7	
	< 0.01		2–5, 4–6, 6–8	
	< 0.001		1–7, 2–3, 5–7, 4–1, 3–4	

Table 4. – Comparative characteristics of data of clinical and biochemical blood tests and other methods of examination in ACS patients at the time of admission

№	Indicators	Value median	1st and 3rd quartiles of distribution	Minimal value	Maximal value
1	Creatinine	89.4 µmol	88.4–113.9 µmol	40 µmol	230 µmol
2	Glucose	5.2 mmol/l	4.7–6.0 mmol/l	3.3 mmol/l	9.6 mmol/l
3	Glucose, fasting	4.9 mmol/l	4.0–5.7 mmol/l	3.0 mmol/l	8.8 mmol/l
4	Total cholesterol	6.1 mmol/l	5.8–6.6 mmol/l	5.8 mmol/l	6.6 mmol/l
5	Leucocytes	6.1 thousand/ml	5.4–6.9 thousand/ml	3.3 thousand/ml	5.8 thousand/ml 120 g/l
6	Hemoglobin	98 g/l	93–108 g/l	76 g/l	32.7 %
7	Hematocrit	29.6 %	27.8–32.7 %	27.2 %	320.0 thousand/ml
8	Thrombocytes	260.0 thousand/ml	225.0–287.5 thousand/ml	180.0 thousand/ml	62 %
9	EchoCG data: • Left ventricular ejection fraction (EF); • EF ≤ 40 % in 372 patients (60.8 %).	42.0 %	38.0–48.0 %	28 %	
10	GRACE scale: • ≥ 1 for ACS w/o elevation of ST and ≥ 2 for ACS with elevation of ST — 53.9 %; • > 150 grades (patients with a high risk of death) — 9.8 %.				
11	RECORD scale: • ≥ 2 grades — 50.6 %; • ≥ 3 grades — 13.4 %.				

As it can be seen in Table 3, new negative wave T (98.0 %), change of ECG in other (except for V_1-V_3) diversions (62.4 %), depression of segment ST (48.9 %), signs of LVH (38.2 %) and «Front» localization of changes in ECG (in diversions V_1-V_3) (37.3 %) were revealed most often in ECG of ACS patients at admission. Elevation of segment ST in ECG was established in 14.7 % of patients; new pathological waves Q — in 13.4 % and new complete left bundle branch block — in 0.5 %.

It should be noted that the share of ACS patients with elevations of ST is traditionally higher and forms around 1/3 of ACS patients. Our group had quite a lot of «young» and «light» patients with ACS without elevations of ST, perhaps, this is why they were treated in a common ward and not in an ICU.

Thereupon, data of clinical and biochemical blood tests and other methods of examination in ACS patients at the time of admission were analyzed (Table 4).

Table 4 shows that a mean value of different indicators (biochemical, clinical, echo-cardio graphic etc.) in ACS patients at the time of admission was: creatinine — 89.4 μmol (min.–max. — 140–230 μmol), glucose — 5.2 mmol/l (min.–max. — 3.3–9.6 mmol/l), glucose in fasting — 4.9 mmol/l (min.–max. — 3.0–8.8 mmol/l), total cholesterol — 6.1 mmol/l (min.–max. — 5.8–6.6 mmol/l), leucocytes — 6.1 thousand/ml (min.–max. — 3.3–5.8 thousand/ml), hemoglobin — 9.8 g/l (min.–max. — 76–120 g/l), hematocrit — 29.6 % (mini.–max. — 27.2–32.7 %), thrombocytes — 42.0 % (min.–max. — 180.0–320.0 thousand/ml) and EF — 42.0 % (min.–max. — 28.0 and 62.0 %).

It should be noted that at the time of admission, 240 ACS patients (39.2 %) had left ventricular ejection fraction $\leq$ 40 %. Ejection fraction > 40 % was revealed in 372 patients (60.8 %); P < 0.05.

During the analysis according to the values of prognostic scales, it was established that the share of patients with intermediate and high risk of death at hospital according to GRACE scale (≥ 1 for ACS w/o elevation of ST and ≥ 2 for ACS with elevation of ST) is determined with frequency 53.9 %, and the share with a very high risk of death at hospital according to GRACE scale (> 150 grades) — 9.8 %.

According to RECORD scale, intermediate and high risk of death at hospital (≥ 2 grades) was noted in 50.6 % of patients, and a very high risk of death at hospital (≥ 3 grades) — in 13.4 % of patients (P < 0.001).

Conclusions

1. Most common clinical symptoms of ACS are chest pain (93.1 %), heart beating (75.3 %) and fatigue (19.3 %). Most ACS patients have decreased left ventricle ejection fraction and decreased hemoglobin level and a high risk of death at hospital (50.6 %).

2. Among the deceased from ACS, there were significantly more patients aged ≥ 65. Deceased patients often had MI in their anamnesis (100.0 %) and kidney failure (100.0 %); but they smoked less often, had angina and arterial hypertension. There were significantly more patients of high and very high risk (81.8 %) according to RECORD scale. Those deceased at hospital were given aspirin more often (100.0 %), ACE inhibitors (100,0 %) and AC (100.0 %); thrombolytic therapy and beta blockers were not used (0.0 %).

3. Registers and conduct of registration programs similar to RECORD register helps objectively view the problems of the approach to treatment and «saving» prevention of the patients with acute coronary syndrome (ACS) and find solutions for them. In the conditions of the research region, they are acceptable, cost-effective and efficient in optimization of methods of early detection and treatment of ACS.

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Effect of combined pharmacotherapy lipid peroxidation and activity of enzymes antioxidant protection in rat livergepatocancerogeneze

Abstract: When hepatitis carcinogenesis marked imbalance in the system of lipid peroxidation and antioxidant enzyme system. Pharmacotherapy cytostatic leads to even greater intensification of lipid peroxidation. Thus activity of antioxidant defense enzymes even more oppressed. Roncoleukin results to some rebalancing of the system of lipid peroxidation and antioxidant enzyme systems. Which has a temporary nature. The combined use of doxorubicin and ronkolejkin some what reduces the marked of doxorubicin hyperlipidperoxidation and increases the activity of antioxidant enzymes.

Keywords: hepatocarcinogenez, system of lipid peroxidation and antioxidant enzyme systems.

Malignant tumors of the liver, according to the literature, comprise 2–3 % in the structure of cancer [4; 10]. Among all primary liver tumors malignant transformation has to 86–90.2 %, and among all primary Malignant tumors of liver tumors the bulk (about 90 %) of tumors gepat hepatocellular carcinoma of liver [4]. To date, the incidence of the disease is increasing in Uzbekistan (3.8 per 100,000 population), which is probably due to the prevalence of VJ-virus hepatitis B and C, which are the most common cause of hepatocellular carcinoma [9; 13]. One of the mechanisms of neoplastic transformation glue-current is a long-term effect on the body increased the number of highly oxidizing [12; 16].

The stages of initiation and promotion of carcinogenesis is dominated by electrophilic compounds that interact directly with the DNA has a direct genotoxic effect and interaction with various chemical compounds — procarcinogens, leads to the formation of carcinogens as a result of hydroxylation, epoxidation and other chemical reactions [15]. However, it should be said that active radicals are one of the highlights of the launch of apoptosis [3; 17]. However, for the induction of apoptosis requires its low physiological concentrations, free radicals, radical formation and causes unwanted excessive radical formation ion up to necrosis or malignant transformation [12].

Despite advances in the treatment of liver cancer mortality remains high mortality. In recent years, to improve the efficiency of the treatment of tumors is apply recombinant interleukin-2 (IL-2) — roncoleukin. It's action is based on the ability to activate cytotoxic potential of NK cells cytotoxic lymphocytes that play a key role in the antitumor surveillance system [2; 7]. However ronkolejkina influence on the processes of lipid peroxidation (LPO) have not been studied at hepatocarcinogen.

Objective

To evaluate the effectiveness of inclusion ronkolejkin correction hyper lipid peroxidation in plasma and liver tissue in DENA — induced carcinogenesis.

Material and methods

The study was conducted on 180 male rats, weight 100–120 g. body/Animals were kept in a vivarium on a standard diet without milk. We used a model DENA-induced hepatocarcinogenesis. DENA synthesis was performed at the Institute of Chemistry of the Academy of Sciences of Uzbekistan laboratory method by V. G. Evgrafova et al. [6]. The synthesized product contains 98 % DENA, with a specific gravity of 0.943, the boiling temperature 177 °S, a refractive index of 1.438 and a well mixed with water. We used the widespread introduction of the scheme carcinogen DENA, which allows you to get the development of hepatocellular liver cancer [6]. To induce hepatocarcinogen in 170 rats were carcinogen administered intragastric probe 5 times a week at a dose of 10 mg/kg body weight for 2 months. The mortality rate at the end of the introduction of the carcinogen was 22.9 %.

After 5 months from commencement of the experiment the survivors 131 rats were divided into 4 groups:

- 1st — 35 rat hepatocarcinogenesis administered saline at a dose of 0.5 ml/100 g.;
- 2nd — 32 rats treated with the antitumor antibiotic doksorubicine — 0.6 mg/kg i/p for 3 days (Doxorubicin, "Pharmitalia" firm) [1];
- 3rd — 32 rats treated roncoleukin at 0.006 mg/kg intraperitoneally (Company "Biotech", St. Petersburg) 3 days;
- 4th — 32 rats received a combination of these drugs in the in tumors inhibits the synthesis of interleukin as in tumors is inhibited by interleukin –2 synthesis.

The drug activates the cytotoxic potential of natural helper and cytotoxic lymphocytes, which play a key role in the antitumor surveillance [2; 7]. The control group consisted of 10 intact rats, kept under the same conditions throughout the experiment. The mortality rate at the end of the experiment was 28.6; 25; 25 and 18.7 %, respectively, groups. Animals were sacrificed at 6,7 and 8 months from the start of the experiment.

The appropriate animal research deadlines sacrificed under light ether anesthesia by decapitation in a cold room with air temperature 0° – +2 °C during killed all ethical norms. In the blood serum malonic dialdehyde (MDA) [1], the enzymes superoxide dismutase (SOD) [1], catalase [8] and the total protein content with microbiuret method. Statistical processing of the results was performed on Pentium-IV computer using the package at application program.

Results and its discussion

Studies have shown an increase in MDA plasma levels in the 1.19 time at 6 months in hepatocarcinogenesis in rats, and in the future, we observed a sharp decline it and by the end of the experiment was less than 1.72 times (P < 0.05) (Table 1).

Given that, the intensity of lipid peroxidation hyper depends on the activity of the HPA, we studied the activity of SOD and catalase. So, after 6 months we have been revealed to you, sharp inhibition of SOD activity (significant reduction in 2 times). During the progression and metastasis of tumor erythrocyte SOD activity even more inhibited (at 3.77 times, P < 0.001). The activity of catalase in 6 months Dost truly exceeded regulatory parameters in 1.43 times (P < 0.05). During the period of progression, and metastasis of the disease process of catalase activity in blood progress decreased by the end of the experiment, it was 1.29 times (P < 0.05).

Pharmacotherapy hepatitis carcinogenesis Doxorubicin sharply intensified lipid peroxidation processes. MDA level was significantly increased in 1.7; 1.69 and 2.29 times the figures, relatively untreated group to 2.03; 1.73 and 1.33 times — compared to indicators in intact rats, respectively timing at 6, 7 and 8 months. Thus of SOD decreased in 1.16; 1.28 and 1.27 times, the activity of catalase — 1.92; 1.73 and 2.03 times the values of the untreated group. Regarding the values of intact rats was 2.38 for the ODS in; 3.72 and 4.81 times for the catalase — 1.35; 2.29 and 2.63 times, respectively, tively terms 6, 7 and 8 months.

Our findings suggest an important role of reactive oxygen species in the cytotoxic action of anticancer drugs, as the education of free radicals-highly active oxidants is the principal mechanism of most conservative methods of cancer treatment (radiotherapy, chemotherapy and photodynamic therapy) [12]. The antitumor effect of the drug is associated with blocking DENA template activity of DENA polymerase and DENA -dependent RNA polymerase systems, which disrupts the synthesis of nucleic acids.

Action ronkoleukin less evident imbalance in the lipid peroxidation and antioxidant enzyme system. If after 6 months, we found no significant differences in the study of the relative values of the untreated animal group, then 7 months MDA level significantly increased, it intensified and adequately AOS enzymes. The same trend continued in the future. It should be noted that the severity of hyper-lipid peroxidation was significantly lower activity of antioxidant enzymes — higher relative to the group values of animals treated with doxorubicin. However, non-spite of these positive developments, of lipid peroxidation and antioxidant enzyme system performance in this group of animals was significantly different from the values of intact rats.

We have obtained positive results were due to the fact that IL-2-domain gives the ability to induce the activity of virtually all clones [2; 7; 14]. Histochemical studies have shown that

cytokines performs a protective role, providing recruitment in the pathological focus Add-tional number of effector cells, stimulating their phagocytic activity and hearth launch of antigen-specific response, all of which contributes to the elimination of tumor cells [5].

Studies O. E. Cecina et al. (2011), but it was shown that recombinant IL-2 at 0.1 ng/ml has a pro-apoptotic activity against lymphocytic cells by changing the ratio of anti- (Bcl-2, Bcl-x1) and proapopmitotic (Bad) proteins Bcl-2 family in favor of the latter [17].

Table 1. – The level of MDA, activity of SOD and catalase in blood of rats at gepatocantcerogeneze (M ± m)

Dates and Groups	MDA nmol/ml	SOD conv/min.mg/ protein	Catalase, mol H_2O_2 min. mg/ protein
6 mon.: intact	3.77 ± 0.16	0.212 ± 0.011	0.218 ± 0.015
Group 1	4.50 ± 0.27 [a]	0.103 ± 0.002 [a]	0.311 ± 0.021 [a]
Group 2	7.64 ± 0.37 [a, b]	0.089 ± 0.002 [a]	0.162 ± 0.011 [a, b]
Group 3	5.01 ± 0.26 [a]	0.111 ± 0.008 [a]	0.296 ± 0.014 [a]
Group 4	6.88 ± 0.34 [a, b]	0.134 ± 0.012 [a, b]	0.241 ± 0.017 [6]
7 mon.: intact	4.12 ± 0.32	0.227 ± 0.014	0.224 ± 0.015
Group 1	4.22 ± 0.19	0.078 ± 0.001 [a]	0.170 ± 0.015 [a]
Group 2	7.13 ± 0.28 [a, b]	0.061 ± 0.004 [a, b]	0.098 ± 0.005 [a, b]
Group 3	5.77 ± 0.16 [a, b]	0.141 ± 0.011 [a, b]	0.187 ± 0.009
Group 4	6.58 ± 0.24 [a, b]	0.128 ± 0.012 [a, b]	0.153 ± 0.011 [a]
8 mon.: intact	4.34 ± 0.14	0.226 ± 0.011	0.239 ± 0.011
Group 1	2.52 ± 0.18 [a]	0.060 ± 0.001 [a]	0.185 ± 0.013 [a]
Group 2	5.78 ± 0.22 [a, b]	0.047 ± 0.002 [a, b]	0.091 ± 0.004 [a, b]
Group 3	3.21 ± 0.14 [a, b]	0.095 ± 0.004 [a, b]	0.165 ± 0.009 [a]
Group 4	5.12 ± 0.11 [a, b]	0.078 ± 0.003 [a, b]	0.138 ± 0.007 [a, b]

Note: a — the difference between the contact and the experimental groups; b — treatment and non- treatment group (P < 0.05).

With the combination of doxorubicin and ronkoleukina MDA level significantly exceeds the value of the untreated group and treated ronkoleukine, but was slightly lower than in the group of rats treated with doxorubicin. The activity of SOD significantly exceeds the value of pre-untreated group and treated with doxorubicin animals, but was slightly lower than in rats treated ronkoleukine. Catalase activity was slightly lower values and untreated groups of animals treated ronkoleukine, but was higher than in the group of rats treated with doxorubicin. In all cases of active-antioxidant enzyme was lower than the values of control rats. Apparently, when co-administered drugs formation of reactive oxygen species in the super-high concentrations of doxorubicin under the action slows down some what, due to activation of antioxidant enzymes, which determines the increase in proapoptotic tumor cell death.

Thus, when unbalance is marked hepatocellular carcinogenesis system lipid peroxidation and antioxidant enzyme system. Therefore, the expediency of different-not only the determination of the activity of antioxidant enzymes and the level of lipid peroxidation products, but also their relationship, which allows, in our view, the differentiated vat stage neoplastic degeneration of the liver. Pharmacotherapy with cytostatic, leads to an even greater intensification of lipid peroxidation system. At the same time the activity of antioxidant enzyme enzyme system protection even more oppressed. Roncoleukin leads to the restored some balance to recommend measures of lipid peroxidation and antioxidant enzyme system, which has a temporary nature. The combined use of doxorubicin and reduce ronkoleukina several marked doksorubicin giperlipoperoksidat and increases the activity of antioxidant enzymes system.

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Comparison of fixed topical combination glaucoma drugs in patients with open-angle glaucomsa or ocular hypertension

Abstract: The purpose of study was to compare the intraocular pressure lowering efficacy, safety and cost-efficiency of fixed combinations travoprost 0.004 %/timolol 0.5 % (tim + tarv), brimonidine 0.2 %/timolo0.5 % (tim + brim), brinzolamide 1 %/timolol 0.5 % (tim + brinz) and pilocarpin 2 %/timolol 0.5 % (tim + pil) in patients with ocular hypertension or open-angle glaucoma. In this prospective, randomized clinical trial included 80 qualifying patients (4 groups) during six month. It was found that the fixed combination travoprost 0.004 %/timolol with 0.5 % is more effective, stabile and safe combination and recommend for long-term therapy of POAG and ocular hypertension. Combination of brimonidine + 0.2 %/timolol 0.5 % and timol + brinsolamid are recommend for fast and effective reduction IOP, short term cost effective therapy of POAG. Combination of pilocarpin 2 % and timolol 0.5 % usually is not recommend for therapy of POAG, but can be use as costly treatment for short time.

Keywords: open angle glaucoma, therapy, fixed combination glaucoma drops.

Bakcgroud

According to the literature to compensate for the intraocular pressure are often (25 to 70 %) is used two or more antihypertensive drug [1; 2; 3]. Today, our market represented a significant arsenal of the fixed combination of antihypertensive drugs, and it is necessary to compare the effectiveness of drugs to determine their characteristics and hypotensive activity. However, the authors of contradictory results [3; 4; 5; 6; 7; 8]. Perhaps this is due to the fact that studies have been conducted in different ethnic groups or different stages of glaucoma, with enough informative methods of research.

According to the requirements of evidence-based medicine, the most reliable are objective imaging technique of the optic nerve — the data of optical coherence tomography (OCT) of the optic nerve (optic disc), and color duplex scanning (CDS) orbit vessels. OCT will identify and quantify the dynamic aspect of the reduction of peripapillary nerve fiber layer (NFL), which is the best indicator of glaucomatous lesions, compared with the computer perimeter [9; 10; 11; 12]. However, the practical application of color duplex scanning orbital vessels, will allow to quantify the condition of blood circulation of the

orbital vessels supplying the optic nerve [13; 14; 15; 16; 17]. According to the literature the most important and reliable parameter of orbital vascular blood flow rate is "resistance index» (Pourcelot's ratio IR) arteria ophthalmica (AO) and posterior short ciliary arteries (PSCA) [18; 19; 20; 21; 22]. resistance index in the AO and PSCA can serve as predictor of progressive deterioration of visual functions in POAG; The authors offer the best of its values: 0.72 and 0.65 for the AO to PSCA [23; 24; 25; 26; 27]. In addition to the above-mentioned indicators are also important indicators of safety, efficiency and ease of use of drugs.

Purpose — to evaluate the features of the hypotensive effect of the fixed combination of timolol 0.5 % + travoprost 0.004 % (tim + trav), timolol 0.5 % brimonidine + 0.2 % (tim + brim), timolol 0.5 % + 1 % brinzolamide (tim + brinz), timolol 0.5 % pilocarpine + 2 % (tim + pil) and their impact on clinical and functional parameters of eye in patients with POAG.

Materials and methods

The survey of 80 patients (158 eyes) with POAG II — III stage. Parameters patient groups are shown in Table 1. The four groups of patients have been formed; The first group (40 eyes) buried

combination timolol + travoprost (Duotrav, the Alcon, Belgium), the second group (40 eyes) — timolol + brimonidine (Brimoptik, Liquor, Armenia), the third group (40 eyes) — timolol + brinzolamide (Azarga, the Alcon, Belgium), the fourth group (38 eyes) were buried timolol + pilocarpine (Fotil, Santen, Finland). The median age was 65 years, patients with predominated dark and light brown iris in 96.6 % cases. Patients with advanced glaucoma was — 56.2 % (86 eyes), the advanced stage of — 43.8 % (72 eyes). The level of IOP patients were distributed as follows: 15 with normal (9.4 %) eyes with moderately elevated 101 (64 %) eyes with high intraocular pressure — 42 (26.6 %) eyes. From studies have excluded patients with severe mental and somatic diseases. Study design masked, prospective, randomized. All patients were examined in terms of 1, 3 and 6 months of treatment.

Table 1. – Patient Information

	1g (n = 20)	2g (n = 20)	3g (n = 20)	4g (n = 20)
Mean age	62.5 ± 7	62.4 ± 6	65.2 ± 8	64.3 ± 7
Sex: M	11 (55 %)	10 (50 %)	12 (60 %)	11 (55 %)
F	9 (45 %)	10 (50 %)	8 (40 %)	9 (45 %)
Central corneal thickness	522.4 ± 28.2	528.5 ± 32.4	536.8 ± 18.4	524.4 ± 36.3
Iris color:				
Dark	11 (55 %)	10 (50 %)	11 (55 %)	10 (50 %)
Light brown	7 (35 %)	9 (45 %)	8 (40 %)	7 (35 %)
Bright	2 (10 %)	1 (5 %)	1 (5 %)	3 (15 %)
Glaucoma stage:				
II:	11	10	11	12
III:	9	10	9	8

All patients underwent standard ophthalmic examinations: biomicroscopy, ophthalmoscopy, tonometry, perimetry, gonioscopy, diurnal IOP fluctuation test. Acute drug test for use of the drug has been put before treatment to patients. Color duplex scanning Doppler mapping of the orbital arteries was performed on the unit Aloka SSD 1700 (Japan) probe 7.5 MHz.; were examined by ophthalmic artery (AO) and posterior short ciliary artery (PSCA) according to a standard protocol [11]. To evaluate the optic disc parameters and the average thickness of the peripapillary nerve fibers (NFL) patients were tested for optical coherence tomography Stratus OCT 3000 (Carl Zeiss, Germany). To evaluate the safety and comfort conducted questioning among patients. Price-efficacy was calculated in terms of; cost one percent of the average IOP reduction for 3 months in US dollars [28]. Statistical data processing has been done with the program Statistics 8.

Results

In general, patients tolerated the prescribed treatment, a significant decrease in intraocular pressure have been reported in all groups. A significant reduction in IOP was observed already after 2 hours, the maximum reduction at 4 hours after instillation. Under travoprost + timolol, unlike other groups IOP level kept at a low level even after 12 hours after the instillation (Fig. 1).
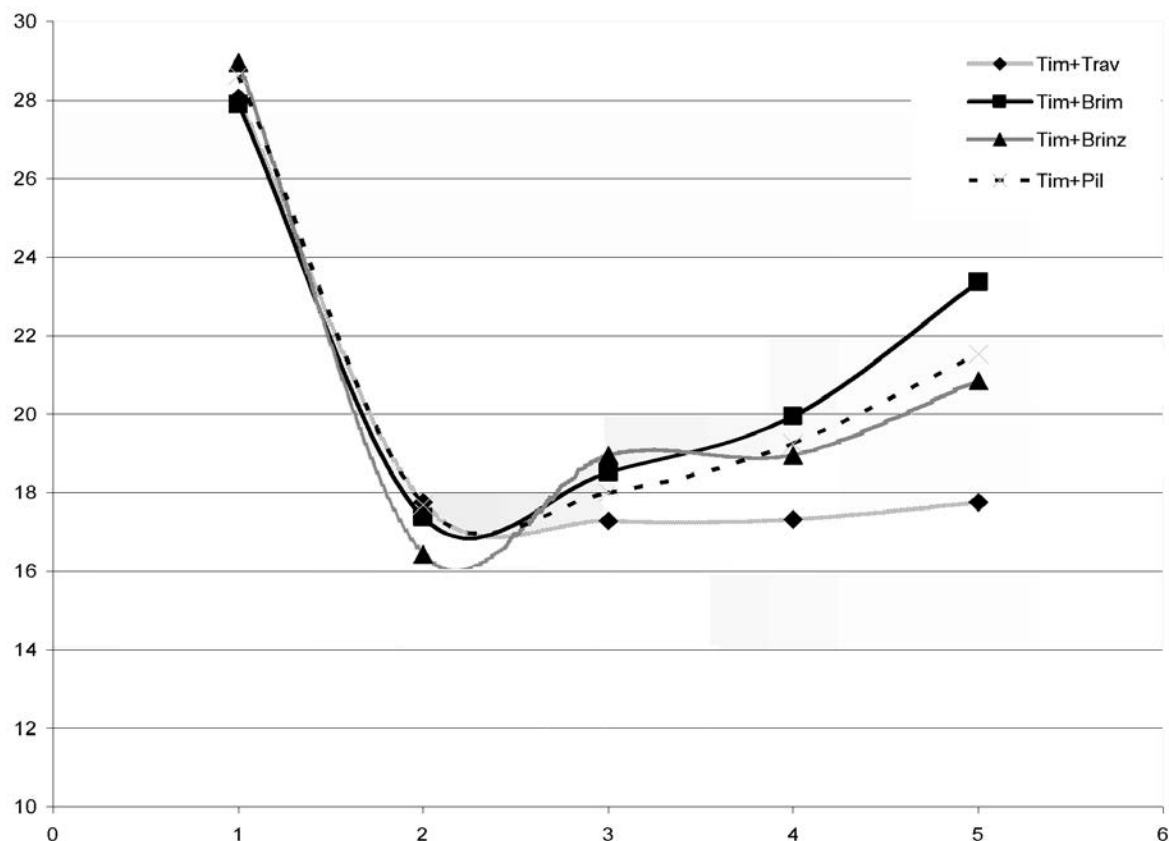
Fig. 1. Dynamics of reduction of IOP during the treatment (IOP/hours) (* — Po < 0.001)

During therapy with a combination of travoprost + timolol observed reduction in IOP from baseline by an average of 33.01 % at the end of the first, and reliable stabilization of the IOP by the end of the 6th month (Po = 0.001). A month later, in patients treated with a combination of timolol + brimonidine, hypotensive activity was high and amounted to 38.1 %; After 3 months — 30.24 % and decreased to 21.81 % (Po = 0.01) from the original — half a year, roughly the same trend in the third group of patients. In the fourth group showed a marked decrease in IOP to the beginning of the third month of treatment, and then IOP was rising again and by the end of 6 months of treatment reached values close to baseline (Fig. 2).
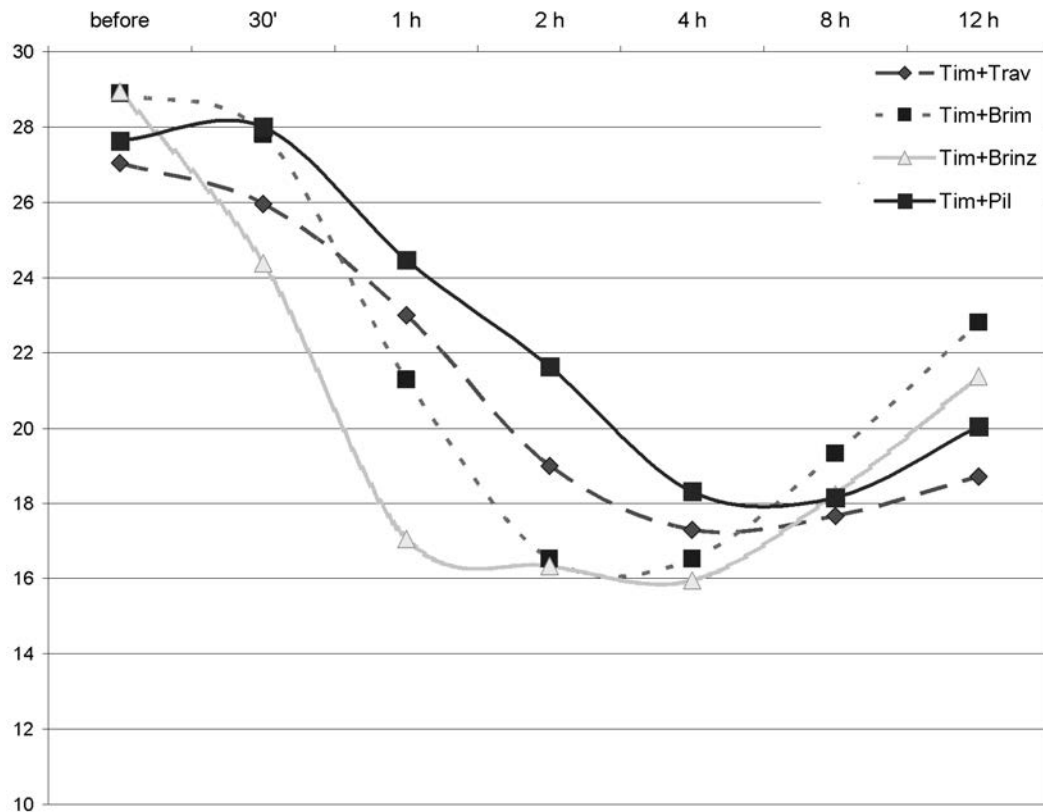
Fig. 2. Mean IOP in dynamics (* — Po = 0.0005 (Tim + Taf, Tim + Brinz); ** — Po = 0.001 (Tim + Brim, Tim + Pil))

Parameters of diurnal IOP after 1, 3 and 6 months of treatment showed a relatively low level of fluctuations in IOP in group timolol + travoprost (Po = 0.001) for the time of observation. In the other groups oscillation IOP remained within physiologic during the first three months, but rose (fig. 3) further level of diurnal fluctuations.
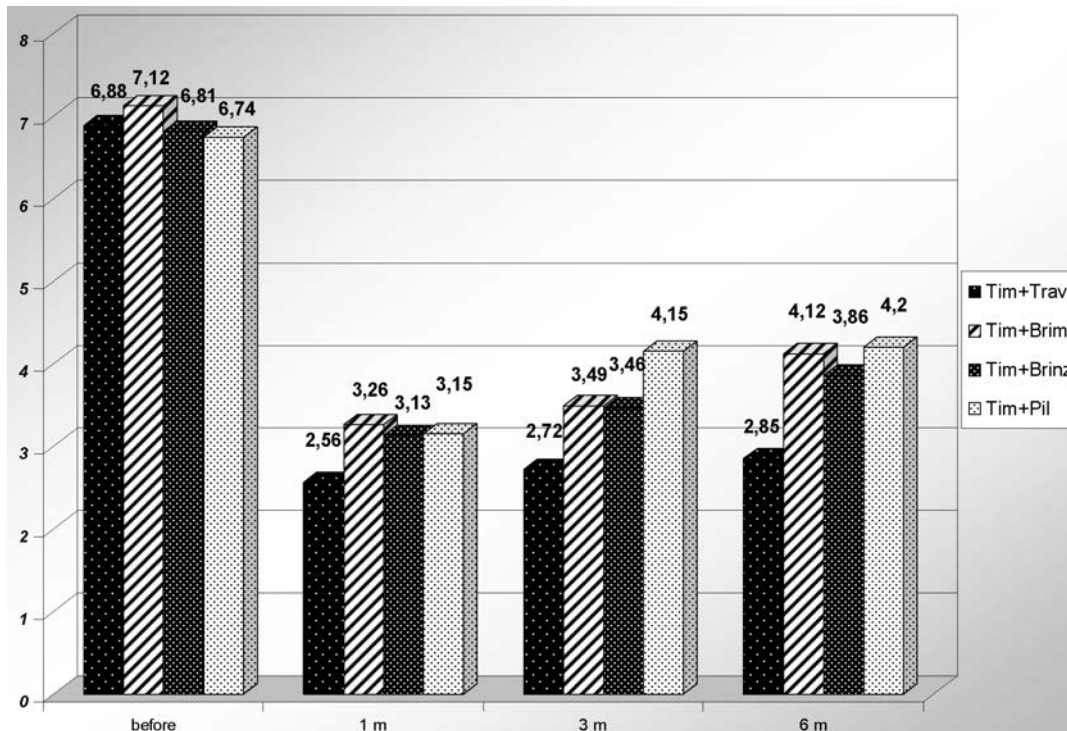
Fig. 3. Diurnal IOP (* — Po = 0.002 (all groups compared to baseline))

In the analysis of the resistance index (RI) AO/PSCA in all groups, except the fourth (timolol + pilocarpine), observed a significant decrease in the third month, more indicators remained stable and at the end of 6 months (tab. 2). It should be noted that in the group timolol + brimonidine resistance performance remained low even at relatively high rates IOP to 3 and 6 months of treatment. Our findings are consistent with the opinion of the authors, show a significant vasoconstrictor properties of brimonidine [29; 30; 31].

Table 2. – Comparative data orbital hemodynamics. Resistance Index (M ± m) of the ophthalmic artery and short posterior ciliary arteries

		Before	3 months	6 months	Po
Tim + Trav	AO	0.79 ± 0.05	0.72 ± 0.02	0.71 ± 0.02	Po = 0.01
	PSCA	0.78 ± 0.03	0.62 ± 0.02	0.62 ± 0.03	Po = 0.01
Tim + Brim	AO	0.80 ± 0.05	0.69 ± 0.02	0.70 ± 0.02	Po = 0.002
	PSCA	0.78 ± 0.04	0.60 ± 0.04	0.61 ± 0.03	Po = 0.002
Tim + Brinz	AO	0.79 ± 0.06	0.69 ± 0.03	0.70 ± 0.02	Po = 0.001
	PSCA	0.79 ± 0.03	0.61 ± 0.02	0.60 ± 0.03	Po = 0.001
Tim + Pil	AO	0.80 ± 0.04	0.73 ± 0.03	0.75 ± 0.03	Po = 0.05
	PSCA	0.78 ± 0.03	0.70 ± 0.02	0.73 ± 0.02	Po = 0.05

In the analysis of structural parameters for OCT retinal most important parameter is the average thickness in the peripapillary nerve fiber retina. Patients in all groups after 6 months showed a significant thickening NFL except group timolol + pilocarpine, wherein the thickness NFL indicators did not change significantly, compared with those of before treatment (tab. 3).

When analyzing the superior performance using the formulations according to the patients (90 %), most comfortably recognized timolol + travoprost combination and timolol + brimoptik, using timolol + brinzolamide combinations and timolol + pilocarpine this conclusion 85 and 75 % of patients, respectively (Figure 4).

Table 3. – Thickness NFL (M ± m)

	Before	3 months	6 months
Tim + Trav	68.13 ± 6.62	81.26 ± 5.39	79.47 ± 4.28 *
Tim + Brim	69.78 ± 4.51	83.94 ± 6.59	79.11 ± 4.96 *
Tim + Brinz	68.42 ± 6.35	80.87 ± 4.56	77.38 ± 3.81 *
Tim + Pil	70.72 ± 3.61	81.93 ± 2.88	74.90 ± 3.61 **

*Note: * — Po = 0.02; ** — Po = 0.05.*
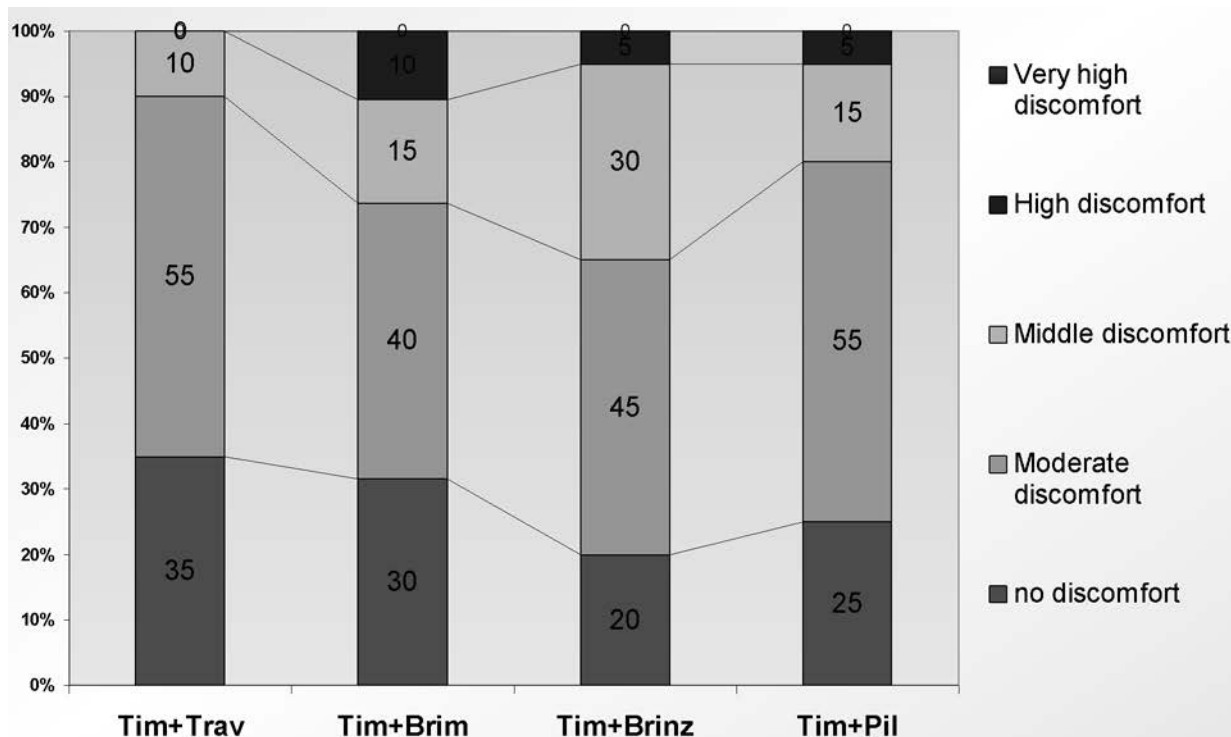
Fig. 4. Satisfactory indices of patients, %

Analysis of the cost and effectiveness of treatment showed that the most inexpensive was a combination of timolol + pilocarpine, a little more expensive than the combination of timolol + brimonidine, but the combination of travoprost + timolol and timolol + brinzolamide treated patients 2.5 times more expensive.

Discussions and conclusions

Within 6 months of therapy, a combination of travoprost + timolol observed stable IOP compensation, the drug has a high, stable hypotensive and neuroprotective activity and IOP decreases gradually. A small amount of local side effects and which reach through a minimum time of application, the drug can be used safely and continuously. The combination of travoprost + timolol appropriate to prescribe long-term therapy for primary open angle glaucoma and ocular hypertension.

A combination of timolol + brimonidine significantly reduce IOP effectively in comparison with the combination of timolol + travoprost in the first 2 months of treatment. It has good neuroprotective activity, confirmed a significant reduction in the coefficient of resistance of the AO, PSCA, but also a considerable thickening of the peripapillary nerve fiber layer. With prolonged use, at 6 months

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Prognosing of perforation of chronic gastroduodenal ulcers

Abstract: We analyzed the results of 36 patients who were divided into two groups — basic (20 patients) and control (16 patients). Patients of the main group were investigated during exacerbation of peptic ulcer disease. Patients in the control group suffered surgery for perforated gastroduodenal ulcers. It proved possible to predict chronic perforation of "uncomplicated"

ulcers. When comparing biopsies of patients of main and control group revealed significant differences in the microscopic structure of the cells. For the prevention of perforation in patients with peptic ulcer disease is recommended to undergo regular medical examinations with biopsy of the ulcer for morphological studies.

Keywords: peptic ulcer, perforation, prediction, Paneth cells.

Actuality

Peptic ulcer (PU), stomach and duodenal ulcers are predominant in the structure of the digestive tract. According to the Institute of Health and Medical Statistics Department of Health of the Republic of Uzbekistan and the overall performance of the primary ulcer incidence it declined significantly in the last 10 years, amounting to 381.2 and 37.9 per 100,000 population, respectively [1; 2; 4]. However, while no tendency to reduce the complications rate. For example, if there is bleeding ulcer in 25 % of cases, the most dangerous complication — perforation occurs before 10 % of the cases [1; 2; 5; 7].

Correlation of peptic ulcer disease in foreign countries is almost the same with our data. For example, if South Korea annually registered about 30–40 patients with primary peptic ulcer per 100,000 population, in the United States are diagnosed each year 500,000 primary cases of peptic ulcer disease, and relapse occur in 4 million [5; 6; 7]. A significant proportion of patients with peptic ulcer disease need surgery, including emergency treatment. This is especially true of complicated forms of the disease. In the CIS countries, diseases of the digestive organs and, above all, peptic ulcer disease is the second most common after diseases of the cardiovascular system [4; 6].

Perforation of the wall with the development of peritonitis ranks second among the complications. This complication occurs in all up to 10 % of cases, however, it belongs to the leading cause of death in patients with ulcer — 2/3 of all cases. Most often pyloroduodenal perforated ulcer — six times more than the body of the stomach ulcer. Annual frequency of perforation of ulcers in the Republic of Uzbekistan is 7–10 cases per 100,000 population [1; 2; 5].

Identification of structural — functional bases of the stomach, the discovery of the role of Helicobacter pylori (HP) in the etiology and pathogenesis of peptic ulcer provided the basis for the revision of the basic principles of the treatment of this pathology [1; 2; 3; 4; 5].

The introduction of new standards of medical treatment of peptic ulcer disease has caused what is now the world many forms of peptic ulcer disease are cured with medication. This has led some authors to suggest that "the ulcer goes down in history". However, this is far from the real situation. First, recent studies show that it is not always peptic ulcer associated with HP [2; 5; 8]. Number of HP negative forms of peptic ulcer disease is 8–12 %. It turns out that HP — negative forms of peptic ulcer disease are up to 30 % of duodenal ulcers and up to 50 % of gastric ulcers [3; 4; 5; 8].

Contrary to expectations, the latest knowledge of structural — physiological bases of functioning of the stomach, the etiology and pathogenesis of peptic ulcer could not deliver the people from this disease of the stomach and duodenum. New standards for the treatment of peptic ulcer disease are based, among other things, the opening B. Marshall and J. Warren, not completely solved the problem of peptic ulcer disease, especially those forms that require surgical treatment.

Despite the widespread introduction into clinical practice of modern antiviral drugs and therapeutic endoscopy, the problem of ulcer complications, requiring emergency surgical intervention is urgent. This is due to the lack of objective criteria for prognostic assessment of the possibility of one or another complication of peptic ulcer disease. The reason for the long persistence of chronic ulcers, the occurrence of complications of peptic ulcer disease, a perforation, ulcer bleeding, the emergence of the giant ulcer, their malignancy continues to be the subject of discussions [1; 2; 3; 7; 8].

Objective

To study the microscopic structure of the substrate complicated ulcer and "uncomplicated" gastroduodenal ulcers and make a comparative analysis between the results.

Material and methods

For comparison of the results, patients were divided into 2 groups according to the presence or absence of complications of peptic ulcer disease. The main group consisted of 20 patients with chronic ulcers of the stomach and duodenum in the acute stage. Ulcerative history ranged from 5 to 20 years. Among them are dominated by patients with duodenal ulcer (4:1). The patients were of working age, men were three times more than women. This group was subjected to study in an outpatient procedure.

The control group included 16 patients with peptic ulcer complicated by perforation.

All biopsy specimens obtained from patients of both groups were studied in the department of Pathomorphology Republican Center of the Ministry of Health of the Republic of Uzbekistan.

In 2013, we filed an application for the acquisition of a patent entitled "Method for predicting perforation of chronic gastroduodenal ulcers" in the Intellectual Property Agency of the Republic of Uzbekistan.

Biopsies were obtained endoscopically using forceps in patients with uncomplicated ulcers or intraoperatively in patients with perforated duodenal ulcers. Biopsies were examined by electron microscopy after staining with hematoxylin and pre-eosin.

Results and its discussion

There were found following results between of 2 groups: significant differences in the ratios of the relative volume fractions of different cell structures and the respective zones between ulcers complicated by perforation and so called uncomplicated ulcers. The most significant differences are revealed in the content of the relative volume fraction of the lymph vessels (Table 1).

Table 1. – The results of microscopic examination

The cellular structure of the stroma		Uncomplicated ulcer	Before perforation and perforated ulcer
Vessels	Blood	0.9 ± 0.02	1.2 ± 0.3
	Lymphatic	0.4 ± 0.03	1.2 ± 0.4
Intercellular sybstance		55.4	92.2 ± 1.0
Paneth cells		Found	Not found

Thus, the relative volume fraction of the lymph vessels in perforated ulcers in more than 3 times higher than in uncomplicated ulcers (Table 1). This is due, primarily, a significant expansion of the lumen of the lymph capillaries. The differences observed in the relative volume fraction of the intercellular substance, which when perforating substantially more (almost twice) than bleeding ulcers and more than the uncomplicated ulcers.

Distinct differences were found in the contents of the duodenum in the crypts Paneth cells. Back in the late 60's mid 70-ies of the last century, it has been suggested that these cells perform the function that facilitates rapid renewal of the population of the intestinal epithelium, ie, mucosal repair. They contribute to an increase in mitotic activity.

A significant increase when perforated ulcers relative volume fraction of the lymphatic vessels is their main difference from the uncomplicated and bleeding ulcers.

Discussion

Analysis of the research showed, that by microscopic counting of morphological structures ulcerative substrate can predict the development of peptic ulcer perforation. To this end, all patients with ulcer history should undergo medical examinations with biopsy of the ulcer for morphological analysis. By increasing the volume fraction of "unstructured" zones in the submucosa, without Paneth cell mitosis and suggested the possible perforation of the ulcer.

Our studies have shown that the perforated ulcers (such as perforated and ulcer with high risk of perforation) major morphological differences are: 1) an increase in the relative volume fraction of cell-free "structureless" zones; 2) an increase in the relative volume fraction of the lymphatic vessels, and 3) a decrease in the number of Paneth cells, followed by a decrease in the number of mitotic figures. These morphological features can serve as predictors of objective possibility of perforation of gastroduodenal ulcers.

Analyzing the literature, the following facts were found. For example, Elisabete Kawakani examined biopsy for neutrophils and HP infection [9]. However, the white blood cells showed only the degree of inflammation around the ulcer process, predicting perforation or any complications was not possible. A pathogen of ulcer disease is now possible to diagnose even with the help of numerous non-invasive methods.

American Society of Gastroenterology reports that the giant ulcer KDP are more prone to perforation, bleeding and penetration than small ulcers, 65 % and 12 %, respectively [8]. However, there is no information about a possible ulcer perforation.

Also in the medical journal of Hong Kong noted that the perforation (92 % of cases) is more common than bleeding (55 %) and stenosis (45 %) in patients with Helicobacter pylori positive ulcers [6].

In Japan, the granulocytes were found in periulcerative zone, which contained a large number of matrix-metalloproteinase-1 (MMP-1) [7]. Increasing these cells also play a role in ulcer perforation of the stomach and duodenum.

However, the literature is still no consensus on the methodology of forecasting of perforation of gastroduodenal ulcers.

Conclusion

The main morphological risk factors of perforation are the increase in the relative volume fraction of cell-free "structureless" zones; increase in the relative volume fraction of the lymphatic vessels and reducing the number of Paneth cells, followed by a decrease in the number of mitotic figures.

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Peroxidation of lipids and activity of enzymes of antioxidant protection in microsomal fraction of the liver and kidneys of rats with leucosis

Abstract: In dynamics of experimental leucosis intensification of the POL (peroxidation of lipids) in microsomal fraction of the liver appears earlier and is more expressed, whereas in kidneys it develops slowly, becoming more active at final terms of experiment. It develops together with activity of antioxidant protection enzymes which progressively decrease in microsomal fraction of the liver, whereas in kidneys that inhibits only during sharp progressing of tumor process. Thus Compensatory capacity of AOP (antioxidant protection) of microsomal fraction of the liver is sharply oppressed, defining early failure (decompensation), and in kidneys its failure noted after 7 months and aggravated by progressing of pathological process.

Keywords: antioxidant protection, tumor, pathological process.

Leucosis are one of actual problems of hematology due to high prevalence and high lethality. Optimization of its treatment allowed increasing survival rate of patients. Results of treatment of acute myeloblast leucosis (OML) showed 35–50 % 5-year survival rate of at persons younger 60 years, and among elderly — the rate was 10–12 %. However the lethality remains high due to development of septicinfectious, thrombo-haemorrhagic complications and development of poly-organ insufficiency. In process of development

of leucosis of the cellsbecome able to grow out of hemopoietic organs: in skin, kidneys, a liver, brain membranes [1; 2]. It is caused by sharp change of immunological properties of an organism, affection of homeostasis, suppression of work of detoxication system organs, violation of the central and peripheral haemodynamics, causing thus development ofhypoxemia. The hypoxemia, leucosis infiltration and toxic effect of cytostaticsleads to affection of the main detoxication organs: liver and kidneys [2; 3]. Cytochrome P-450 dependent monooxygenaze system (MOS) which provides biotransformation of endogen and exogenhydrophobic compoundsis responsible for these processes. Intensification of the POL (peroxidation of lipids) which promotes destruction of membranes of smooth of endoplasmic reticulum in the conditions of a hypoxemia can be one of the mechanisms in decrease of activity of membrane-boundenzymes in rats with leucosis [12; 20]. For clarification of the matter we investigated level malonic dialdehyde (MDA) and activity of AOP (antioxidant protection) enzymesmicrosomal fraction of the liver and kidneys in dynamics of an experimental benzene leucosis.

Material and research methods

For this purpose we have selected and upgraded the benzene model of leucosis which was reproduced on 157 adult malerats by *subcutaneousinjection* of 40 % oil solution of benzene (0.01ml/100 g. of weight of a body) during whole period of the experiment [18]. The general mortality rate was 40.1 %. Development of leucosis was determined every month until 8th month from the beginning of experiment based on indicators of peripheral blood and bone marrow [2]. By the end of 6-month 50 % of animals developed leucosis, rate of leucosis increased to 77.4 % in 7 months and to 86.4 % in 8 months. In the mentioned periods the animals with signs of chronic leucosis wereslaughtered under a raush-anesthesia observing the rules of the European Convention on Protection of Vertebrate Animals (Strasbourg, 1986). Mitochondrial fraction of the liver and kidneys were extracted using method of a differential centrifugation. Intensity of peroxidation of lipids estimated by level malonic dialdehyde (MDA) [1], and also activity of antioxidant protection superoxyddismutaze (SOD) [13] and a catalase [10]. The obtained data processed by statistics method using software STATISTICA 5. Confidence interval level was at P < 0.05.

Results and their discussion

The conducted researches showed that level of malonicdialdehyde (MDA) in microsomal fraction of the liver of rats withleucosis increasesto 1.72, 1.75 and 2.04 (P < 0.01) times in process of progressing leucozogeneze (table 1).

Table 1. – Indicators of peroxidation of lipids and activity of enzymes of antioxidant protection in microsomal fraction of the liver of rats with leucosis, M ± m, n = 6–7

Groups and research terms	Content of malonic dialdehyde (MDA), nmole/mg. protein	Activity of Enzymes	
		SOD, rel. un./min*mg. protein	Catalaze, mkmole H_2O_2/min*mg. protein
Intact	0.244 ± 0.011	0.178 ± 0.012	0.219 ± 0.011
Leucosis, after: 6 months	0.419 ± 0.017	0.118 ± 0.003	0.172 ± 0.009
P	< 0.001	< 0.01	< 0.05
7 months	0.427 ± 0.011	0.091 ± 0.002	0.151 ± 0.008
P	< 0.001	< 0.001	< 0.01
8 months	0.498 ± 0.024	0.078 ± 0.004	0.121 ± 0.008
P	< 0.001	< 0.001	< 0.001

Table 2. – Indicators of peroxidation of lipids and activity of enzymes of antioxidant protection in microsomal fraction of the liver of rats with leucosis, M ± m, n = 6–7

Groups and research terms	Content of malonicdialdehyde (MDA), nmole/mg. protein	Activity of Enzymes	
		SOD, rel. un./min*mg. protein	Catalaze, mkmol H_2O_2/min*mg. protein
Intact	0.167 ± 0.013	0.178 ± 0.011	0.121 ± 0.011
Leucosis, after: 6 months	0.198 ± 0.014	0.159 ± 0.013	0.117 ± 0.009
P	> 0.05	> 0.05	> 0.05
7 months	0.242 ± 0.011	0.129 ± 0.009	0.075 ± 0.002
P	< 0.001	< 0.001	< 0.01
8 months	0.298 ± 0.014	0.101 ± 0.007	0.062 ± 0.008
P	< 0.001	< 0.001	< 0.001

Activity of SOD enzymes and a catalase progressively decreases: in 6 months — to 1.51 (P < 0.01) and 1.27 (P < 0.05) times, in 7 months — in 1.96 (P < 0.001) and 1.45 (P < 0.05) times, in 8 months — to 2.28 (P < 0.001) and 1.81 (P < 0.001) times, according to enzymes. Dynamics of decrease in a ratio of the sum of activity of SOD enzymes and catalase to the contents malonicdialdehyde (MDA) can serve as confirmation of development of theimbalance in POL-AOP system. So, if this indicator in intact rats was 1.63 rel. un. in rats with leucosis after 6, 7 and 8 months it progressively decreased to 0.69, 0.58 and 0.4 rel. un., according to terms.

The analysis of processes of POL/AOP in microsomal fraction of kidneys of rats with leucosis showed activizationlipo- peroxidation: level malonicdialdehyde (MDA) increases 1.45 and 1.78 times, activity of SOD and a catalase decrease 1.39 (P < 0.05) and 1.61 (P < 0.01) time — in 7 months, 1.76 (P < 0.01) and 1.95 (P < 0.001) times — after 8 months from the beginning of experiment (table 2). It leads todesrease of ratio of (SOD + catalase)/MDA to 1.4, 0.84 and 0.55 rel. un., according to terms after 6, 7 and 8 months, at norm of 1.79 rel. un.

At the same time, we observed some distinctions in processes the POL of microsomal fraction of the liver and kidneys of rats with leucosis. Intensification of the POL (peroxidation of lipids) in microsomal fraction of the liver appears earlier and in subsequent terms its increase declines. At the same time in kidneys processes of a hyperlipoperoxidation begin later (after 7 months) and they are intensified in process of progressing of pathological process

pointing later involvement of kidneysin pathological process. In the liver decrease in activity of SOD is more expressed, whereas in kidneys — activity of catalase.

Apparently from the provided data, compensatory capacity of AOP (antioxidant protection) of microsomal fraction of the liver is slightly higher, than in kidneys. Compensatorycapacity of AOP in kidneys after 6 months from the beginning of experience remain high whereas in the liver they are sharply oppressed, defining early failure (decompensation), causing a destruction of membranes and decrease in activity of microsomal oxidation enzymes of xenobiotics. This decompensation is even more oppressed further. In our opinion, it is connected with early involvement of the liverin pathological process. In kidneys failure of compensatory capacity of AOP is noted after 7 months and it is aggravated in process of progressing of pathological process. The results obtained by us coincide with dynamics of change of enzymes of microsomal oxidation in kidneys and confirms later involvement of kidneysin pathological process.

Activizationof processes of free radical oxidation leads to destructive changes in bio membranes. Phospholipidsof the membraneswhich contain polynon-saturated fatty acidsare exposed to oxidation in the first instancedue to high solubility of molecular oxygen in a lipid phase. In membranes endoplasmic reticulum the contents phosphothidilcholin decreases, occurs selective modification of arachidon, docosahexaenoic and linoleic acids of phosphothidiletonolamine, concentration of more polar lipids increases, asymmetry of a membrane, change of its properties amplifies. In these conditions functioning of the membrane-bounded enzymes, in particular cytochrome P450 dependentmonooxigenasesof the liver and kidneys of experimental animals is affected. The data obtained by us coincide with data from literary which shows the intensification POL, decrease activity glutathione peroxidase, level of sulfhydryl groups, retinol and alpha-tocopherol in patients with hemoblastosis [14; 15; 17]. The labialization of membranes observed in these conditions promoted release of toxic products of a metabolism from tumors, mutilated functional activity of cells of the owner [17] and developed of endogenic toxicosis.

Refering to obtained data we can conclude:

1. The intensification of the POL (peroxidation of lipids) in microsomal fraction of the liver appears earlier and is more expressed, whereas in kidneys it develops slowly, becoming more active at final terms of experiment.

2. In dynamics of an experimental leucosis activity of catalaseenzymes and especially SOD, progressively decrease in microsomal fraction of the liver, whereas in kidneys that inhibits only during sharp progressing of tumor process.

3. Compensatory capacity of AOP (antioxidant protection) of microsomal fraction of the liver is sharply oppressed, defining early failure (decompensation), and in kidneys its failure noted after 7 months and aggravated by progressing of pathological process.

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Influence of various forms chitosan on redox processes in the liver and metabolic syndrome

Abstract: When metabolic syndrome is develop the functional activity of the cytochrome P-450 in microsome of the liver decrease and develop disbalance in activity ferments of cycle tricarbone acid in mitochondria's.

Keywords: metabolic syndrome, liver, microsomale and mithochondrial oxidation, hitozan.

The clinical significance of metabolic syndrome (MS), the combined framework syndrome is the presence of a whole range of risk factors, which are formed long before its development [1]. In clinical practice, MTS communications with impaired liver function is defined as the term "diabetic steatosis" (Canadian Diabetes Association. Canadian Diabetes Association 2003). Despite the importance of liver disorders in the development of metabolic syndrome, many aspects of the pathogenesis of this disease with hepatocytes, in particular molecular-cellular mechanisms remain unclear. Especially there is no clear clarity on the functional relationship systems, mitochondrial microsomal oxidation in the liver with the formation of MS.

Of particular interest is the study of the effect on the microsomal system, mitochondrial membrane protectors of the liver. There is some evidence that chitosan and its isoforms may positively affect the functional activity of the liver in acute and chronic hepatitis [2]. However, it remains unclear how does chitosan and its isoforms at the subcellular level in the liver with the formation MS.

The aim of this study was to investigate the microsomal, mitochondrial oxidation in the liver and the impact of various forms of chitosan on these processes.

Material and methods

Experiments were carried out on 60 male rabbits, body weight from 2050 to 3400 g. Metabolic syndrome in rabbits is caused by the method of S. A. Saidov [3]. To create a model of metabolic syndrome in animals trough added 5 % sugar solution and mixed in a daily feed crystalline cholesterol of 250 mg/kg. body weight. Animals were subcutaneously injected insulin dose of 0.1 units/100 g., a day. The duration of 2 months. Animals were divided into 3 groups: Group 1 (intact) contained in natural vivarium conditions (12 rabbits). 2 group — called metabolic syndrome (12 rabbits). 3 group — correction of metabolic syndrome chitosan sulfate (12 rabbits); 4 group — correction of metabolic syndrome, a form of nano chitosan sulfate (12 rabbits); 5 group — comparison group, where the correction of the metabolic syndrome was performed Glyukofazh. Chitosan is a deacetylation product of chitin. The chemical structure of chitosan is a copolymer of D-glucosamine and N-acetyl-D-glucosamine. Chitosan is a universal sorbent capable of binding a huge range of substances of organic and inorganic nature, which defines the broadest possible application in human life. The study examined the effect of chitosan sulfate and Nana form synthesized based on chitosan Bombyx mori, represented by the Institute of Physics and Chemistry of the Academy of Sciences of Uzbekistan (Head of Laboratory, Dr. R. Y. Milusheva).

MS used for correction sulphate chitosan Chitosan obtained sulfation reaction medium in chlorosulfonic acid. Orally aqueous solution of chitosan and its sulfate form nano administered 25 mg/kg. over 20 days after receiving a model of metabolic syndrome. Glucophage, according to the instructions of the drug was administered orally at the rate of — 7.14 mg/kg. body weight.

Isolation of mitochondrial and microsomal fractions of the liver was carried out by differential centrifugation on a refrigerated centrifuge RL — 6 and VAC- 601. The contents of cytochrome P-450 in the microsomal suspension was determined with a spectrophotometer UV/VIS (LTD, China) by the method of Omura T., Sato R. [4]. The content of cytochrome b5 were determined after recovery experienced microsomal suspension samples by the addition of NADPN. Activity aminopyrine demethylase-N- method Bast A., Nordhoock J. [5], NADPH-cytochrome C-preductase method Willians C. H., Kamin H. [7] and microsomal protein of O. N. Lowry [8].

Determination of liver mitochondrial enzyme activity of cytochrome oxidase (CCO) — polarographic method (in the LP-7 polarograph closed platinum electrode type Clarke), succinate dehydrogenase (SDH), succinate — cytochrome with reductase (SCR- ed.), Rotenone — insensitive NADPN — cytochrome with reductase and monoamine oxidase (MAO) spectrophotometric method [9].

Results and discussion

Studies have shown that after 2 months from the beginning of the simulation of the experimental MS in liver microsomes of cytochrome P-450 and B5 was significantly reduced by 28.6 ($P < 0.01$) and 17.2 % ($P < 0.05$), respectively, compared with the intact group (Table 1). Activity-NADFH-cytochrome c reductase, aminopyrine demethylase-N-, anilingidroksilazy animals of this group decreased 2.48; 1.93 and 2.14 times, respectively, compared to the intact group. This enzyme system plays an important role in metabolizing both endogenous (steroid hormones, cholesterol, fatty acids and bile acids, prostaglandins) or exogenous (xenobiotic majority) substrates, it is fully functional condition depends on the integrity of the endoplasmic reticulum membrane structures. Therefore, these results indicate a pronounced inhibition of microsomal oxidation in the liver and metabolic syndrome.

NADPH-cytochrome P-450 microsomes and mitochondria electron transport system is in constant renewal de novo protein enzyme complexes, metabolic activity which is largely dependent on the varying conditions of physiological and pathological processes in the cells [10]. Thus protein synthesis de novo enzyme complexes requires considerable use of ATP and NADPN. Mitochondrial and microsomal systems compete for NADPN connection with its use in the process of mitochondrial respiration in the free and conjugated with the operation of the cytochrome P-450 systems smooth endoplasmic reticulum [10; 11; 12; 13]. The development of many diseases is closely related with the damage of cell membranes, which leads to violation of their functional activity. Damage to the energy systems of the cell is unable to produce sufficient amounts of ATP and nukleotrifosfat [14]. In our studies, the study of mitochondrial

enzyme activity revealed a significant increase in the activity of monoamine oxidase (MAO) and cytochrome oxidase (CHO) for MS and 67.55 %, 58.14 % (P < 0.001) respectively compared to the intact group of animals (Table 2). At the same time, the activity of succinate dehydrogenase (DHN), succinate-cytochrome with reductase (SCC), rotenone-insensitive NADH-cytochrome with reductase was significantly reduced by 32.92 %; 42.38 %; 44.19 % (P < 0.001) respectively compared to intact group. Consequently, there are significant shifts in the way of using oxidase O_2 in the citric acid cycle. An imbalance in the system substrate oxidation in the citric acid cycle requires excessive consumption of NADPN. Inhibition of the activity of the liver MOS at the metabolic syndrome may be due to a deficiency of NADPH — as the main source for the functioning of NADPN — cytochrome c reductase in microsomes, as noted in our research. Currently offers a variety of methods to restore the microsomal oxidation processes, including chitosan derivatives (Table 1).

Table 1. – Effect of chitosan derivatives on microsomal oxidation in the liver of rabbits with the metabolic syndrome (M±m)

Group	Microsomes				
	P-450, nmol/mg.	в₅, nmol/mg.	NADPH – cyt.-c. red., nmol/min/mg.	AN, nmol HCHO/min/mg.	AG, nmol ami-nofen/min/mg.
Intact	0.985 ± 0.030	0.593 ± 0.021	94.4 ± 8.48	7.0 ± 0.492	1.09 ± 0.06
MS	0.703 ± 0.024*	0.491 ± 0.004*	38.0 ± 2.94*	3.6 ± 0.28*	0.51 ± 0.026*
MS + chito-san sulfate	0.775 ± 0.033*	0.484 ± 0.024*	49.6 ± 3.27*	4.4 ± 0.30* **	0.57 ± 0.024*
MS + chitosan sulfate nano	0.837 ± 0.026* ** ***	0.518 ± 0.019*	53.8 ± 2.48* ** ***	5.5 ± 0.177* ** ***	0.67 ± 0.034* ** ***
MS + glyuko fazh	0.706 ± 0.032*	0.497 ± 0.021*	45.7 ± 1.76*	3.6 ± 0.28*	0.54 ± 0.032*

*Note: * — differences with respect to the data of the control group significant (* — P < 0.05; ** — P < 0.01; *** — P < 0.001).*

Investigating the effects of the three forms of chitosan — chitosan sulfate and nano forms on monooxygenase system showed a significant increase in the content of cytochrome P-450. When administered chitosan and its sulfate form nano levels of cytochrome P-450 exceeded by 10.2 and 19.1 % (P < 0.05 and P < 0.05, respectively) compared to those animals with MS parameters. Chitosan Sulfate and its nano form of significant changes in the content of cytochrome B5 causes. Chitosan Sulfate significantly to 30.45 % (P < 0.01) increases the activity of only NADPN-cytochrome C-ed. compared to the untreated group. At the same time form nano chitosan sulfate increases more significantly as activity NADPN-cytochrome c-ed and aminopyrine demethylase-N-, anilingidroksilazy 41.6 %, 53.6 %, 31.7 % (P < 0.001), respectively, compared with the untreated group (Table 2).

Table 2. – Effect of chitosan derivatives on mitochondrial oxidation in the liver of rabbits with the metabolic syndrome (M±m)

№	Group	Mitochondria				
		MAO, nmol/min/mg.	DHN, nmol/min/mg.	CCO-red., nmol/min/mg.	PH-cyt. C-red., nmol/min/mg.	CHO, nmol/min/mg.
1	Intact	23.0 ± 0.09	127.8 ± 4.144	120.2 ± 3.35	55.1 ± 2.0	120.3 ± 2.63
2	MS	38.6 ± 1.34*	85.7 ± 1.53*	69.3 ± 2.3*	30.7 ± 1.39*	190.2 ± 8.49*
3	MS + chitosan sulfate	35.1 ± 1.41*	97.2 ± 3.70*	89.6 ± 3.48* **	40.2 ± 1.67*	150.4 ± 7.54* **
4	MS + chitosan sulfate nano	28.5 ± 1.47* ** ***	116.2 ± 2.54* ** ***	103.8 ± 4.60* ** ***	46.8 ± 1.84* ** ***	133.6 ± 6.25* ** ***
5	MS + glyuko fazh	37.2 ± 1.32*	90.7 ± 3.37*	70.5 ± 4.23*	33.8 ± 1.44*	188.3 ± 9.83*

*Note: * — differences with respect to the data of the control group significant (* — P < 0.05; ** — P < 0.01; *** — P < 0.001).*

A study comparing the action of the drug — Glucophage has shown that he is not sufficiently active to enhance the functional activity of microsomes and mitochondria. Also, no significant differences in the study Glyukofazh action on the activity of mitochondrial enzymes. Glucophage is widely used as a means of correction dismetabolic disorders in MS development. Perhaps it is not related to the effect of the influence on the processes oxidase and oxygenase way of oxidation. Unlike Glyukofazh chitosan derivatives and chitosan nano largely affect the activity of mitochondrial enzymes oxidation. This nano chitosan has a greater influence on the process of reducing the activity of MAO and CCO and increase the reaction rate of LDH, SO tsit. s.red. RN-tsit. s.red than chitosan sulfate, respectively — 18.8 %, 11.2 % (P < 0.05) and 19.5; 15.8; 16.4 % (P < 0.05).

It is believed that with the improvement of the functional activity of the enzymes oxidase oxidation way, helped to improve the functioning of the citric acid cycle enzymes, transport of electrons and protons along the respiratory chain to its final link — CCO. In this case the electron acceptor is O_2 and the protons, which is formed in the reduction of H_2O. This oxidation pathway is known to conjugate and ADP phosphorylation and the resynthesis of ATP in the mitochondria NADPN. It should be noted that excessive CCO activity may be an important factor in the formation of the hydroxyl radical, which is a strong oxidizing agent active center of the cytochrome P-450 enzyme activity inhibition of microsomal oxidation.

Thus, studies have shown that the development of MS pronounced inhibition observed functional activity of cytochrome P-450 system and liver microsomes imbalance in activity of the enzymes of the tricarboxylic acid cycle in mitochondria.

Chitosan derivatives, to a greater extent chitosan nano, positive impact on the recovery of impaired activity of enzyme systems microsomes and mitochondria, it is possible to believe, it is one of the reasons for the decline of MS factors in experimental animals.

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Roentgenologic description of repeated fractures of forearm bones in children

Abstract: The successful development of traumatology orthopedics in the last decade has not solved some of the problems which, in particular, to repeat the treatment of bone fractures in children. Nonunion and refracture are a common complication of bone fractures and trauma require attention. The main method of diagnosis is X-ray examination, which not only allows us to determine the nature of the displacement of bone fragments, but also plays a major role in the evaluation of treatment results.

Keywords: children, refracture, X-ray examination, forearm.

Introduction

According to the literature it is known that bone fractures in children ranged from 52 % to 58 % [2; 4; 5]. In 5.2 % of them concern to the refractures in children [1; 7; 8]. Repeated bone fractures in children are some of the serious injuries and at the same time, diagnosis and treatment are accompanied by some difficulties. The main diagnostic method of re-fracture is X-ray examination, which not only allows us to determine the nature of the displacement of bone fragments, but also plays a major role in the evaluation of the results of surgical treatment. Diagnosis of this pathology is challenging and misdiagnosis can lead to different consequences and complications.

Incomplete gathering of the anamnesis in children without finding-out of the reasons of occurrence of a trauma, an establishment of terms of occurrence concerning primary fractures of bones with finding-out of a way of treatment after primary fractures can complicate a choice of an adequate way of treatment in case of re-fracturein the same place.

The only prevention of complications is a detailed description of these radiographs. According to available literature, complications of various character such as re-refracture occur in cases of 1.4–1.7 % and pseudoarthrosis — in 2.4–2.6 % cases [3; 6; 8]. In the course of studying this problem, we realized that nowhere and in any literary source is not given x-ray data and defined refracture problems in children. The relation of the radiological signs of re-fracture by osteoreparative processes is not defined and not demonstrated the status of callus during the re-fracture.

Based on the abovementioned, we have put the purpose as to explore and explain the radiological signs of refractures, depending on the stage of the regeneration of the primary fracture.

Materials and methods

In Children Traumatology Department of the Scientific Research Institute of Traumatology and Orthopedics of MH of the Republic of Uzbekistan, were examined and treated 109 children with refracture (without concomitant somatic diseases), during the period from 2000 to 2014. From them 77 (70.6 %) were boys and 32 (29.4 %) girls. The distribution of children according to the localization was as follows: with diaphyseal refracture were 91 (83.5 %), in the proximal part — 7 (6.4 %) cases and in the distal portion were 11 (10.1 %) children. Also, children are separated depending on the fracture frequency in the same segment, i. e. twice (refracture) in 91 (83.5 %), children, re-refracture or many times (more than three times) — in 18 (16.5 %) patients. Depending on the type of injury was observed the home injury — in 57 (52.3 %) children, street trauma — in 44 (40.3 %) and during sport activities — in 8 (7.4 %) children. 66 (60.5 %) patients treated conservatively and another 43 (39.5 %) patients by surgery way, from them. 43 (39.5 %) children in 24 (22.0 %) cases was used the combined method of osteosynthesis using the Ilizarov's apparatus, in 16 (14.7 %) — intramedullary

osteosynthesis with wires and in another 3 (2.8 %) cases was performed the intramedullary nailing.

All patients performed clinical, laboratory and instrumental (radiography, Doppler ultrasound, multislice computed tomography, roentgen densitometry) methods.

Results and discussion

Should be considered, it is necessary to assess the radiological signs and by the same way phased diagnosis of regenerative processes of refractures and to find out the period of occurrence of refracture with respect to the initial phase of primary fracture. Osteochondral regenerate in the area of the primary fracture in the period up to 3 months looks like cuff. In the case of re-fracture at the time and in the same place of cuff in the area of bone regenerate in the absence of careful attention on the chest X-ray can be diagnosed as a primary fracture. Maybe factor confirming the absence of the mechanism of injury in the study of life history of patients. Radiographic signs of refracture of cuff in area of bone regenerate after initial fracture depending on the stage of regeneration processes are characterized with different manifestations. Therefore, we decided to give some explanations of radiological manifestations of repeated fractures depending on the stage of reparative processes after the initial fracture. Thus, the shape of the fracture line and of bone fragments end surfaces undulating contours and rough and not smooth and sharp as primary fractures. The fracture line passes through the formed callus, dividing it into two parts, the ends of the calcification of bone fragments and through the fracture area passes blackish line than is characterized the repeated fracture.

Bone structure changes in refracture, the severity of which depends on the amount of periosteal callus forming, the state of the broken bones and pictures of the formed osteochondral regenerate after the primary fracture in segment. Form of callus is as cuff, in some cases, the secondary callus is located parallel to the cortex. If re-fracture occurs in the period of appearance of periosteal callus of reparation after the initial fracture and the radiological signs are distinctive, i. e. the cortex is flattened, thickened character and how verge towards to the fracture, the amount of cuff increases. In the area of primary fracture the periosteum is thickened as a "drawbridge" and the area after refracture has the character changes with the divergence of bone fragments from each other and diastasis between the fragments. In addition, to determine residual parts of callus (periosteal callus) under partitioned periosteal callus. Symptom "separation drawbridge" is mainly determined in the first phase (up to 3 months) of bone regeneration after the initial fracture, because in this period are already appeared as a full periosteal and paraossal callus. The callus layers are separated, the newly formed layer of callus is on top of the old callus and different plane with

unclear and irregular contours. The cortex is formed by the extension of the callus is smooth, as in the field of re-fracture cortical bone is filled with callus and cortical bone has lost its shape.

In children the difference of refracture from the primary concludes (by covering up) with callus of cortex. The appeared callus on the cortical surface have as partitioned form, which takes place in the period up to the third month of regenerative processes, i. e., in the stages of development periosteal callus. It is not difficult to put diagnosis for refracture in this period by X-ray data. On radiographs the callus in the field of the primary fracture reminds a conical shape and this shape is maintained in refracture, which is formed during periosteal callus.

Phasing regeneration is disturbed, it does not form a complete periosteal callus begins to dissolve periosteal callus and lost strength in the segment. On radiographs determined roughness of the fracture line.

Periosteal callus is white and had dissolving views, demonstrating due to resorption of the periosteal callus. The ends of the periosteal callus are obtuse and the ends of paraossal callus are acute. The cortex in the area of refracture thickened and hypertrophied due to paraossal and periosteal calluses.

In some cases, the phasing of regenerative processes is distributed, there is a early resorption of paraossal callus, which leads to disruption weakness. In this the minor repeated trauma is available to occur the refracture. In this period the periosteal callus is hypertrophied.

On radiographs determined the absence of endosteal callus, the resorption of paraossal callus that leads to weakness in the area of the fracture. Due to the re-injury may occur the refracture. At normal physiological regeneration process the forming of the callus proceeds in stages, one formed at the expense of other resorption. In some cases, the phasing is distributed, there are one-time resolution parameters, peri- and endosteal calluses and reduces healing field strength.

In the second period of regenerative processes observed complete resorption of periosteal and paraossal calluses it begins to dissolve the endosteal callus while was not formed the intermediate callus. As a result of re trauma occurs refracture. Radiographic signs show such as cortex thickened, rough contour inaccurate and therefore, determine the edges of the cortical layer is very difficult. In the field of refracture of the bone marrow sclerotic, pale and medullary canal appear as closed. Due to the rough calluses bone ends are not consistent with each other. At primary fracture the cortex is accurate, smooth and as repeated the line of fracture.

Conclusions:

1. To study the radiological signs facilitates the installation of the diagnosis, choice of the treatment and evaluation of the results.
2. By studying radiologic manifestations can stop the possible postoperative complications and reduce disability.

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Role of standard antibiotic therapy in Helicobacter pylori associated diseases of stomach in development of stomach MALT lymphoma

Abstract: The discovery of H.pylori and the proof of its leading role in the development of most of gastrointestinal diseases has radically changed the approach to their treatment. Chronic gastritis, peptic ulcer disease, gastric lymphoma associated with H. pylori infection require therapy aimed at killing microbes.The main reason for the ineffectiveness of current treatment program is based on a point mutation of the genome HP and uncontrolled use of modern antimicrobial drugs. Moreover, the literature contains no information on the role of long-term use of ineffective drugs in the occurrence of gastric neoplasms. This fact is the reason for further research in this area. Aim of this research to determine efficiency of antibiotic therapy in antibiotic-resistant forms of Helicobacter pylori in the development of malignancy MALT tumors in gastrointestinal tract. After the study we concluded that long-term use of antibiotics for resistant forms of HP besides ineffective against the disease, contribute to the development of local and general disturbances of the immune status. Availability treatment-resistant forms of HP accelerates proliferation and dysplasia, which leads to the development of neoplasms.

Keywords: MALT-lymphoma, helicobacter pylory, stomach neoplazms.

Helicobacter pylori — small, gram-negative, asporous, micro-aerophilic bacteria. Under the influence of the external environment, for example, a change in temperature or pH, long cultivation, Helicobacter pylori starts to change in coccal form. This may be due to the degenerative changes and the transition to an inactive phase, which favors its survival and could be an important factor in the epidemiology and spread of bacteria [1].

In coccal forms impaired enzymatic activity, and they lose their reproductive capacity, becoming resistant to antibacterial agents, they have created good conditions for preservation of bacteria in the bowels. Once in favorable conditions, such forms of H. pylori may be re-transformed into vegetative forms that can colonize in the gastric mucosa.

Helicobacter pylori has the ability to colonize, also it is able to protect themselves from the action of hydrochloric acid. It is equipped with a smooth cell wall — glycocalyx. Glycocalix makes bacteria non-susceptible to antibacterial agents and protects it from the host's immune response. Helicobacter pylori produce urease which neutralizes the hydrochloric acid in gastric juice that creates pH 7 environment around Helicobacter pylori.

In addition, the urease of H. pylori acts as a toxin that formed ammonium ion during the hydrolysis of urea. It damages epithelium which increases the inflammatory reaction by activation of monocytes and neutrophils, stimulation of cytokine secretion, formation of oxygen radicals and nitric oxide, moreover, large subunit urease (UreB) acts as an attractant for leukocytes [2].

There are two types of Helicobacter "stomach" — clinically important type is Helicobacter pylori (as well as H. acinonychis, H. baculiformis, H. bizzozeronii, H. cetorum, H. cynogastricus, H. felis, H. heilmannii, H. mustelae, H. salomonis, H. suis), «enterohepatic» (H. anseris, H. bilis, H. brantae, H. canis, H. canadensis, H. cholecystus, H. cinaedi, H. equorum, H. fennelliae, H. ganmani, H. hepaticus, H. marmotae, H. mastomyrinus, H. mesocricetorum, H. muridarum, H. pametensis, H. pullorum, H. rodentium, H. salomonis, H. trogontum, H. typhlonius).

More than 10 types of helicobacter are pathogenic to human body (H. pylori, H. heilmannii, H. cinaedi, H. fennelliae, H. bilis, H. pullorum, H. hepaticus, etc.).

The most clinically important type for human is — Helicobacter pylori, which according to modern ideas, related to many cases of stomach ulcers, gastritis, MALT tumors and gastric cancer.

The second most important type for human is H. Heilmannii. It usually causes antral gastritis.

According to many authors H.felis is a major factor in the development of gastric cancer. In particular, to address the conciliation meeting Maastricht IV (Part 3. "Preventing gastric cancer and other complications" statement № 1) "… Transgenic expression of IL-1β of gastric parietal cells leads to the spontaneous development of gastritis, mobilization suppressor cells of myeloid origin and dysplasia. Helicobacter felis infection leads to the progression of neoplasms".

In addition H. suis also associated with organic lesions of the stomach.

According to the molecular — genetic results, genome of Helicobacter pylori (strain 2965) contains 1,667,867 pair of nucleotides that determine the synthesis of about 1,500 proteins and includes genes, — cagA, vacA, iceA and babA associated with increased pathogenicity of microorganism.

Gene cagA or cytotoxin — associated gene (cytotoxin associated geneA) located in pathogenic island of PAI (pathogenic island) and encodes synthesis of protein — cagA 120 kD. Gene cagA presents not all strains of Helicobacter pylori. Formation of protein cagA associating with peptic ulcer disease, gastric cancer, lymphoma. After adhesion Helicobacter pylori, protein cagA transported to the stomach cells through the secretion system of type IV, which is also encoded pathogenic island.

In different situations the same Helicobacter pylori strain may express different pathogenicity, virulence, due to the genetic characteristics of the individual and the influence of environmental factors.

The reason for the lack of efficacy of many gastroduodenal diseases is increasing resistance to antibiotics of Helicobacter pylori (H. pylori), which is caused by mutations in different genes. The greatest practical importance 23S rRNA have mutations underlying resistance to clarithromycin. According to international consensus Maastricht-3 circuit with a proton pump inhibitor (PPI), clarithromycin and metronidazole is recommended as 1st line therapy.

The discovery of H. pylori and the proof of its leading role in the development of most of gastroduodenal diseases has radically changed the approach to their treatment. Chronic gastritis, peptic ulcer disease, gastric lymphoma associated with H. pylori infection require therapy aimed at killing microbes. In recent years there has been an increase of failures during the 7-day triple schemes of eradication therapy [1; 2; 3]. The main reason for them is the antibiotic resistance of H. pylori. The development of resistance of H. pylori to antibiotics is associated with point mutations of different genes.

Antibiotic resistance — a leading factor in unsuccessful treatment of first and second line. This explains why it is impossible to provide a standardized treatment which can be applied worldwide. In addition, stability is constantly changing due to the overuse of antibiotics to treat other diseases, and as a result of migration.

The widespread use of clarithromycin for the treatment of respiratory tract infections, especially in children, and metronidazole in gynecology and parasitic infections in the developing countries increased primary H. pylori resistance to the two antibiotics. Metronidazole resistance in some areas as high as 100 %. In developed countries, after studies, as a replacement of metronidazole and clarithromycin, fluoroquinolones proposed to which H. pylori still has a relatively low resistance.

Thus, a brief digression digestive information indicates failure of antibiotic eradication therapy in the treatment of resistant forms of HP.

Based on the literature review, we concluded that long-term treatment of resistant forms of HP insensitive antibiotics does not cure the underlying disease.

The main reason for the ineffectiveness of current treatment program is based on a point mutation of the genome HP and uncontrolled use of modern antimicrobial drugs.

Moreover, the literature contains no information on the role of long-term use of ineffective drugs in the occurrence of gastric neoplasms.

This fact is the reason for further research in this area.

Aim of the study: to determine efficiency of antibiotic therapy in antibiotic-resistant forms of Helicobacter pylori in the development of malignancy MALT tumors in gastrointestinal tract.

Material and metods

We studied 20 patients with diagnosis of tumor in the gastrointestinal tract, treated in the period of 2012–2015 years at the National cancer center of Uzbekistan and Tashkent city oncology center.

Age ranged from 25–69 years, with an average of 47.1 ± 0.4 years. The men were 14 (60.8 %), 6 women (39.2 %).

All patients had a history of repeated unsuccessful attempts to medical treat various forms of gastritis and/or peptic ulcer disease in different parts of the system of health care.

All patients on admission to hospital conducted comprehensive diagnostic studies, according to the "Standards of diagnosis and treatment of cancer patients," by Ministry of Health. For determining the HP used materials such as gastric juice, blood and biopsies blocks.

The diagnosis was verified by morfological and immunophenotypic study of biopsies. Helicobacter pylori determined by PCR. Resistance to HP determined by microbiological examination. Biopsies placed in containers such as "Eppendorf" with sterile 20 % glucose solution and stored prior to deliver to the laboratory conditions of the refrigerator at +4 °C. Within 2–4 hours gastrobioptats delivered to the laboratory for inoculation. Seedings processed in accordance with the method of cultivation [4].

For choosing, the question of determining discharged bacterial culture of Helicobacter carried on the basis of a characteristic morphology of isolated colonies, as well as a set of tests: morphology of culture in the smear, stained by Gram, and the presence of specific biochemical properties (the ability to produce urease). Typical cell H. pylori microscopy were kind of thin curved pale — pink sticks.

The resistance of H. pylori isolates studied using the limiting dilution method, which is based on the detection of the inhibition of microorganism growth on nutrient agar containing defined concentrations of antibiotics. Determines the sensitivity of H. pylori strains to clarithromycin, amoxicillin, levofloxacin, metronidazole and tetracycline. Working concentrations of these antibacterial drugs in the agar were as follows:

- amoxicillin — 0.25; 0.12; 0.06 g/ml;
- clarithromycin — 1.0; 0.5; 0.25; 0.12 g/ml;
- Levofloxacin — 2.0; 10; 0.5 ug/ml;
- Metronidazole — 16; 8; 4 ug/ml;
- Tetracycline — 2.0; 10; 0.5 ug/ml.

For adequate comparison of the results of the control group consist of 20 patients with chronic atrophic gastritis and 20 patients with gastric ulcer.

We examined all patients for detection of HP gastric juice.

Results and discussion

The first group consisted of 20 people, patients with gastric MALT lymphoma.

In all (100 %) of the patients by polymerase chain reaction for the detection of DNA of HP quality in real time is positive.

In the history of all patients conducted eradication treatment for HP. For a long time took antibiotics such as metronidazole, clarithromycin, amoxicillin.

By morphological picture of the tumor resembles visually dense infiltrate of small atypical, mostly dentritlike cells surrounding the "wide belt" pre-existing reactive follicles with light centers of breeding and propagating interfollicular. Tumor infiltration in most cases located in the mucosa. Often infiltrate seen sporadic reactive follicles that sometimes "stratify" the tumor cells. It is noted the presence of plasma cells and monocytoid B — cells.

Bacteriological analysis of 20 patients of 1st group in 11 (55 %) patients sensitivity to claritromycin was not observed. To metronidazol we observed a low sensitivity (+), sensitivity to amoxicillin was medium (++). For Tetracycline and levofloxacin the sensitivity was high (+++).

6 (30 %) patients in the first group to the low sensitivity of clarithromycin (+). To metronidazol and amoxicillin no sensitivity (–). Tetracycline, we observed an average sensitivity (++) and to levofloxacin high sensitivity (+++).

In 3 (15 %) patients in the same group for metronidazol and claritromitsin sensitivity was not observed. For the rest of the antibiotics: amoxicillin, tetracycline and levofloxacin sensitivity was moderate (++).

2nd group — 20 patients with chronic atrophic gastritis. The average age of 46.5 ± 0.9 years. Patients in this group had a history of chronic hyperacid gastritis. The duration of clinical symptoms until diagnosis is 6–12 months.

In all (100 %) 20 patients by polymerase chain reaction for the detection of DNA of HP quality in real time is positive.

The history of all who had eradication HP treatment. They took antibiotics such as metronidazol, clarithromycin, amoxicillin by the standard of treatment.

By endoscopic study on the background of atrophic gastritis were identified erosive lesions of the mucous membrane. Erosion different polymorphisms in endoscopic picture.

Morphologic study were found degenerative changes in the cells and dysgenerator surface epithelium, continuous inflammatory infiltration of the gastric mucosa and a decrease in the number of normal glands. The epithelium appear fundal cancer among the main and parietal cells. Also found elements of the "restructuring" of the mucosa.

Bacteriological analysis of 20 patients in 9 (45 %) patients to claritromitsin and metronidazol has low sensitivity (+), no sensitibility for amoxicillin (–). Tetracycline medium sensitivity (++) and high sensitivity to levofloxacin (+++).

6 (30 %) patients of the second group no sensitivity to clarithromycin, metronidazol and amoxycillin (–). Tetracycline and to levofloxatcin we observed high sensitivity (+++).

In 5 (25 %) patients in this group to claritromitsin, metronidazol, amoxicillin and levofloxacin sensitivity was low (+) and tetracycline sensitivity was moderate (++).

3rd group — 20 patients with stomach ulcer. The average age of 46.5 ± 0.9 years. Patients in this group had a history of chronic hyperacid gastritis.

20 (100 %) of 20 patients by polymerase chain reaction for the detection of type DNA HP quality in real time is positive.

The history of all had eradication HP treatment, antibiotics such as metronidazol, clarithromycin, amoxicillin.

Morphologic study was a single ulcer, which has an oval or round in shape and size from a few millimeters to 5–6 cm. Ulcer penetrated the stomach wall at different depths reaching sometimes up to a serous layer. Edge sores facing the esophagus, some implied, and the mucous membrane hangs over the defect. The edge facing the gatekeeper, flat, looks like terraces, steps which are formed by layers of walls — mucosa, submucosal and muscular.

Bacteriological analysis of the 20 patients — 13 (65 %) patients to clarithromycin, metronidasol had an average sensitivity (++) to amoxicillin, tetracycline, and to levofloxacin observed high sensitivity (+++).

In 3 (15 %) patients of the third group to clarithromycin and metronidazol had a high sensitivity (+++). To amoxicillin, tetracycline and levofloxacin observed mild sensitivity (++).

In 4 (20 %) patients in this group to claritromicin, amoxicillin, tetracycline and levofloxacin has high sensitivity (+++). Metronidazol, we observed a low sensitivity (+).

Conclusions

1. Long-term use of antibiotics for resistant forms of HP besides ineffective against the disease, contribute to the development of local and general disturbances of the immune status. Availability treatment-resistant forms of HP accelerates proliferation and dysplasia, which leads to the development of neoplasms.

2. Antibiotic-resistant form of HP, unlike other forms of family HP, a chemical mutation may increase the pathogenicity.

3. Antibiotic-resistant form of the HP continuously irritate lymphatic tissue and the use of eradication therapy in non-susceptible strains of HP causes an allergic reaction of the mucous membranes and lymph tissues of the gastrointestinal tract. This reduces the barrier protection of the stomach wall and HP directly stimulates lymphatic layer.

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Surgical treatments herniated disc of the lumbar spine in elderly and senile

Abstract: The article presents the data of examination and surgical treatment of 118 patients with herniated lumbar spine in elderly persons. The contingent of patients aged 60 to 85 years. In the preoperative period conducted clinical neurological and instrumental methods of research using X-ray, CT, MRI. The results of surgical interventions (arcotomy + discectomy —

13 patients hemilaminectomy + discectomy — 105 patients), good results were obtained in 83 (70.3 %), satisfactory 31 (26.2 %) and unsatisfactory in 4 (3.5 %) patients. The findings indicated that in elderly and senile pathological process is polysegmental character. Good results were achieved during hemilaminektomic access surgical procedures.

Keywords: osteochondrosis, degeneration, arcotomy, hemilaminectomy, discectomy.

Introduction

Osteochondrosis of the lumbar spine are most frequent pathology and its main manifestations are considered various neurological disorders. Efforts orthopedists and neurosurgeons in the treatment of patients with lumbar osteochondrosis address the radicular disco, disco-Vascular conflicts [1; 4; 10; 11]. Although there are different ways of surgery, with herniated disc to date there is no common approach to the definition of indications and choice of interventions volume [2; 3; 9; 15]. In today's medical world problem of treatment of patients in elderly is of particular medical and social ethical significance [5; 6; 8; 13]. The urgency of this problem is an adequate assessment of the pathology, the complexity of its differentiation from natural ivolyutivnyh changes, and selecting the optimal method for the treatment of established diseases [7; 12; 14]. Please note that in the elderly the risk of surgery is much higher. So far there is no consensus in the choice of tactics of treatment of degenerative diseases of the lumbar spine, particularly in elderly individuals. There are currently a large number of surgical treatment of degenerative spine lesions methods [4; 7; 10; 15].

According to Simanovich's information, the patients with lumbar vertebral osteochondrosis compose 16 % of all patients who addressed medical staffs. Most of them had complications. Clinic of lumbar vertebral osteochondrosis, its course of neurologic complications are a little different in patients old and advanced ages. There were not much spoken about diagnostics and surgical treatment of old and advanced patients in literature and is considered as one of the most vital problems nowadays.

The aim of the research work — to treat lumbar vertebral osteochondrosis of old and advanced aged patients surgically and to determine the basic properties of preparing it for the operation and to prevent possible problems that can be met during the operation and post operation time.

Age-related changes in the lumbar spine degenerative are accompanied by changes that may lead to the development of pathological conditions requiring an adequate surgical treatment [1; 7].

Materials and Methods

We observed in the neurosurgical clinics of ASMI department from 2008 to 2012. there were 118 patients of elderly and senile patients with lumbar osteochondrosis complicated by herniated intervertebral discs. The patients' age from 60 to 87 years. The greatest number of patients were between the ages of 60 to 75 years — 85 (72.0 %). The allocation of the men on the floor — 66 (55.9 %) and women — 52 (44.1 %).

The disease duration from 3 months to 15 years. Of the 118 patients examined the occurrence of disease and its first symptoms associated with heavy physical labor 69 (58.4 %) and one-off physical overload 26 (22.4 %) patients. The remaining 23 (19.4 %) patients the occurrence of disease associated with inflammatory processes.

Neurological examination of patients with the disco-radicular conflict manifested itself in the form monoradikulyarnogo syndrome in 75 (63.5 %) patients, biradikulyarny syndrome in 43 (36.4 %) patients. Most often they suffered L4 – L5 – S1 roots. From the roots of tension symptoms symptoms Lassega investigated, spondylitis, and Neri. Thus Lassega symptom was noted in 85 (72.0 %) patients, ankylosing symptom in 56 (47.4 %) patients and Neri symptom in 68 (57.6 %) patients. Violations of the sensitivity is usually observed in the area of pain — hypoesthesia. Almost all observations have been marked changes in tendon reflexes — knee and Achilles. The phenomena of paresis of the foot on the affected side were noted in 23 (19.4 %) patients and dysfunction of the pelvic organs in 7 (5.9 %) patients.

X-ray examination of all 118 patients were identified spondylograms signs of osteochondrosis in various stages of development, the triad Bar. Of the 118 patients 109 (92.3 %) patients were performed MRI and CT studies. MRI and CT studies revealed the characteristic signs of herniation of intervertebral discs in the sagittal and axial planes T1 and T2 mode, the state of the epidural space, the size and the direction of deposition of the intervertebral disc, the degree of compression of the dural sac and the spine. Dimensions of hernias of intervertebral disks were from 8 mm. to 15 mm. In 76 (64.4 %) cases were left-sided hernia in 28 (23.7 %) cases, the right-handed and 14 (11.6 %) cases were located mid hernia. Polysegmental herniation on MRI study were identified in 98 (83.0 %) cases on 2 levels — 69 patients (58.4 %) and 3 levels of 29 patients (24.5 %). In identifying MRI polysegmental hernias of intervertebral discs, the removal was performed if their size is greater than 8 mm.

After diagnosis, the patients were subjected to surgical treatment. Minimally invasive surgical interventions were carried out by arcotomy and hemilaminectomy. At the same time we take into account the size of the disk has fallen, its relationship surrounding nerve structures, the severity of degenerative changes of the spine and the age of patients. In addition, the presence of lesions polysegmental adjacent disks as used by hemilaminectomy access.

Of the 118 patients surveyed arcotomy was performed in 13 (11.0 %) cases and 105 (88.9 %) cases hemilaminectomy. In all cases, it was noted hypertrophy of the yellow ligament and economical removal after the last audit made of the spinal canal. After hernia detection produced the mobilization of the dural sac, spine and proceeded to discectomy. Technical difficulties with discectomy appeared at larger sizes hernias (12 to 15 mm.), due to the presence of scars between the dural sac, spine and hernia. In these cases, discectomy was performed 2-stage — first made the removal of herniated disc between the dural sac and the spine, and then made the mobilization of these entities, and the complete removal of a hernia. In 97 (82.2 %) cases, discectomy was completed foraminotomy due to narrowing of the places of the spine bone formations — osteophytes.

Results and discussion

Evaluation of surgical procedures performed on the basis of the results of orthopedic and neurological criteria. At the same time we take into account the regression of neurological symptoms and the restoration of the biomechanics of the damaged segment of the spinal column.

Good results — the disappearance of pain, restoration of sensitivity, motor activity and disturbed functions of the pelvic organs — were noted in 83 (70.3 %) patients.

Satisfactory results — saving blurred pain in the spine during movement and physical activity, slow regression of neurological symptoms — in 31 (26.2 %) patients.

Unsatisfactory results — saving motor and pelvic disorders in the pre-operative level, although there is a decrease of pain due to decompression of nerve structures — 4 (3.3 %) patients.

Conclusions:

1. According to the X-ray, CT and MRI studies indicated that patients with middle and old age is a characteristic type of lesion polysegmental vertebrae and intervertebral discs;

2. The correct choice of surgical approach based on neurological disorders and on the basis of MRI studies of patients with herniated discs promotes earlier restoration of the biomechanics of the spine and the regression of neurological symptoms.

3. We believe that patients elderly optimal surgical approach to the vertebral canal is hemilaminectomy that gives complete decompression of the dural sac and the spine.

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Evaluation of the results of treatment in patients with locally common forms of ovarian cancer in Andijan Regional Oncological Dispensery

Abstract: The article deals with the treatment and the results of a locally common forms of ovarian cancer. The study included registered in Andijan Regional Oncological Dispensery histologically verified patients with ovarian cancer. The purpose of this section of our study is to evaluate the effectiveness of various schemes of neoadjuvant chemotherapy in combined treatment of patients with locally advanced ovarian cancer. Also, long-term treatment results are obtained depending on the different schemes poliochemotherapy.

Keywords: ovarian cancer, locally common forms of ovarian cancer, neoadjuvant chemotherapy, adjuvant chemotherapy, drug, treatment.

The main part of the malignant ovarian tumors constitute epithelial neoplasia, which at the time of diagnosis already have a common form of the disease [1].

Despite the use of different variants of combined and complex treatment, long-term results remain unsatisfactory. Little studied problems remain to study the role and place of neoadjuvant and adjuvant chemotherapy in combined treatment of ovarian cancer (OC) [2; 3].

Standard treatment in recent years is the use of platinum drugs in combination with other cytostatics. The data obtained in this matter are contradictory and differ from each other depending on the circuit and the chemotherapy regimen [4; 5].

The emergence of new drugs had an impact on results of treatment of ovarian cancer, especially in locally advanced form. This is confirmed by the statistics of the American Cancer Society, showed an increase in 5-year survival in ovarian cancer with 30 % in the 60s to 50 % in the 90s [6; 7].

The aim of the research — to improve the results of treatment of patients with locally common forms of OC in terms of Andijan Regional Oncological Dispensery (AROD).

Materials and methods

We studied the incidence of ovarian cancer based on age in the Andijan region, which were registered in AROD. All outpatient card accounts of patients with OC from 2013 to 2015 inclusive were investigated. For 3 years it was taken on account of 169 patients with OC, but with locally advanced forms of OC have held 44 (26 %) patients. The results of their own research in the years 2013–2015 with AROD happened rejuvenation of OC in the Andijan region, compared with the data for 20 years, when the bulk of this disease was old age. The highest incidence rates are observed in the older age groups. The allocation of patients over the age of most of them were between the ages of 41–50 years 44 patients (28 %), 51–60 years, 39 patients (26 %) and older than 60 years — 45 patients (30 %).

As can be seen from the chart, with rate incidence at 41–50 years — 44 patients (28 %) and older than 60 years — 45 patients (30 %), which amounted to (58 %). The lowest rates were in 17–30 years, 19 patients (6 %) and 31–40 years, 23 patients (10 %), which amounted to (16 %). Up to 20 years, the probability of OC is very low.

Results and discussion. To conduct this study, all the selected patients had locally advanced form of OC and were divided into groups depending on the treatment carried out by them. The first group consisted of 21 (47.7 %) and the second (control) group of 23 (52.3 %) of patients with OC. All patients had locally advanced form, which reacted III stage of the process. All patients underwent ultrasound study and computed tomography. Each group of patients were divided into two groups according to the treatment.

Patients I[th] A subgroup consisting of 10 persons (22.4 %) had a laparotomy with biopsies followed rate poliochemotherapy (PCT) scheme ATS, which is a combination of cisplatin at a dose of 75 mg/m^2 intravenously (w/w) at 1 day, doxorubicin — 40.0 mg/m^2/day at 1 and cyclophosphamide — 600 mg/m^2/day at 1.

I B subgroup of patients consisted of 11 persons (25 %) received cytoreductive surgery + ATS PCT scheme, which is a combination of cisplatin at a dose of 75 mg/m^2 intravenously (w/w) at 1 day, doxorubicin — 40.0 mg/m^2 in/in 1 day and cyclophosphamide — 600 mg/m^2/day at 1.

Patients II A subgroup consisted of 10 people (22.4 %) was conducted laparotomy + carboplatin — 450 mg. per day + 1 cc (paclitaxel) (175 mg/m^2) + cc + progesterone scheme THT.

Patients II B subgroup consisted of 13 people (29.5 %) was performed cytoreductive surgery + carboplatin — 450 mg. per day + 1 cc (paclitaxel) (175 mg/m^2) + cc + progesterone scheme THT.

After the treatment, we observed long-term results of our patients survival in months (Table 1).

Table 1. – Survival rates by month depending on prognostic factors of patients receiving chemotherapy according to the scheme

Survival Months	Group I (21 man – 47.7 %)		II group (23 man – 52.3 %)	
	I (A) 10 (22.4 %)	I (B) 11 (25 %)	II (A) 10 (22.4 %)	II (B) 13 (29.5 %)
6–12	7 (15.9 %)	6 (13.6 %)	3 (6.81 %)	3 (6.81 %)
13–24	3 (6.81 %)	4 (9.09 %)	5 (11.4 %)	6 (13.6 %)
25–36	–	1 (2.27 %)	2 (4.54 %)	4 (9.09 %)

Analysis of the data shows that the 1-year mortality in group I was — 13 (29.5 %), while it turned out much lower than in group 2 deaths within 1 year, which amounted to 6 (13.62 %) patients.

By comparing the 3-year survival of patients in group 1 received treatment scheme cytoreductive surgery + ATS PCT scheme, which is a combination of cisplatin at a dose of 75 mg/m^2 intravenously (w/w) at 1 day, doxorubicin — 40.0 mg/m^2/in 1 day and cyclophosphamide — 600 mg/m^2/day in 1 to 3 years survived only 1 (2.27 %) patients, where as in the 2 (control) patients in the treatment group with the circuit cytoreductive surgery + carboplatin — 450 mg. cc 1 day + paclitaxel — 175 mg/m^2 cc + progesterone + scheme THT survived to 36 months in 6 patients, which accounted for 13.63 %.

Conclusions:

1. Taking into account the age of the patients registered in AROD for 2013–2015 year, we found that the peak incidence of locally advanced forms of OC accounts for premenopausal and menopausal periods, age was 41–50 years (28 %) and older than 60 years (30 %). The total number was (58 %).

2. Carrying out the treatment in patients with locally OC scheme cytoreductive surgery + II line chemotherapy with carboplatin scheme — 450 mg. cc 1 day + paclitaxel — 175 mg/m^2 cc + progesterone + scheme THT survival was much higher 6 (13.63 %) patients, while in group 1 patients received treatment scheme cytoreductive surgery + ATS PCT scheme, which is a combination of cisplatin at a dose of 75 mg/m^2 intravenously (w/w) at 1 day, doxorubicin — 40.0 mg/m^2/day at 1 and cyclophosphamide — 600 mg/m^2/day in 1 to 3 years survived only one patient (2.27 %). It follows that the benefit of treatment with locally OC forms use 2 lines of chemotherapy with endocrine therapy and THT ovarian cancer has a positive effect on the long-term survival of patients.

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Microscopic and biochemical bile structure in acute viral hepatitis «C» convalescent children

Abstract: We have revealed microscopic and biochemical disorders in the bile of children recovering from acute VHC, namely, the higher levels of mucus and cylindrical epithelium, leucocytoids and crystals that indicate the presence of inflammatory phenomena in the mucous membranes and contribute further to gallstone disease development.

Keywords: viral hepatitis C, bile, cholesterol crystals, microliths, microscopic and biochemical structure of bile.

Relevancy

In the Republic of Uzbekistan, viral hepatitis morbidity tends to decrease dynamically. In 2010, in comparison with 1990, the total viral hepatitis morbidity decreased in 8.2 times and made 107.7 against 882.0 per 100 thousand population. In 2010, in comparison with 2009, viral hepatitis decreased by 18.6% [1; 2].

One of the problems related to viral diseases of the liver is development of dysfunctions of the bile excretory system after acute viral hepatitis [3; 4–8]. It necessitates application of laboratory methods of examination enabling to reveal and correct the disorders of functions of the organs of the hepatobiliary system at early stages.

Thereupon, **the research objective** was: to study changes in the indicators of microscopic and biochemical structure of the bile of children recovering after acute viral hepatitis C (rVHC) with pathology of the biliary system.

Materials and methods

The clinical part of the research was conducted in the period from 2009 to 2015 at the Children Infections Unit of the 3rd hospital of Tashkent Medical Academy, Tashkent-city consultative and diagnostic hepatologic centre at the 1st clinical infectious hospital, the hepatologic unit at the Scientific Research Institute for Virology and the children hepatitis unit at the Scientific Research Institute for Epidemiology, Microbiology and Infectious Diseases.

Thirty two rVHC children with pathology of the biliary system have been included in the research.

The indicators of 20 rVHC children without pathology of the biliary system were used for comparison; the control group consisted of ten apparently healthy children with similar indicators' values.

The diagnosis of viral hepatitis was made on the basis of Uzbekistan MoH's order No 5 of January, 5, 2012 "On measures on perfection of struggle against viral hepatitis in the country".

The biliary system pathology (reactive cholecystitis, cholangitis, residual hepatomegaly) was verified by the results of routine clinical tests, biochemical tests of blood, instrument examination methods (ultrasonic examination of the abdominal cavity, duodenal probing), microscopic and biochemical examinations of the bile structure.

The bile acids' spectrum was determined by thin-layer chromatography by A.I. Ivanova's method (1973). The analysis of bile biochemical structure included identification of such key bile components as bilirubin, cholesterol and bile acids with determination of the cholatocholesterol coefficient (HHC). Bilirubin in the bile was determined by Skakun N.P. (1982) method, its concentration (in mg.%) was calculated by the gauging curve made with a bilirubin standard solution. The spectrum of bile acids was also determined in the bile.

Results of the research and discussion

Among rVHC children with the biliary system pathology, children at the age of 7–14 years prevailed (65.6%).

The results of the bile microscopic structure analysis are presented in table 1.

As Table 1 shows, children of the basic group have bile in all the bile portions (81.3%, 75.0%, 62.5%, accordingly), that demonstrates the presence of inflammatory process.

In all children of the study group, all bile portions had cylindrical epithelium, as well as leucocytoids exceeding 10 in the field of vision that suggests development of the inflammatory phenomena in the BET mucus.

In rVHC children with BET pathology, crystals of cholesterol and calcium bilirubinate were found in all portions of bile in a high percentage of cases (71.8%, 84.4%, 68.7%, accordingly). This indicates that in children of the basic group, the risk of development of gallstone disease (GSD) is high. High frequency of microlith identification (78.1%, 84.4% and 43.7 in portions of bile A, B and C%, accordingly) also proves to be true.

Studying the biochemical structure of bile was the next investigation step. The results of the study are presented in table 2.

As Table 2 shows, in children of the basic group, significant disorders of bile biochemical structure (P < 0.05) in comparison with children of other groups were registered. For instance, due to impairment of bilirubin synthesis children of the basic group demonstrated an expressed decrease in the level of bilirubin in bile (5.0 ± 0.5 mg/%) and bile acids (148.0 ± 11.0 mg of %) and, hence, an increase in the values of cholesterol (90.0 ± 6.5 mg.%) was registered. Thereof, a decrease in HHC was registered.

In addition, in children of the basic group, a significant decrease in bile acids value of GDC and TDC as well as an increase in GC and TC indicators were registered.

It is necessary to notice that in all indicators of bile acids, the ratio of conjugates of bile acids with glicine and taurine has made 3:1. It indicates that the principal value has not so much the type of conjugation with glicine or taurine, but rather the ratio of hydrophilic (GDC, TDC) and hydrophobic (GC and TC) bile acids.

Conclusion

Thus, we have revealed microscopic and biochemical disorders in the bile of children recovering from acute VHC, namely, the higher levels of mucus and cylindrical epithelium, leucocytoids and crystals that indicate the presence of inflammatory phenomena in the mucous membranes and contribute further to gallstone disease development. For instance, one more provoking factor of gallstone disease development was impairment of bilirubin synthesis which consequence was an increase in the cholesterol level, glycocholic and taurocholic acids. The revealed disorders dictate expediency of selection of corresponding therapeutic treatment to prevent the late consequences in the form of cholecystitis, gallstone disease, etc.

Table 1. – Microscopic structure of bile at children rVHC

Type	Apparently healthy (n = 10)		rVHC with the GBS pathology (n = 32)		rVHC with no GBS pathology (n = 20)	
	Abs.	M + m	Abs.	M + m	Abs.	M + m
Portion A						
Mucous	–	–	26	81.3 ± 6.8	3	15 ± 7.9
Cylindrical epithelium	1	10 ± 9.4	32	100	10	50 ± 11.2
Leucocytes in the field of vision <10	1	10 ± 9.4	–	–	9	45 ± 11.2
Leucocytoids in the field of vision >10	–	–	32	100	11	55 ± 11.1
Chiolesterol crystals	–	–	23	71.8 ± 7.9	3	15 ± 7.9
Ca bilirubinate	–	–	25	78.1 ± 7.3	2	10 ± 6.7
Microliths	–	–	25	78.1 ± 7.3	4	20 ± 8.9
Portion B						
Mucous	–	–	24	75 ± 7.6	3	15 ± 7.9
Cylindrical epithelium	1	10 ± 9.4	32	100	6	30 ± 10.2
Leucocytes in the field of vision < 10	1	10 ± 9.4	–	–	3	15 ± 7.9
Leucocytoids in the field of vision > 10	–	–	32	100	17	85 ± 7.9
Chiolesterol crystals	–	–	27	84.4 ± 6.4	5	25 ± 9.6
Ca bilirubinate	–	–	27	84.4 ± 6.4	5	25 ± 9.6
Microliths	–	–	27	84.4 ± 6.4	5	25 ± 9.6
Portion C						
Mucous	–	–	20	62.5 ± 8.5	2	10 ± 6.7
Cylindrical epithelium	1	10 ± 9.4	32	100	8	40 ± 10.9
Leucocytes in the field of vision < 10	1	10 ± 9.4	–	–	4	20 ± 8.9
Leucocytoids in the field of vision > 10	–	–	32	100	16	80 ± 8.9
Chiolesterol crystals	–	–	22	68.7 ± 8.1	7	35 ± 10.6
Ca bilirubinate	–	–	14	43.7 ± 8.7	4	20 ± 8.9
Microliths	–	–	14	43.7 ± 8.7	6	30 ± 10.2

Table 2. – Biochemical structure of bile in rVHC children

Indicators	Bilirubib (mg. %)	Cholesterol (mg. %)	Bile acids (mg. %)	HHC (cond. units)	GDC	GC	TD C	TC
rVHC with pathology BET (n = 32)	5.0 ± 0.5*	90.0 ± 6.5*	14.,0 ± 11.0*	1.64 ± 0.10*	32.4 ± 0.8*	46.6 ± 1.5*	7.7 ± 0.2*	13.3 ± 0.2*
rVHC with no pathology BET (n = 20)	12.0 ± 0.4*	50.0 ± 4.0	222.0 ± 10.5*	4.44 ± 0.15*	46.0 ± 1.8	27.4 ± 1.4	18.7 ± 0.6	7.9 ± 0.5*
Apparently healthy (n = 10)	14.5 ± 0.5	46.8 ± 3.5	254.0 ± 9.8	5.4 ± 0.10	49.2 ± 2.5	26.7 ± 1.3	20.0 ± 0.8	4.1 ± 0.4

*Note: * — significant against the values in healthy children ($p < 0.05$).*

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Descriptiveness ray method in the diagnosis of tuberculous spondylitis

Abstract: The use of CT and MRI opened up new possibilities in the diagnosis of tuberculosis spondylitis; CT and MRI are highly effective in the detection of spinal cord compression in patients with tuberculosis spondylitis. The diagnostic efficacy of CT — 98.1 %, MRI — 100 %. MRI is more effective in determining the extent of compression (100 %) and is the only method of visualization of changes in the spinal cord.

Keywords: computed tomography magnetic resonance imaging tuberculosis spondylitis.

Osteoarticular tuberculosis is one of the leading TB problems. In the structure of the localization of osteoarticular tuberculosis of the spine is stable and ranked first is 70–75 %. Violation of the support function of the spine, the formation of abscesses, the incidence of neurological disorders of varying severity, diagnosis and adequate treatment delay cause the severity of disease and a high level of disability of patients from 40 to 50 [1].

The similarity of clinical and radiological picture with different etiology spondylitis causes diagnostic difficulties in verification of the diagnosis. In this regard, relevant is the early and timely diagnosis of tuberculosis spondylitis using modern radiation techniques [2; 3].

Implementation possibilities of modern surgery in tuberculous spondylitis is largely dependent on timely, accurate visualization of the pathological process and the correct assessment of the results of surgical interventions. So far evaluation of the effectiveness of surgical treatment of spinal tuberculosis was carried out by X-ray, which does not give a complete picture of bone regeneration and transplantation, does not detect the changes in the spinal cord and its membranes, which are the cause of spinal disorders after surgery. Implementation possibilities of modern surgery in tuberculosis spondylitis is largely dependent on timely, accurate visualization of the pathological process and the correct assessment of the results of surgical interventions. So far evaluation of the effectiveness of surgical treatment of spinal tuberculosis was carried out by X-ray, which does not give a complete picture of bone regeneration and transplantation, does not detect the changes in the spinal cord and its membranes, which are the cause of spinal disorders after surgery.

In the last decade, significantly increased the level of radiation diagnosis in identifying the causes of spinal disorders of various origins. The technique of contrasting the subarachnoid space of the positive water-soluble agents — Contrast myelography (KMG). The advent of magnetic resonance imaging (MRI), computed tomography (CT) has opened up new possibilities in the diagnosis of complicated and uncomplicated forms tuberculosis spondylitis.

In this regard, the aim of this study was: to study the role of radiation diagnosis in detecting tuberculosis spondylitis and causes of spinal disorders.

Materials and methods

We have analyzed the medical records of 140 patients with tuberculous spondylitis treated in osteo-articular branch of Republican Specialized Scientific Practical Medical Center Phthisiology and Pulmonology.

Among the studied patients with tuberculosis of bones and joints (TKSS) by age of the main indicators were persons from 18 to 55 years. Of these men have made — 80 (57.1 %) patients, women — 60 (42.9 %).

For the purpose of interpreting the clinical and radiological changes in the spine, taking into account the localization process, all the patients were divided into the following groups: the thoracic spine tuberculosis — 31 (22.1 %), with the thoracolumbar spine tuberculosis — 25 (17.9 %) with lumbar spine tuberculosis — 48 (34.3 %) with sacral spine tuberculosis — 18 (12.9 %).

In terms of the distribution of vertebral lesion patients was as follows: the defeat of a specific process 2 vertebrae was detected in 30 (21.4 %) patients, lesions specific process 3 vertebrae — in 51 (36.4 %), defeated by 4 to 6 — 53 (37.9 %) and 6 (4.3 %) loss of more than 6 vertebrae. It should be noted that the prescription of a pathological process in the spinal column, it was 1 in 68 (48.6 %) patients, aged 2 — 36 (25.7 %), up to 3 years — 19 (13.6 %) and higher 3 years — in 17 (12.1 %) cases.

In 132 (94.3 %) patients underwent radical surgery, restorative nature. The diagnosis of "tuberculosis spondylitis" confirmed histological and bacteriologic in 132 (94.3 %) patients; the remaining 8 (5.7 %) cases — clinical – X-ray laboratory confirmation.

In the preoperative period of observation in 125 (89.3 %) patients set paravertebral, presacral, epidural, psoas abscess and fistula, and often in large numbers. Bone grafting in the main process performed in all patients operated on. At the same time, 56 (42.4 %) patients used grafts taken from the rib (from 2 to 4 pieces) in 70 (53.0 %) used from the iliac crest, and in 6 (4.5 %) used in the fibula In 132 (94.3 %) patients underwent radical surgery, restorative nature. The diagnosis of "tuberculosis spondylitis" confirmed histologically and bacteriologically in 132 (94.3 %) patients; the remaining 8 (5.7 %) cases — clinical – X-ray laboratory confirmation.

The study of the characteristics of pain symptoms in the patients examined, and their frequency are as follows: the most common and long-standing symptom was pain at rest in 75 (53.6 %) patients, with a load of pain in 140 (100 %), limitation of motion in 72 (51.4 %) patients. Total pronounced pain syndrome was observed in 23 patients, pain in the affected spinal tuberculosis at 69, girdle pains on intercostal space in 27, radicular pain radiating to the lower extremities, 16 epigastric pain and right upper quadrant in 38 patients.

Among the new cases 40 (28.6 %) patients were sent to ftizio-orthopedic department of surgical departments general health, which were carried out in terms of different surgical procedures. clinical picture of erosion has led to the erroneous diagnosis and long-term treatment of these patients (1 to 5 years) about nontuberculous etiology.

An analysis of your material showed that the percentage of erroneous interpretation of the results of radiation survey tuberculosis spondylitis in the early stages is still large, dominated by late diagnosis of tuberculosis spondylitis. In 96.0 % of cases, the process has been revealed during the height of spondylitis in 33.0 % on developed neurological disorders. The most common process involved 2–3–4–5–6 vertebra.

Infiltration in the spinal canal were detected in 45 (32.1%) patients. Radiographs abscesses are well identified in the thoracic spine, where they are seen against the backdrop of the air of the lung tissue. Retroperitoneal abscesses were detected by indirect signs of expansion m.iliopsoas major circuits, when they reached a considerable size. It was impossible to see the abscess of the soft tissue of the back and small paravertebral abscesses in the lumbar spine.

The contours of abscesses and their relationship with the surrounding organs at radiographs and tomograms could not always identify. CT and MRI are equally well detected abscesses, their cameras, relations with the vertebrae and surrounding organs and tissues, especially after the internal contrast. At an early stage of formation of an abscess was observed infiltration of fat around the body of a vertebra. MRI advantage — the ability to study that reveals abscesses relations not only with the surrounding tissues, and their connection with each other. Comprehensive assessment of bone structure changes detected on rentge-notomogramma and CT scan, and pathological changes in the MRI signal, gave an idea of the morphological changes in the spinal column and tuberculous spondylitis phase.

Conclusions

The use of CT and MRI opened up new possibilities in the diagnosis of tuberculosis spondylitis; CT and MRI are highly effective in the detection of spinal cord compression in patients with tuberculosis spondylitis. The diagnostic efficacy of CT — 98.1%, MRI — 100%. MRI is more effective in determining the extent of compression (100%) and is the only method of visualization of changes in the spinal cord. The use of CT and MRI in the postoperative period allows to obtain objective criteria for evaluating the effectiveness of surgical treatment and to determine further treatment policy.

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Preclinical studies of neutron capture therapy effectiveness in the treatment of malignant tumours, at the nuclear reactor HVR-SM INP AS of RUz

Abstract: Developed for treatment of radio resistant malignant tumors the Gadolinium neutron capture therapy (GdNCT) is based on the nuclear capture and reactions that occur when 155Gd and 157Gd, which are non-radioactive constituents of natural elemental gadolinium, are irradiated by thermal neutrons with low energy, In this article, results of scientific researches on development GdNCT in Uzbekistan are presented. The beam of epithermal neutrons with characteristics satisfying the all requirements of IAEA was received. As gadolinium delivery agent the well-known pharmacological preparation Magnevist was chosen. For absorbed dose calculation, the Magnevist pharmacokinetics was studied after intratumoral injection in mice and intramuscular injection in rats. Results of researches of influence epithermal neutrons beam on binding ability of transport proteins of human blood, on tumor cells C-180 at mice and on surgical material of human stomach adenocarcinoma are presented. Planned scientific researches with application of this beam in Uzbekistan are summarized.

Keywords: Neutron capture therapy, oncology, radiology, reactor, neutron.

Currently, there is a significant increase of human life expectancy in average associated with the intensive development of scientific and technological progress and improving of life quality. This phenomenon has caused increasing incidence of cancer pathology [3].

The World Health Organization (WHO) had concluded that one of five people on the planet is dying from cancer, after analyzing the situation in the world. WHO predicts anincreasing tends of mortality from cancer in 2020, which may be more than 12 million people and exceeding the total deaths from tuberculosis, malaria and HIV infection [5; 7; 8].

One of the most effective treatments of malignant tumors is radiotherapy in different types and about 70% of cancers patients are need it [2].

An actual problem of modern oncology is the problem of the electoral lesion of the tumor, which can be solvedby the method of neutron capture therapy.

Neutron capture therapy is based on the irradiation flux of epithermal neutron fluxes in conjunction with the administration of drugs (containing boron, gadolinium) selectively accumulate in tumors, which occur in the interaction of the nuclear reaction with the release of large amounts of energy [6]. This method providesconformality — maximal biological effects to the tumor, with minimal impact on normal tissues surrounding the tumor.

After the modernization of one of the horizontal channels of research nuclear reactor HVR-SM INP AS of RUz allowedfrom energy spectrum of reactor neutron pick out he flux of epithermal neutrons highlights with characteristics suitable for the development of NCT method [1; 4].

Due to the absence of unified equipment — each channel — collimator has a specific range of neutron fluxes and there is no any unifiedmethodology for neutron capture therapy. Therefore, there arenumber of problems to solve researchers for development of this technique: from the creation of the therapeutic beam irradiation to develop a methodology in this beam [1; 4].

The aim of our study was to develop a technique of neutron capture therapy in the treatment of experimental tumorstrains using gadolinium-containing drug Magnevist at a nuclear reactor of INP Uzbekistan.

Materials and methods

We have performed three series of experiments on male outbred mice, weighing 17–40 g. at the age of 4 months. Experiments have been conducted under the European Convention for the Protection of Vertebrate Animals used for Experimental and other Scientific Purposes (EuropeanCouncil, Strasburg 2004). All mice were kept in a vivarium, bait pellets and had free access to water. The animals were under daily observation, special attention when assessing the overall state of the mice, was directed on: locomotor activity, feeding activity and drinking, grooming (cleaning), body weight.

Sarcoma tumor strain C-180 was grafted to the right thigh, with the principles of antisepsis. Experiments were performed on 20th day after tumor inoculation.

The pharmacokinetics of drug was pre-studied on inoculated with tumor mice. Due to it, mice were subjected to fixation, followed by intratumoral administration of gadolinium-containing drug Magnevistwhich hasan x-ray contrast property. Pharmacokinetic study was performed on X-ray diagnostic apparatus firm Siemens, by registering Magnevist circulation time through the body. Average tumor volume was 135 mm^3. The drug was administered in strict center of the tumor. The maximum drug concentration in the tumor is registered immediately after administration. T ½ is registered at 6.5 minutes after administration. After 15 minutes the drug is mainly accumulated in the kidney and partly in the liver, in lungs and heart.

Total radiation of mice were occurred on the ninth horizontal channel of research nuclear reactor HVR-SM INP AS of RUz, neutron beam density 6.5·10^8 n/cm^2·s, immediately after the introduction of Magnevist. The study group consisted of 6 mice irradiated with epithermal neutron fluxes and the total absorbed dose was 6 Gy. 6 mice in the control group were irradiated with a neutron flux to the total absorbed dose of 3 Gy.

Magnevist (Bayer Shering A. G., Germany) was intratumorally injected to mice prior to irradiation, in 1 ml of which is 469.01 mg. of gadopentetatdimegyumine (78.77 mg. Gd), diethylenetriaminepentaacetic acid, 0.99 mg. of meglumine, a dosage of 0.1 mmol/kg. Then mice were placed in a «lock– container for radiation and neutron — capture therapy of experimental rats and mice" (a reasonable proposal #635 10.05.2012).

Tumor size was measured before the experiment on 5th, 10th, 16th, 25th days after irradiation. Formula $V = A \times B \times C$ was usedfor tumor volume measurements.

Evaluation of the antitumor effect of neutron capture therapy was conducted by examining of the tumor growth percent inhibition.

Results of histological examination of tumor after experimental therapy were assessed according to the therapeutic pathomorphosis classification of G. A. Lavnikova.

Mice were euthanized, decapitation were performed under ether anesthesia on 25th day after the experiment. After that, an autopsy of animals were done, tumor and all organs and tissues sampling for histological examination were done.

Results

Mice over the observation period were active, with preserved reflexes, feeding behavior unchanged. Appearance of mice was wool smooth and shiny.

At mice from both groups was significant inhibition of tumor growth. Inhibition of tumor growth in the study group was 94–97 % and 82–86 % in the control.

a — Therapeuticpathomorphosis III; b — Therapeuticpathomorphosis IV
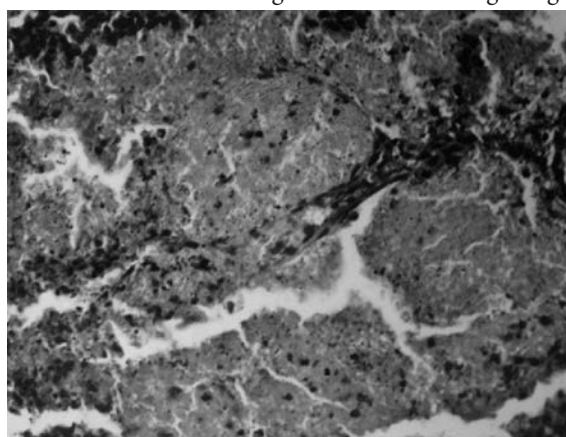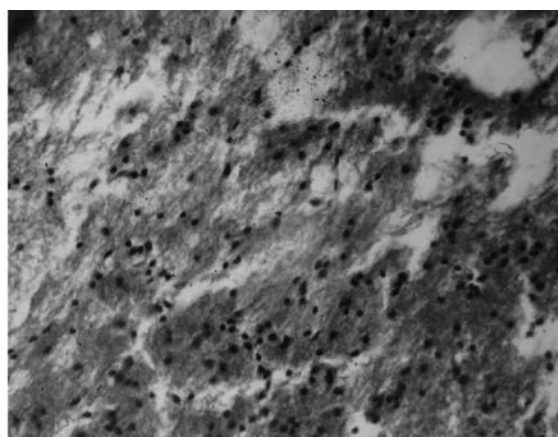
Fig. 1. a — TherapeuticpathomorphosisIII; b — Therapeuticpathomorphosis IV

Pathomorphosis III (44. 4 %) and IV (27. 8 %) (fig. 1) were observed more frequently in the main group than in the control 38.9 % and 22.2 %, respectively. Isolated tumor cells with vacuolated nuclei in necrotic masses were observed at pathomorphosis III. In tumor tissue were detected extensive areas of necrosis with accumulation of fibroblasts around it and hyalinosis vessels at pathomorphosis IV.

Also, in the pathohistologicalstudy of internal organs degenerative changes were observed, neither in study nor in control groups.

Conclusions

Study of efficiency neutron capture therapy with gadolinium-containing drug Magnevist in the experiment in vivo, showed its high antitumor efficacy: the prevalence of therapeutic pathomorphosis III, IV degree, a high percentage of tumor growth inhibition without affecting to the internal organs of mice. It should be noted, the higher the neutron dose rate, the greater the effect of neutron capture therapy.

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Analysis of clinical outcomes of cervical carcinoma surgery in fertile age patients

Abstract: In the NORC MH Uz we analyzed the outcomes of surgical treatment of 204 young patients with cervical cancer. We observed mainly the patients with exophytic –82 (40.2 %) and 68 endophytic growth (33.3 %) of cervical tumors. Besides standard examination the patients were determined sex hormone level (estradiol, progesterone), CA-125 level, calcium and phosphate level in blood. The treatment effect was evaluated by dynamic monitoring of patients as well as it was studied the quality of life of a young body. Patient's life quality was followed in dynamic by MENQOL American system.

Keywords: cervical cancer, fertile age, squamous cell, systemic chemotherapy, endoarterial regional chemotherapy, sex hormones, fertility-sparing surgery, ovarian transposition, effectiveness of treatment, quality of life, dynamic monitoring.

Today cervical cancer (CC) remains the most common malignant tumor of female genital organs. Every year it is revealed about 500,000 new cases of CC in the world and each year 300,000 women die from this disease. Herewith, 75 % of cases occur in developing countries in Africa, Latin America and Asia, where CC is firmly takes 1st place in the cancer incidence of the female population, and only 25 % — in economically developed countries in Europe and North America. Annually, the European Union diagnoses more than 25,000 cases of CC and about 12,000 deaths from this disease [1; 5; 7; 8]. In the structure of oncological morbidity of female reproductive system of the Republic of Uzbekistan CC takes second place after breast cancer and the fourth place in the incidence of all cancers in the country [3]. In 2014, intensive incidence rate was 4.6 cases per 100,000 population. The highest cervical cancer incidence has been reported in women of 45–55 yrs. The world reports have estimated that women under 50 years of age comprise 3 % per year, with a particularly significant incidence increase in women up to 29 years, in Russia it is 2.1 % per year. The similar trend to CC increase in women of fertile age has been followed in other countries. Currently, there are following methods of CC treatment: surgery, combined radiotherapy, chemotherapy. However, the principal therapeutic methods for cervical cancer are surgery and radiation which are used both separately and in various combinations. In severe cases it is necessary to perform advanced surgery, the volume of which is directly depended on the advance of tumor process. Most CC patients who underwent radical treatment tended to keep the former style of life, social status, and work activities. The quality of life as an integral characteristic of physical, psychological, emotional and social functioning of a woman is based on her subjective perception. When performing radical surgery on young women with CC it is advisable to carry out the transposition of both ovaries in the lateral channels of the abdominal cavity, removing them from subsequent exposure to radiation in order to preserve hormone function considering the serious consequences of post-castration syndrome. A distinctive characteristics of extended hysterectomy with ovarian transposition is the preservation of uterus — ovary and fallopian tube and their neurovascular connections located in the funnel — pelvic ligament [4; 9].

To standard cervical cancer surgery for stage IB1–IIIa is to be an extended hysterectomy with appendages. In fertile age patients ovaries can be preserved and led beyond the pelvis. The advantages of surgical approach to beam are the chance to save ovarian function and vagina elasticity in young patients. Ovarian transposition can be performed at squamous cell carcinoma in high and moderate differentiation and the absence of tumor vascular embolism.

Material and methods

We have analyzed the survey data and the phases of treatment 204 patients with CC. All patients examined in the treatment guidelines were divided into 2 groups:

1. The study group — 112 patients who had combined and complex therapy with fertility- saving surgery.

2. The control group — 92 patients who had combined and complex therapy with traditional approach. Sources of information are the following data:

1. Complaints data, anamnesis and objective status at the time of examination and treatment, analysis of patient card, medical history, operation log, archive data, pathology laboratory data.

2. The results of dynamic observation, survey of patients, monitoring the treatment effect and quality of life of patients, requests in the oncology clinics and oncology offices domiciliary.

Analysis of age characteristics shows that over the past 20–25 years in the Republic of Uzbekistan CC occurs more common in younger women. According to WHO, the young age is considered the age of 18 to 45 yrs. Our studies included the patients aged 23 to 45 years, i. e., in the most hard-working and fertile period. The incidence peak is at the age of 31–45 yrs. Of 204 patients 63 (30.8 %) were the city residents and 141 (69.2 %) of the patients were from rural areas.

The mean age of patients was 36.7 ± 4.4 yrs. Analysis of the obtained data showed that the initial complaints of all 204 patients were general weakness, fatigue, watery or sanious discharges from the genital tract, pain in the abdomen and lower back. The symptom-complexes, specific to cervical cancer lesions, depending on the duration of the first signs in a varying degree were identified. Pain syndrome was in 136 (66.7 %) of observed CC patients. Patients noticed the pains of different nature: dull, aching, cramping, or moderate, varying duration — constant, periodic or unannounced, various sites — low abdomen, in the back, in the crotch area, when urinating or during defecation. The condition of initial focus and tumor grading was evaluated as follows: tumor location (anterior lip, posterior lip ectocervix or endocervix, with/without transition on neighboring organs and tissues, tumor size, growth form, parametrical tissue infiltration, invading to regional lymph nodes. During our examination we mainly met the patients with exophytic 82 (40.2 %) and endophytic growth — in 68 (33.3 %) cervical tumors. Diagnosis was verified morphologically in all 204 (100 %) patients. Histologically, 197 (96.6 %) patients were diagnosed squamous cell carcinoma of cervix with/without keratinization, 7 (3.4 %) — cervical adenocarcinoma. G1 — high degree of differentiation, G2 — moderate degree of differentiation and G3 — low grade were isolated by histo-pathological differentiation of tumor cells. All patients were distributed by TNM system as follows (tabl. 1).

Table 1. – Distribution of the followed patients by groups and stages (n = 204)

Stage	Main group (n = 112)		Control group (n = 92)		Total	
	abs.	%	abs.	%	abs.	%
T1bNoMo	5	2.5	2	0.9	7	3.4
T2 aNoMo	18	8.8	19	9.1	37	17.9
T2 вNoMo	57	27.9	32	15.9	89	43.8
T2 вN1Mo	11	5.5	17	8.3	28	13.8
T3 aNoMo	21	10.2	22	10.9	43	21.1
Total	**112**	**54.9**	**92**	**45.1**	**204**	**100.0**

Considering the young age of patients of the study group, in addition to standard methods of diagnosis all 112 patients were determined the level of sex hormones (estradiol, progesterone) in order to study the functional state of the ovaries. To study the organic condition of the ovaries and exclude the presence of tumor in the ovary it was performed ultrasound, Doppler ultrasound, CT and determined CA-125 — tumor marker level, as well as some of the patients (34 patients) were determined the level of calcium and phosphate in blood. Complete blood count showed that in most of observed patients, anemia was more frequently detected both in study and control groups. *Group I* included 112 (55.1 %) patients, who underwent surgery with ovarian transposition as a part of combined and complex therapy. *Group II* included 92 (44.9 %) patients, who underwent surgery without ovarian transposition as a part of combined and complex therapy. Each group was divided into 3 subgroups: *Subgroup 1* comprised the patients with stage $T_{1b-2a}N_0M_0$, who underwent surgery + combined radiotherapy (CRT). *Subgroup 2* comprised the patients with stage $T_{2b}N_{0-1}M_0$ who underwent systemic PCT + surgery + CRT. *Subgroup 3* comprised the patients with stage $T_{2b}N_{0-1}M_0$ who underwent endoarterial regional continued chemotherapy (EARCCT) + surgery + combined radiotherapy CRT. The technique of surgical treatment with ovarian transposition for patients with cervical cancer: The distinctive feature of extended hysterectomy with ovarian transposition is the preservation of the uterus (ovaries and fallopian tubes) and their neurovascular connections located in funnel-pelvic ligament. There are several wing, posterior wall of pelvic, on both sides of spinal column, the upper

abdomen, and others options for ovarian transposition: to iliac. The best optimal version is the transposition of ovary in the upper abdomen. As a result of transposition the ovaries are displaced on supplied "pedicle" into the upper abdomen and, herewith, they are removed from the zone of postoperative irradiation and become prevented from radiation castration (Fig. 1.).
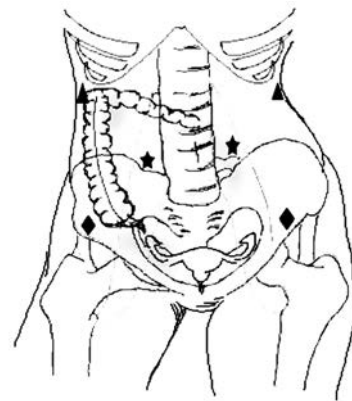
Fig. 1. The scheme of preservation and lateral transposition of ovaries in upper abdomen, jvary transposition without fallopian tube. After removal of the preparation the main anatomical structures are clearly visualized in the surgical wound: neurovascular bundles (total, external and internal iliac artery and vein), ureters, obturator nerve, the cult of vagina, bladder and rectum. Small bowel loops are fixed in the upper abdomen

Fixation of appendages are made with certain silk ligatures to the lateral divisions of the abdominal wall in the hypochondrium; this makes available to remove the ovaries of the zone of possible exposure in postoperative period; during topometry their location is determined on the plain film of abdominal cavity. This sequence of surgical operations ensures the safety of ovaries and their vascular "pedicles".

The main clinical criteria of the effect of antitumor treatment are the immediate objective effect, the development of side effects, recurrence and period of their development, the survival rate of patients within 3 years of observations.

Overall survival analysis of patients showed that the efficacy of treatment in study and in control group were almost the same, in study group is slightly higher than in control.

Table 2. – Survival rate depending on the stage (%)

	1 year	2 year	3 year
Stage	100	100	100
T2aNoMo	100	97.1	94.2
T2bNoMo	98.5	95.5	92.5
T2bN1Mo	96.7	89.2	81.3
T3aNoMo	96	76	72
T3aN1Mo	86	71.5	67.5

To study the quality of life is a relatively new field of clinical research. However, it attracts more and more attention in the study of oncology diseases and can serve as the main criterion for clinical efficacy. Quality of life is considered one of the key parameters in the study of ultimate results of the treatment. Quality of life of patients in the dynamics of observation was determined by American system MENQOL. Dynamic monitoring of patients was carried out with full examination every 3 months during the first year after treatment completion, in the sequel every 6 months. Observation periods vary more than 3 years.

Conclusions

Technology of functionally – sparing treatment of CC in fertile age women is a new approach without detriment to the outcomes of therapy for cancer patients. To spare the functional activity of the ovaries in young patients with favorable prognostic factors (early stage, high differentiation of the tumor, the absence of ovary affection, the ovaries with preserved function) allows avoiding violations, developing at different times after removal of gonads.

These studies testify the possibility of preserving the uterus and ovaries in women of fertile age with careful pre- and intraoperative examination.

Analysis of conducted data (over 3 years) shows that the fertility – sparing volume of surgery improves the immediate and long-term results of treatment.

Overall, the organ and function-sparing approaches in the treatment of gynecological cancer patients is relevant and promising research direction, allowing not only to cure the patient, but also to maintain the basic functions of female body, to improve greatly the quality of life, reduce the time of social and psychological rehabilitation.

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Hygienic assessment of persistent organochlorine pesticides in milk products

Abstract: In this article the hygienic assessment of averages entering the body in the milk and milk products daily doses of persistent organochlorine pesticides in the towns of the Ferghana valley (Ferghana, Andijan, Namangan region). According to a special formula has been determined the actual level of pesticides and on the results of the study made the appropriate conclusions.

Keywords: milk and dairy products, organochlorine pesticides, the sample, the average number, of daily dose, a residue, risk.

Pesticides are the only pollutant that person deliberately introduced into the environment. In many countries of the world pays great attention to the problems of the environment, feed and food contamination by hazardous chemicals in various anthropogenic and natural origin.

The role of organochlorine pesticides as a pollutant of the ecological system is now an established fact. They are carried for many kilometres from the place of their use and cause contamination of soil, water and plants. Researchers pay special attention to persistent organochlorine pesticides and, above all, to DDT and hexachloran (HCCH). Danger to animals associated with the chronic effects of pesticides and the consequences of their influence of small doses, now stands in the first place because of their daily contact with the body.

Whole cow's milk and prepared from milk products it is an important component of the human diet. Therefore, the content in milk products of harmful substances (eg, organochlorine pesticides) in excess of the maximum allowable levels (MALs) may cause a risk to public health. Among different age groups at high risk of exposure to organochlorine pesticides (OCPs) and products of their transformation are children who consume more dairy products than adults. Particularly at risk are young children and young children, for whom milk and dairy products are a major and indispensable part of the diet. The ability of organochlorine pesticides to stand out in the composition of milk is in itself sufficient reason for a particularly rigorous approach to the valuation of these pesticides. The presence of OCP in the milk leads to permanent its content in all dairy products derived from this milk. A particularly large number of OCP observed in dairy products with high fat content [1; 2; 3].

Purpose of the study

On the basis of hygienic assessment set content in the milk and milk products of residues of persistent organochlorine pesticides (DDT and its metabolites, hexachloran — HCCH).

Materials and methods

Determination of pesticides and their metabolites in dairy products was carried out using gas chromatography mark "Tsvet". Hygienic assessment of pesticide residues is given on the basis of sanitary rules and norms 42–123–4540–87, as well as with the use of sanitary regulations "Methods for determination of the maximum permissible level of pesticides in food".

The following formula was used to calculate the complex, and the combined effect of pesticides on the human body, the proposed E. I. Spinu [4]:

$$R_{фоп} = \frac{Д_ф}{ДСД} <= 1,$$

where $R_{фоп}$ — integral criterion, which reflects the actual risk of the pesticide; $Д_ф$ — quantity characterizing the total radiation dose for admission of substances to food, water and air; ДСД — acceptable daily intake for humans.

The object of study: dairy products manufactured in dairy farms of the Fergana valley (it includes Fergana, Andijan and Namangan region).

Study and discussion of results

The observation points in the Fergana Valley are given hygienic assessment quantitative indicators of organochlorine pesticides. It is known that in the sanitary-toxicological against the most dangerous pesticides which have one or the following combination of properties: high toxicity, high stability in the external environment and long-term persistence in soil, water and food, high toxicity, pronounced cumulative properties, long stay in the body, the ability to discharge from the body through the milk of lactating animals

and nursing mothers through milk, resistant ability to form long-oil emulsions and these emulsions stored in the processing of fruit and other plant products used in human nutrition.

It should be noted that under the influence of weather and other factors pesticide spread over large distances and the space, and as a result, recently found pesticides in the environment, even in facilities that have never been processed. For example, DDT was detected in adipose tissue and milk dolphins in Antarctica, where organochlorine never used drugs.

In the studied observation points us Andijan region quantitative level of DDT and its metabolites in the human body was designed, and the rate was on average 0.08 ± 0.05 mg/kg (MALs — 1.25 mg/kg). The daily dose of exposure was equal to 0.0028 mg. In Namangan region 0.07 ± 0.003 mg/kg, daily dose of 0.0025 mg. In Fergana region 0.07 ± 0.006 mg/kg, daily dose of 0.0025 mg. In the city of Fergana, the figure amounted to an average of 0.09 ± 0.009 mg/kg, daily dose in the human body is equal to 0.0032 mg. Total average daily intake of DDT and its metabolites in the body was 0.077 ± 0.0045 mg/kg. Daily dose — 0.0027 mg.

A study of residual quantities of DDT and its metabolites in dairy products have been identified in yogurt in an amount of 0.04 mg/kg, in a cream 0.05 mg/kg, in sour cream 0.02 mg/kg, in curdled 0.001 mg/kg, in sour milk 0.006 mg/kg.

The content in milk products of DDT and its metabolites averaged 0.007 mg/kg. This value does not represent a serious danger to public health. However, its daily total dose in the diet may give rise to potential danger [5]. Therefore, currently of great importance strict control to prevent proper penetration of the drug across the border.

Hexachlorocyclohexane or HCCH is widely used as an insecticide in the Fergana Valley, its working dose of 1.0 kg/ha. Remains of this drug in dairy products have been investigated in 2002–2004 by international organizations on the territory of Kazakhstan and Karakalpakstan.

We've found that in the Andijan region of the Ferhana Valley the average value of the drug was 0.00052 ± 0.00001 mg/kg, daily dose of the drug entry into the body is equal to 0.000018 mg. If the daily value of Namangan region HCCH was 0.00071 ± 0.00002 mg/kg, the daily dose was 0.000025 mg. The observation points of the Fergana region quantitative indicators of the drug amounted to 0.00061 ± 0.00002 mg/kg, and the daily dose is equal to 0.000021 mg. As for the city of Fergana quantitative indicator — 0.00054 ± 0.00009 mg/kg, daily dose — 0.000019 mg.

Among the samples taken at observation points is the maximum dosage has been identified in the city of Fergana, which is 0.019 mg/kg (daily dose — 0.00067 mg). The daily dose limit HCCH product is 0.05 mg/kg. Mean values of the data amount to 0.0006 mg/kg, a daily dose of exposure is equal to 0.000021 mg. Also fresh milk contained in HCCH cream in an amount 0.0035 mg/kg, 0.00012 mg. daily dose; sour cream 0.0046 mg/kg, daily dose intake of 0.00016 mg; in kefir 0.0018 mg/kg, 0.000064 mg. daily dose; feta cheese in 0.0041 mg/kg, daily dose of 0.0014 mg; in cheese 0.0038 mg/kg and the daily dose of 0.00013 mg. Obviously, the reasons for the relatively high content of organochlorine pesticides in acidic dairy products may be linked to the presence of fat. On this basis, it is believed that low-fat dairy products do not contain HCCH.

Thus, the need to develop a system of hazard analysis and critical control points to establish accounting and reporting hazards at all stages of the production process the milk and milk products. Also, streamlined application system, storage and transportation

of pesticides and fertilizers. Strictly comply with hygiene regulations, such as dosage, frequency of application, waiting period, the quarantine period, MAC (maximum allowable concentration), MALs and other hygiene regulations.

Conclusions:

1. It was found that the actual level of the HCCH equal to 0.0008 mg. Given the low cumulative properties HCCH, after 60 days (0.0008×60) can be argued about the dangerous dose of education to human health.

2. As a result of the data obtained, it can be argued that in order to neutralize the milk and milk products from organochlorine pesticides, it is necessary to produce sour — milk products, as well as recommended steps to remove the fat in the milk.

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Characteristics of social and living conditions, the incidence of patients with CRF

Abstract: The high level of clinical entities of identified diseases in patients with chronic renal failure (CRF), which are conditioned by their functional state, body resistance, living conditions, working conditions, leisure and everyday life have been identified. The incidence has been studied at average for 2 years (2014, 2015), as it is studied for general morbidity of the population. The study included 105 patients whose social conditions had been studied, as well as morbidity rate. They studied the rates of overall morbidity in 325 patients with CRF who are on the dispensary at the city nephrology hospital of Tashkent city.

Keywords: patients with CRF, social conditions, clinical entities of diseases.

The number of patients with kidney disease is being increased all over the world, due to the incidence rate not only of the kidneys but also the increasing number of patients with diabetes, obesity, aging, damaged renal vascular nature, in particular renal ischemia [1; 2; 8; 9; 10; 11]. A steady rise in the level of CRF has been noted in the world. The number of patients with CRF in the world, who are receiving renal replacement therapy has been more than 4–5 times over the last 20 years [5; 6]. In the US, the prevalence of CRF in 1996 reached up to 268 per 1 million population [7]. In Russia in the past decade — CRF has been diagnosed in adults from 100 to 600 people [3; 4]. In the Republic of Uzbekistan (Uzbekistan), the prevalence of CRF in 2014 is 19 701 to 30.759 million of population.

Aim: description of the social conditions, the incidence of patients with CRF in Tashkent city.

Materials and methods

Subjects of study: adult population, patients with chronic kidney disease and CRF, who are being treated in the clinic (105) and 325 patients with CRF who are on the dispensary in Tashkent city.

Medical and social research included: the copy of the medical record data (form № 025/U). When studied anamnestic data in patients with CRF (105) the particular attention was made to past illnesses, the presence of chronic diseases and foci of infections. The incidence analysis was carried out in accordance with the International Statistical Classification of Diseases and Related Health (ICD-10, 2000).

We studied the rates of overall morbidity in 325 patients with CRF who are on the dispensary at the city nephrology hospital of Tashkent city. The incidence has been studied for average 2 years (2014–2015), as is the case for the study of general morbidity of

the population. Development and morbidity analysis was performed according to the International Classification of Diseases 10 review, highlighting at the same time the main classes and clinical entities of the diseases.

Results

As a result of analysis of medical records, it was found that CRF is one of common diseases. We observed 105 patients, including 74 women and 31 men. The study of educational qualifications showed that incomplete secondary education had 1 (1.4 %) woman and 1 man (3.3 %), secondary education 53 (71.6 %) and 18 (58.0 %), respectively, higher education 20 (27.0 %) and 12 (38.7 %) patients. Among the surveyed disabled patients 8 (10.8 %) were women and 3 (9.7 %) men, the unemployed — 12 (16.2 %) and 11 (35.5 %), respectively, the retired — 47 (63.5 %) and 9 (29.0 %), the working patients 7 (9.5 %), and 8 (25.8 %).

7.8 % of women and 12.0 % of men were employed in production sphere with shift, including the night, work regime. During the day, 5 % of women and 12 % of men exposed to factors such as vibration, noise, dust, smell of paints, 8 % worked with chemicals.

The conducted analysis of the diet also revealed a number of features. Thus, on average 85 % of the surveyed patients with CRF at the age of 18 to 55 years break their diet: four time's meal with long intervals (5–6 hours). In the elderly, there was no desire to take the meals frequently. It was observed low physical activity, especially in elderly population. Both the assortment of products and the structure of nutrition had no fundamental difference. Therefore, it should be noted that only 35 % of the patients surveyed had an idea of a balanced diet and dietary nutrition in CRF. Only 28 % of patients could evaluate their diet objectively by themselves, but in most cases it was possible to find out with the help of health professionals.

A comprehensive study of the health status of patients with CRF and analysis of questionnaires and medical records showed that all patients had concomitant diseases. Thus, 10 (13.5 %) women and 1 (3.3 %) man had obesity I and II degree, respectively. 45 (62,2 %) and 21 (63.8 %) patients had diabetes, 6 (8.1 %), and 4 (12.9 %) — digestive organ diseases, 9 (12.2 %) and 6 (19.4 %) — respiratory diseases, 34 (45.9 %) and 11 (35.5 %) — diseases of cardiovascular system, 67 (90.5 %) and 29 (93.5 %) — kidney diseases, 5 (6.8 %), 1 (3.3 %) — allergic disorders, 4 (5.4 %) and 2 (6.5 %) — endocrine disorders. In addition, 11 (14.9 %) of the women surveyed had gynecological diseases, and 1 (1.4 %) female — a family member suffered TB. 1 (3.3 %) male patient had neuro-psychological disorder.

According to Table 1 the first place in patients with CRF among identified diseases takes the genitourinary system diseases, which have been defined in 42 women and 48 men. The second place is occupied by endocrine diseases, nutritional and metabolism that were observed in 35 women and 29 men. Diseases of blood and blood-forming organs and certain disorders involving the immune mechanism were observed in 4 women and 6 men, congenital malformations, deformations and chromosomal abnormalities were evenly defined in women and men — 4. Infectious and parasitic diseases were in 1 patient, circulatory system diseases were in 3 men and 1 woman with CRF.

Table 1. – Distribution of clinical entities identified in patients with CRF

ICD-10	Classification of diseases	Women (180)		Men (145)		Total (325)	
		abs.	%	abs.	%	abs.	%
I	Infectious and parasitic diseases	1	5.6 ± 5.5	0	0.0 ± 0.0	1	3.1 ± 3.1
II	Urinary tract infections	1	5.6 ± 5.5	0	0.0 ± 0.0	1	3.1 ± 3.1
III	Diseases of the blood-forming organs and certain disorders involving the immune mechanism	4	22.2 ± 11.0	6	41.4 ± 16.5	10	30.8 ± 9.6
	Anemia	4	22.2 ± 11.0	6	41.4 ± 16.5	10	30.8 ± 9.6
IV	Endocrine diseases, nutritional and metabolic disorders	35	194.4 ± 29.5	29	200.0 ± 33.2	64	196.9 ± 22.1
	Diabetes	34	188.9 ± 29.2	28	193.1 ± 32.8	62	190.8 ± 21.8
	Diabetic nephropathy	1	5.6 ± 5.5	0	0.0 ± 0.0	1	3.1 ± 3.1
V	Diseases of the circulatory system	1	5.6 ± 5.5	3	20.7 ± 11.8	4	12.3 ± 6.1
	Hypertension	1	5.6 ± 5.5	2	13.8 ± 9.7	3	9.2 ± 5.3
	Cardiac ischemia	0	0.0 ± 0.0	1	6.9 ± 6.9	1	3.1 ± 3.1
VI	Diseases of the genitourinary system	42	233.3 ± 31.5	48	331.0 ± 39.1	90	276.9 ± 24.8
	Chronic glomerulonephritis	26	144.4 ± 26.2	37	255.2 ± 36.2	63	193.8 ± 21.9
	Chronic pyelonephritis	15	83.3 ± 20.6	10	69.0 ± 21.0	25	76.9 ± 14.8
	Urolithiasis	1	5.6 ± 5.5	0	0.0 ± 0.0	1	3.1 ± 3.1
VII	Congenital malformations, deformations and chromosomal abnormalities	4	22.2 ± 11.0	4	27.6 ± 13.6	8	24.6 ± 4.5
	polycystic renal disease	4	22.2 ± 11.0	4	27.6 ± 13.6	8	24.6 ± 4.5
Total		87	483.3 ± 37.2	90	620.7 ± 40.3	177	544.6 ± 27.6

Clinical entities of diagnosed diseases in patients with CRF, endocrine diseases, nutrition and metabolic disorders rank first among women — 35; the most specific gravity had diabetes which was observed in 34 women, diabetic nephropathy identified in only 1 female patient. Among men suffering from CRF, the first place was occupied by genitourinary system diseases: chronic glomerulonephritis was registered in 37, chronic pyelonephritis in 10 male patients with CRF. Second place among women were genitourinary system diseases, the specific gravity of chronic glomerulonephritis was registered in 26, chronic pyelonephritis in 15 patients, urolithiasis was observed only in 1 patient.

Among men suffering from CRF, the second place was occupied by endocrine diseases, eating disorders, the specific gravity of diabetes was observed in 29 men. In the structure of diseases of blood and blood-forming organs the specific weight had iron deficiency anemia, ranking the third place in 6 men and 4 women, respectively.

The fourth place in the structure of the incidence of congenital malformations, deformations and chromosomal abnormalities

within this class the largest specific gravity made polycystic kidney disease: in 4 women and 4 men with CRF. The last place in the structure of morbidity was diseases of the circulatory system. The most common form of this disease was hypertension in 2 men and 1 woman, cardiac ischemia was observed in only 1 patient. Urinary tract infection was detected only in 1 patient with CRF.

Thus, the high level of certain clinical entities of identified diseases among patients with CRF are conditioned by their functional state, body resistance, living conditions, work –rest cycle, healthy diet and lifestyle. All this point to the fact that only the doctor and the patient talk at doctor's reception is insufficient. It is necessary to develop and conduct educational programs to teach patients the basics of a healthy lifestyle.

Conclusions:

1. The prevalence of CRF in the population of the Republic of Uzbekistan currently stands at an average of 1000 people with significant difference depending on the specific areas. It is assumed that these differences largely depend on the quality of diagnosis in primary care.

2. Rank places in the structure of general disease incidence of women with CRF are different from men, the first place takes the diseases of the genitourinary system, diabetes, iron deficiency anemia, the second place polycystic kidney disease, hypertension.

3. Among the men with CRF, the first place was occupied by diseases of the genitourinary system: chronic glomerulonephritis, chronic pyelonephritis, the second place was occupied by endocrine diseases, eating disorders, diabetes, hypertension, coronary heart disease, nutritional and metabolic disturbances.

4. The revealed features of morbidity in patients with CRF will help in processing improvements for further reduction of this pathology in Uzbekistan.

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State oxidant-antioxidant plasma systems blood red blood cells in patients children with pulmonary tuberculosis

Abstact: As a result of carried out biochemical blood analysis in 44 children and adolescents with an active pulmonary tuberculosis the considerable changes in processes of lipid peroxidation were detected: authentic decrease of vitamin E content, increase of superoxide dismutase and ceruloplasmin levels in comparison with noninfected subjects. Intensity of lipid peroxidation increased in the patients with pulmonary tuberculosis along with the change of antioxidants protection. This was manifested by growth of concentration of malonic dialdegide and dien conjugate. The most expressed changes of the evaluated biochemical parameters were in children and adolescents with complicated course of tuberculosis. detected: authentic decrease of vitamin E content, increase of superoxide dismutase and ceruloplasmin levels in comparison with noninfected subjects. Intensity of lipid peroxidation increased in the patients with pulmonary tuberculosis along with the change of antioxidants protection. This was manifested by growth of concentration of malonic dialdegide and dien conjugate. The most expressed changes of the evaluated biochemical parameters were in children and adolescents with complicated course of tuberculosis.

Keywords: lipid peroxidation lipid peroxidation, malonic dialdegide malonic dialdegide

The main link in the pathogenesis of functional changes in organs and systems in pulmonary tuberculosis in children and adolescents is the development of respiratory failure manifested disorder of external, pulmonary and tissue respiration, hypoxia and hypoxemia. Under the influence of hypoxia and hypercapnia disturbed functional state of the central nervous system and neuro reflex regulation of vital body functions. Because of infringement important functions of organs and systems in the body changes occur in metabolism. Violation of gas exchange and redox reactions, hypoxia and hypoxemia lead to the activation of anaerobic oxidation of incompletely oxidized products of metabolism. Under the influence of hypoxia, bacterial toxins, metabolic products and changes in hemodynamics in children with pulmonary TB marked dysfunction of vital organs. These changes are accompanied by increased activity of lipid peroxidation processes and reorganization of systems of antioxidant protection of red blood cells. Under the influence of hypoxia, bacterial toxins, metabolic products and changes in hemodynamics in children with pulmonary TB marked dysfunction of vital organs. These changes are accompanied by increased activity of lipid peroxidation processes and reorganization of systems of antioxidant protection of red blood cells [1; 2].

Material and methods

The study is based on clinical and laboratory examination of 151 children with the — pulmonary tuberculosis, which were supervised and received in the city TB hospital in Tashkent during the period from 2013 to 2014. All the examined de ti were divided into 2 groups according to the forms of pulmonary tuberculosis: group 1 consisted of 71 (47.0 %) of pediatric patients with focal form, group 2–80 (53.0 %) with the disseminated form of pulmonary TB.

In this paper, a study, determining the level of lipid peroxidation (POL) the initial product of diene conjugates (DC) in the membranes of red blood cells and the final product of POL malondialdehyde (MDA) by Koroljuk method.

The results and discussion

The study revealed the increasing intensity of free radical processes in the background of progressive non-sufficiency of antioxidant system in lymphocytes of children with TB, the deepening of the manifestations of immune deficiency in T-link. In the period of acute illness marked a significant rise in the level of MDA in patients of Group 1 to 2.79 ± 0.11 nmol/L, in group 2 — 8.23 ± 1.11, which is higher than the control 2.33 times and 2.9 times respectively, in groups, and DC reaches patients of group 1 to 3.27 ± 0.09 U/ml, in group 2 — 5.61 ± 0.69. Semi-obtained results show a significant activation of POL. The level of SOD decreased in group 1 to 99.5 %, in group 2 — by 99.6 %, indicating that the structural and functional changes in the lymphocyte membrane

It is possible that these violations of micro — and macro blood rheology of non-small role belongs to the activation of free radical processes. For example, Kaminsky G. O. (2011) showed that the activation of erythrocytes in free-radical processes reduces fluidity and deformability of erythrocytes membranes gives morphological erythrocyte structure and there by alter the aggregation ability of these cells [3; 4].

Activation of POL and AOS, as a result of this, the presence of changes in the structure of the lipid-round are the basis for therapeutic and preventive measures aimed at correcting these faults (see Table 1).

Thus, studies have established an important pathogenetic role of violations of antioxidant function in the body for TB in children. Changes in the POL-AOS system disorders are the leading mechanism of functioning of lymphocytes. The loss of functional activity of immune cells with TB can be attributed to an imbalance of oxidant and antioxidant systems.

Table 1. – The activity of pro- and antioxidant system in the membranes of red blood cells in children with TB

	Indicators	Control group (n = 40)	1 group (n = 71)	2 group (n = 80)
POL	MDA nmol/l	2.79 ± 0.11	6.51 ± 0.22***	8.23 ± 1.11***
	DC, U/ml	1.43 ± 0.02	3.27 ± 0.09***	5.61 ± 0.69***
AOS	SOD units/ml	2.41 ± 0.09	1.21 ± 0.01***	1.01 ± 0.01***
	CT, umol/mg	11.55 ± 0.77	7.96 ± 0.31***	5.66 ± 0.39***

*Note: * — differences relative to the control group significant data (* — $P < 0.05$; ** — $P < 0.01$; *** — $P < 0.001$).*

Analysis of new TB pathogenesis of data allows us to conclude that a significant and sustained increase in the intensity of lipid peroxidation is an essential mechanism for the formation of TB, reducing the functional activity of lymphocytes, it leads to the formation of immune deficiency and, as a consequence, severe course of the disease.

Conclusion

Activation of lipid peroxidation in conjunction with the lack of AOS is pathogenetic justification for the use in the treatment of children and adolescents with active tuberculosis antioxidant and membrane stabilizing respiratory drugs.

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The results of the activity of the territorial service of emergency medicine of Moscow

Abstract: The authors present a retrospective statistical analysis of the kinds and scale of emergency and crisis situations on the territory of Moscow for 2011–2015.

Keywords: emergency situations (ES), ES structure, organization of emergency medical service in the ES.

The problem of organization of rendering of emergency medical service to the injured in emergency and crisis situations remains important according to the publications [1; 2; 3; 4].

Liquidation of medical consequences of emergency situations in Moscow is laid upon the territorial disaster medicine service (TDMS) of the Department of Healthcare and its lead agency Scientific-Research Center for Emergency Medical Services — the territorial disaster medicine center (TDMC).

The DMS currently operating on the territory of the city has a strong disaster medicine service and a full-fledged chain of trauma centers of the 1st and 2nd level. In accordance with the approved plans-tasks on the admission of the mass flow of the injured for adult and children population in respect of certain specializations, the city hospitals can arrange up to 15 thousand beds within a short period of time in case of an ES.

The automated information-analytical system «Disaster Medicine of Moscow» (AIAS «Disaster Medicine of Moscow») established in the TDMC performs the functions of recording, functions related to collection, registration, grouping and generalization of data about ES in Moscow, functions of formation of operative and reporting information, functions of control of the condition of resources as well as planning of resources and regulation of their use.

The following sub-systems function in the AIAS «Disaster Medicine of Moscow»:

- Management of medical team and equipment of EMS («Team and equipment of EMS»);
- Recording, control and analysis of everyday medical-sanitary situation in the city («Monitoring of medical-sanitary situation in the city»);
- Management of medical support of scheduled city all-city events with large concentration of people («Medical support of public events»);
- «Monitoring of medical-sanitary situation in the ES zone»;
- Personified recording of the injured in large-scale ES and results of rendered medical aid at all stages of medical-evacuation support («Injured — ES»);
- Formation and keeping of data base of the AIAS «Disaster Medicine of Moscow».

In order to improve the organization of operation of the territorial disaster medicine service of Moscow, a retrospective statistical analysis of emergency and crisis events of different kind and scale on the territory of Moscow during 2011–2015 was conducted.

The following events contained in the data base of the AIAS «Disaster Medicine of Moscow» were selected by us for the purpose of the study:

1. Vehicle accidents:
 – Road traffic accidents with the injured more than 3,
 – All RTA with public transport,
 – Accidents with rail, water and air transport;

2. Fires:
 – All fires with the injured,
 – All fires with evacuation, failures,
 – All fires at institutions, enterprises, medical organizations;

3. Failures not related to fires:
 – All events with the cause «Failure»;

4. Technological accidents (including production) with causes:
 – «Explosion» of non-criminal character,
 – «Emission of high-toxic substances», «Emission of radio-active materials», «Emission of BIO agents»,
 – «Life support system accidents», «Spill of fuels»,
 – «Detection of aggressive substances», «Gas emission»,
 – «Breach of safety guidelines at production facilities»;

5. Biological-social:
 – All events with the cause «Infectious diseases»,
 – Poisoning with medical and non-medical products;

6. Social:
 – All events with the cause: criminal, violent and anti-social activities, including explosion threats, realized explosions, detection of explosive devices, mass disorders, use of guns and offensive weapons,
 – Terrorist attacks;

7. Natural:
 – Hydro-meteorological (hurricanes, rain showers, landslides, floods).

The structure of crisis and emergency situations as well as their dynamics for 2011–2015 are presented in the table and figures.

Table 1. – Structure of the causes for crisis and emergency situation calls

Type of crisis and emergency situation	Years									
	2011		2012		2013		2014		2015	
	Abs.	%	Abs.	%	Abs.	%	Abs.	%	Abs.	%
Technogenic:	1546	56.0	1701	61.7	1662	60.8	1682	63.2	1501	60.6
Fires	770	27.9	792	28.7	768	28.1	854	32.1	732	29.6
Vehicle accidents	708	25.6	808	29.3	785	28.7	725	27.2	649	26.2
Failures not related to fires	13	0.5	11	0.4	20	0.7	20	0.8	14	0.6
Technological accidents	55	2.0	90	3.3	89	3.3	83	3.1	106	4.3
Biological-social	260	9.4	252	9.1	280	10.2	220	8.3	170	6.9
Social	933	33.8	770	27.9	771	28.2	742	27.9	771	31.1
Natural	22	0.8	21	0.8	19	0.7	12	0.4	21	0.8
Other	–	–	11	0.4	–	–	5	0.2	13	0.5
Total	2761	100	2755	100	2732	100	2661	100	2476	100

As it is seen from the data presented in the table, the events of social character (criminal, violent and anti-social activities, including explosion threats, realized explosions, detection of explosive devices, mass disorders, use of guns and offensive weapons), fires and vehicle accidents were the most frequently occurred among all ES in different years. Herewith, during the last three years, there was an obvious tendency for reduction of the total number of crisis and emergency situa-tions. Thus, compared with 2011, the number of ES in 2015 reduced by 10.4 %. Similar tendency is observed throughout Russia in the whole.

The analysis of the dynamics of events according to years shows that crisis and emergency situations of technogenic char-acter prevail (Fig. 1).

Among technogenic ES, the first place is taken by the fires and vehicle accidents (Fig. 2).
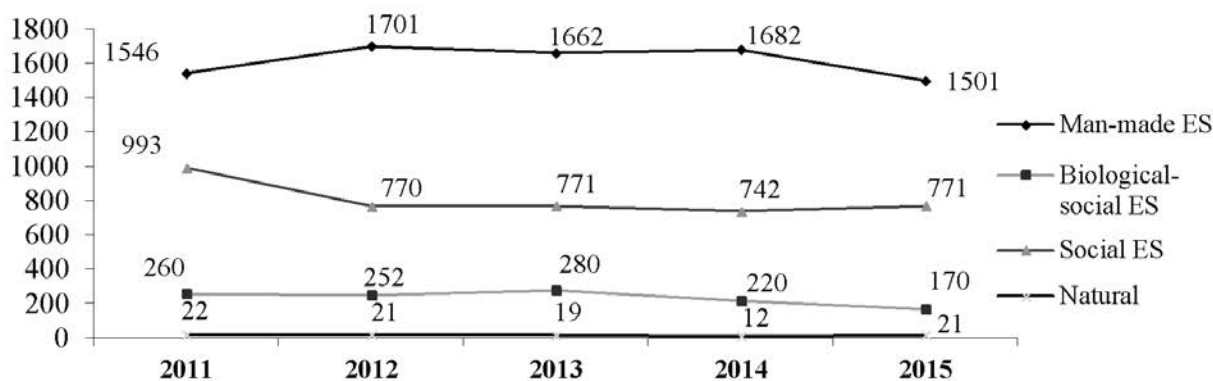
Fig. 1. Dynamics of ES and crisis situations in Moscow
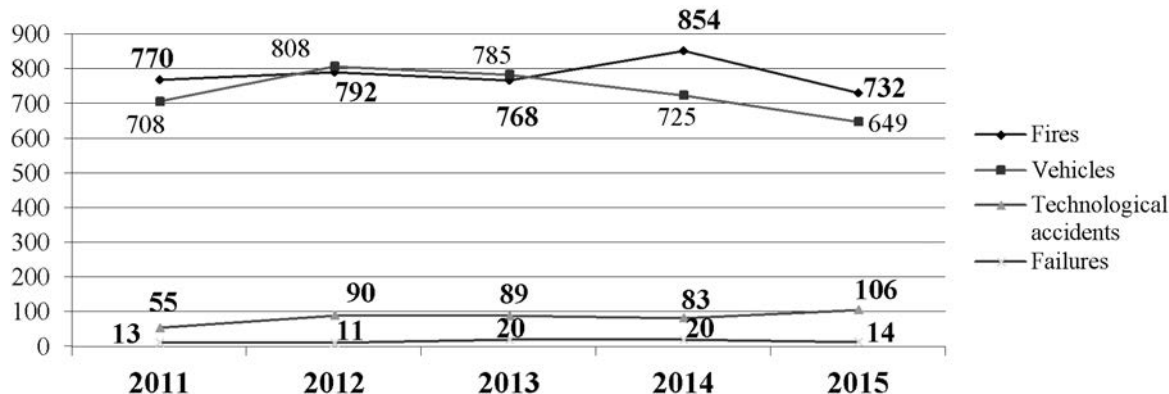
Fig. 2. The structure of ES of man-made character in Moscow for 5 years

In 2015, there structure of crisis and emergency situations under-went some alternations. The first place, just like in 2011, was taken by the ES of social character that accounted for 31.1 %. Fires took second place and accounted for 29.6 %. Starting from 2014, there has been a tendency for reduction of vehicle accidents. Thus, in 2015, vehicle accidents took third place in the structure of crisis and emergency situations and accounted for 26.2 % (Table 1, Fig. 1 and Fig. 2). The reduction by 19.7 % took place compared with 2012.

The assessment of the scale of events according to the size of sani-tary losses certifies that the structure of events hasn't changed scale-wise for the last 5 years. The biggest number is the events with sanitary losses from 1 to 5 (68 % at average), events with the injured from 6 to 10 people accounted for 2.5 %, and the events with sanitary losses with over 10 people — 1.2 %. Events without sanitary losses were 28.3 %. However, crisis situations without sanitary losses but being a risk event (failures not related to fires, technological accidents and events of social character) took first place for separate kinds of events.

Figure 3 shows that the number of ES with the injured has a tendency for reduction and the number of events without the in-jured is increasing starting from 2012.

The dynamics of sanitary losses as a result of emergency and crisis situations for 5 years is presented in Figure 4.
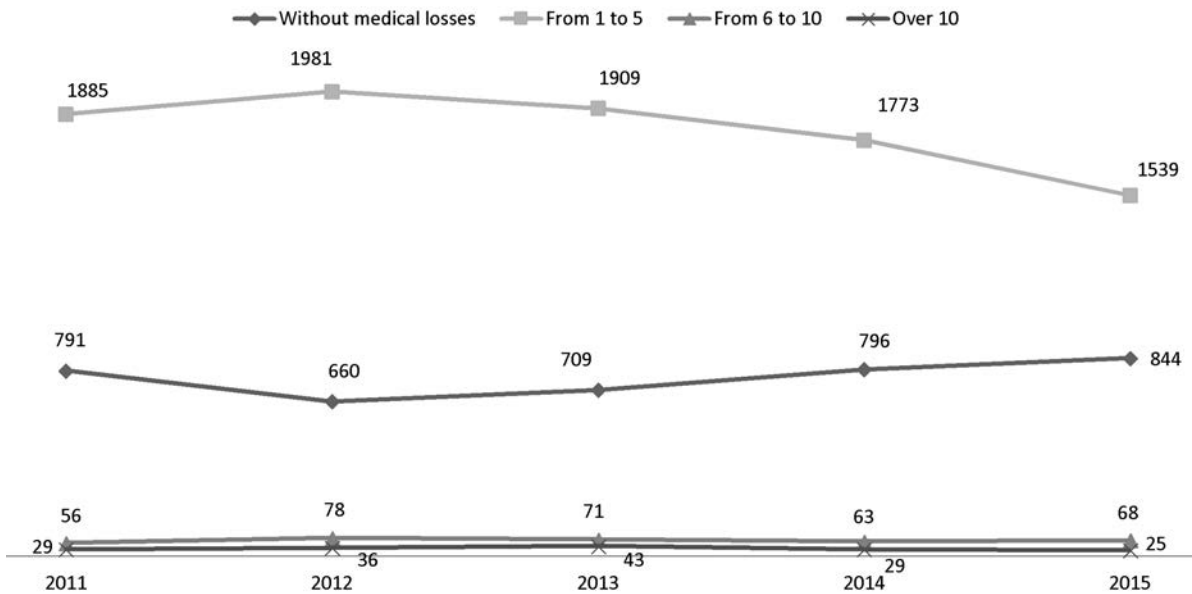
Fig. 3. Scale of events in the dynamics for 5 years
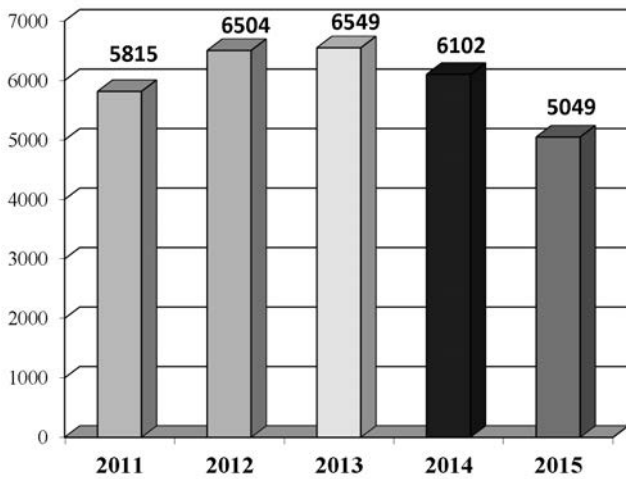
Fig. 4. The dynamics of sanitary losses as a result of
emergency and crisis situations for 5 years

Fig. 5. Medical consequences of vehicle ES
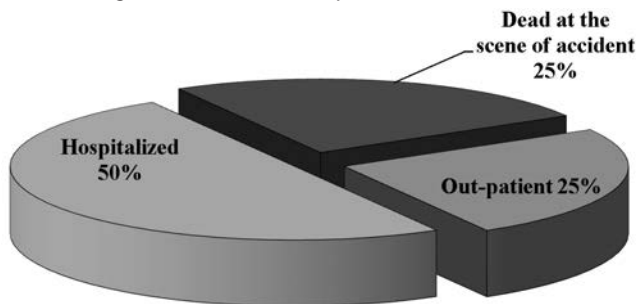
Fig. 6. Medical consequence of fires

Fig. 7. Medical consequences
of crisis and emergency situations
of social character

The presented data certifies that the number of medical losses in ES has a tendency for reduction.

This tendency is especially noticeable in vehicle accidents and ES of social character. Thus, the number of the injured in vehicle accidents in 2015 reduced by 21.6 % compared with 2011, and the number of the injured in ES of social character in 2015 reduced by 44.6 % compared with 2011.

The structure of sanitary losses for the last years remains unchanged.

Among the injured, at average, a significant number (**65.2 %**) was hospitalized; the share of the deceased at the scene of accident was **6.4 %**, and **28.4 %** of the injured were provided out-patient help at spot.

Figures 5–7 present the structure of sanitary losses for separate kinds of ES in total for 5 years.

The presented data certifies that despite the most number of the injured in vehicle accidents, deaths at the scene of accident accounted for 5 %. Whereas, deaths during pre-hospital period during fires is 5 times more than the deaths during vehicle accidents and accounted for 25 % at average, which indicates significant sanitary losses and severity of the condition of the injured in the fires.

Thus, the conducted retrospective statistical analysis of crisis and emergency situations in Moscow revealed the tendency for reduction of events starting from 2011.

The size of sanitary losses over the last two years also showed the tendency for reduction, especially in vehicle accidents and ES of social character.

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Hemodynamics features investigation in research groups of pregnant women mother-placenta-fetus system

Abstract: Currently, herpes virus infection is a serious problem of modern medicine. This is due to the steady increase in the frequency of herpes virus infection, its decisive influence on reproductive health, leading role in the development of intrauterine infection, leading to perinatal and infant morbidity and mortality.

Keywords: herpes, pregnancy, fetoplacental insufficiency, fetus, placenta.

The prevalence of genital herpes in Russia are also very high. Its frequency has been growing steadily and is 7.4 per 100 thousand population [2; 7]. The current situation is contagious, according to experts, primarily related to the expansion of diagnostic capabilities as well as an absolute increase in the number of patients with genital herpes [3; 5].

In recent years there has been a tendency to a predominantly asymptomatic (latent) flow of herpesvirus diseases. A frequency of recurrent herpes genital infections primarily in young, sexually active people increased twice. This contributes not only to the wide and uncontrolled spread of infection with the herpes simplex virus, but further negative impact on the possibility of a normal pregnancy and birth of a healthy baby [1; 6; 7]. Herpesvirus disease are generally highly contagious, transmission path are very diverse, but the infection often occurs during close physical contact. This is a horizontal transmission path, which is carried out mostly domestic, air-borne and sexually transmitted [4; 5; 8]. Vertical transmission path of infection from mother to fetus is tipical for herpes viruses: prenatal transplacental infection of the fetus and during labor when there is an infection of the child during the passage through the infected birth mother's ways. Intrauterine transplacental infection of the fetus is a cause of antenatal mortality, miscarriage, premature birth, and early disability children (deafness, blindness, epilepsy, microcephaly, heart defects, splenomegaly, and others). Up to 70 % of cases of prenatal herpes infection is associated with the child's mother, having a latent herpes virus infection [1; 7]. Manifestation of herpes infections in newborns frequently observed in the first 2 weeks of life proceeds in the form of disseminated disease with severe skin lesions, mucous membranes, lungs, central nervous system, liver, accompanied by development of thrombus syndrome. Mortality in infants with herpes virus infection as high as 80 %. In this context, alertness obstetricians about testing pregnant women

becoming particularly urgent in order to identify infection by herpes simplex viruses, as well as the development of tactics prenatal conduct and prenatal preparation of infected pregnant women, which will greatly reduce the likelihood of intrapartum injury of the child and thus reduce the risk of severe herpetic disease in neonates.

The aim of our study was evaluation of fetoplacental complex and fetus functional state during recurrent herpes infection.

Research materials and methods

The study involved 144 pregnant women with herpes infection. Clinical observations carried out on the basis of urban maternity hospitals in Tashkent. The control group consisted of 60 healthy women without herpes infection. The investigation of the fetus status was made by using ultrasound dopplerometric methods.

Increased fetal vascular resistance due to their spasm, is one of the compensatory mechanisms — centralization of circulation with the primary blood supply to vital organs with increasing hypoxia and metabolic disorder. With the development of placental insufficiency opposite changes in the blood flow state in comparison to the aorta artery and the umbilical cord occurs in fetal cerebral arteries. The value of diastolic blood flow in the cerebral vessels initially remains unchanged and then increases, resulting in a reduction of the numerical values of the indices of vascular resistance [3; 8].

The increase in fetal hypoxia associated with reduced resistance of cerebral vessels, ensuring its adequate oxygenation. Preferential blood flow of the fetal brain in the condition of pulsation index (PI) progression has been called «brain-sparing effect» [8].

Doppler study analysis in the I-main group revealed significant differences of hemodynamic parameters in the mother-placenta-fetus as compared with those in the control and comparison group (Table 1).

There was a significant violation of utero-placental blood flow at 46.67 ± 9.11 % of pregnant women in the main group.

Table 1. – Systolic diastolic ratio (SDR) indicators of surveyed vessels of pregnant women with herpes infection and control group

Vessels	Main group (n = 69)	Comparison group (n = 75)	Control group (n = 60)
Uterine artery	2.90 ± 0.08* **	1.90 ± 0.06	1.93 ± 0.04
Umbilical artery	3.27 ± 0.20***	2.20 ± 0.11	2.21 ± 0.06
Middle cerebral artery	1.89 ± 0.18* **	3.83 ± 0.10	3.86 ± 0.10

*Note: further on in this document: * — Statistically significant difference between groups I and II (p < 0.001); ** — Statistically significant difference between the control group and I (p < 0.001).*

From this table it is clear that the main group of patients when compared with blood flow velocity curves (BFVC) of utero-placental blood flow was determined by a significant increase in the SDR (2.90 ± 0.08), PI (1.643 ± 0.06) and resistance index (RI) (0.67 ± 0.03) in comparison with indicators of the comparative group and the control group (p < 0.001).

Thus, revealed pathological changes of hemodynamic parameters in the uterine arteries in the study group reveal a violation of the process of ensuring adequate oxygenation and nutrition of the developing fetus.

It is known that pathological BFVC in the arteries of the umbilical cord of the fetus characterized by a decrease in end diastolic velocity of blood flow, which indicates a significant increase in peripheral vascular resistance of fetal part of the placenta, and is expressed in increasing vascular resistance index higher than normative values.

During Doppler research of feta-placental and fetal hemodynamics pregnant women with unaltered feta-placental blood flow and cerebral blood flow were identified in the comparison group were:

–   Fetal hemodynamics without pathological changes on 36.24 ± 4.76 % of observations;
–   Fetal hemodynamics changes on 63.76 ± 3.24 % of observations.

In the analysis of hemodynamic features of the fetus in 36.24 ± 4.76 % of observations there was no significant difference from those of its parameters in the control group, so that feta-placental blood flow was normal.

When analyzing the dopplerometric data of feta-placental blood flow in 44 (63.76 ± 3.24 %) was revealed significant differences in the basic group of pregnant women compared to the comparison group and the control group. There were abnormal changes SDR, RI and PI in these fetuses. Increased systolic-diastolic ratio in the umbilical artery is due to the reduction in diastolic blood component, reflecting the slowing of blood flow in diastole phase due to increased vascular resistance of the fetal part of placenta. When comparing how to determine the tendency to increase "angle independent" index (RI and PI) in the umbilical artery of the fetus in patients of the main group compared to the control group.

Identification of increased vascular resistance in umbilical artery in 44 pregnant women (63.76 ± 3.24 %) of the main group draws much attention. At the same time an increase in vascular resistance in feta-placental link characterized by SDR in umbilical artery (UA) more than 3.0, RI — more than 0.67, PI — more than 0.90.

Patients of the main group in the umbilical artery showed significant changes in the SDR (3.27 ± 0.20), RI (0.73 ± 0.03) and PI (1.05 ± 0.05). In the comparison group, these figures were: SDR (2.20 ± 0.11), RI (0.53 ± 0.02) and PI (0.75 ± 0.04), (p < 0.001).

Analysis of the research showed that assessment of BFVC in the umbilical artery of the fetus of the main group is more characterized by increasing of vascular resistance index.

Table 2. – RI indicators of surveyed vessels of pregnant women with herpes infection and control group

Vessels	Main group (n = 69)	Comparison group (n = 75)	Control group (n = 60)
Uterine artery	0.67 ± 0.03	0.48 ± 0.02	0.49 ± 0.01
Umbilical artery	0.73 ± 0.03* **	0.53 ± 0.02	0.59 ± 0.02
Middle cerebral artery	0.78 ± 0.01	0.79 ± 0.01	0.81 ± 0.02

The definition of «angle independent» index in umbilical artery showed that the study group was determined significant decrease in feta-placental blood flow (FPBF) (P < 0.001), with a significant increase in the values set PI (1.05 ± 0.05) and RI (0.73 ± 0.03) compared to control group indicators. The increase in RI in the umbilical artery, exceeding the norm, a sign of violations of FPBF on dopplerograms. In the comparison group, violation of feta-placental blood flow was observed in 10 % of cases, while in both cases there was a questionable fetal biophysical profile. In 90 % no any violations were found (p < 0.001). Noteworthy is the fact that the decrease in the intensity of the FPBF in the main group in all cases accompanied by chronic intrauterine hypoxia (100 %). Unlike umbilical artery pathological BFVC in the middle cerebral artery is not characterized by decrease but by increase in diastolic blood flow velocity, so when the fetus suffering a decline of numerical values of the indices of vascular resistance in cerebral vessels.

Doppler study of curves velocity in the middle cerebral artery (MCA) was conducted. In the study of dopplerometric indicators the following features have been identified in the main group:

–   Isolated increase in vascular resistance in feta-placental link (SDR in the umbilical artery > 3.0, RI > 0.67) 33.33 ± 8.61 % of observations;
–   Increase in vascular resistance in feta-placental link (SDR in UA > 3.0, RI > 0.67) in combination with a reduction in vascular resistance in the MCA (SDR < 2.3, PI < 1.0) — 26.67 ± 8.67 % of observations.

Table 3. – PI indicators of surveyed vessels of pregnant women with herpes infection and control group

Vessels	Main group (n = 69)	Comparison group (n = 75)	Control group (n = 60)
Uterine artery	1.43 ± 0.06* **	0.65 ± 0.04	0.69 ± 0.03
Umbilical artery	1.05 ± 0.05* **	0.75 ± 0.04	0.72 ± 0.03
Middle cerebral artery	0.98 ± 0.03**	1.61 ± 0.05	1.62 ± 0.03

As shown in the table in the main group SDR was 1.89 ± 0.06, PI — 0.98 ± 0.03, ($p < 0.001$), RI — 0.78 ± 0.01.

In the comparison group, the vascular resistance index in the MCA were within standard values and do not exceed 95 percentile:

SDR — 3.83 ± 0.10, PI — 1.61 ± 0.05, RI — 0.79 ± 0.01.

In the control group these figures were — 3.86 ± 0.10, 1.62 ± 0.03 and 0.81 ± 0.02 respectively.

Conclusion

As you can see from the above data, the restructuring of the fetal hemodynamics leads to increased cerebral blood flow (reduction of vascular resistance index in the middle cerebral artery). During comparative analysis of the vascular resistance in the UA there is increase up to 6 times in the main group relative to the comparison group. It should be emphasized that in this case combined disturbance in placental blood flow detected.

Thus, the Doppler study of blood flow parameters in the feta-placental link of the main group showed that the umbilical artery isolated increase in vascular resistance (SDR above 3.0) is occurs in 33.33 %, combined disturbance of blood flow in the umbilical artery and middle cerebral artery occurs in 26.67 % of observances. It should be noted that generally placental blood flow disturbances in the control group is detected overall in 10 %, and in the main group — 60 %, which is six times more often. Changes in feta-placental blood flow (increased rates of resistance index in umbilical artery and the decline in vascular resistance in the MCA), reflect the current fetal hypoxemia.

In general, as shown by our study, the frequency of adverse perinatal outcomes is increasing in the main group, which are exacerbating by the detection of changes in fetus hemodynamics during dopplerometry.

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Genetic associations of S282T polymorphism of the gene Nat2 with parkinsonism: clinical and molecular comparisons

Abstract: There have been carried out the molecular genetic studies of patients with Parkinson's disease (PD) and vascular parkinsonism (VP) among the people of Uzbek nationality. The association of different genotypes of S282T polymorphism of NAT2 gene with Parkinson's disease was studied. There were revealed significant differences in the frequency of the genotype m/m among the main and control groups ($\chi^2 = 4.9$; $p = 0.02$). Homozygous for mutant alleles of the S282T polymorphism of NAT2 gene was reliably associated with increased risk of PD, the development of akinetic-rigid form and the rapid rate of progression.

Keywords: parkinsonism, Parkinson's disease, NAT2 gene.

Parkinson's disease (PD) is one of the four most common neurodegenerative disease of elders. In average, from 120 to 200 per 100 000 population worldwide is susceptible to this disease [1; 9; 10].

Over the past decade tremendous efforts have made to study the etiology and pathogenesis of Parkinson's disease. Numerous foreign and domestic researches have shown that the basis for the development of PD are complex interactions of genetic and environmental factors [2; 3; 4].

Alongside of the development of molecular genetic technologies, opportunities for the formalization of the genetic components of susceptibility to PD were opened, a significant number of data on the involvement of different polymorphic genes in the predisposition to the formation of PD were accumulated [4; 5; 6; 7; 8; 11].

However, despite the achievements of world scientific society in the human genome studies and the development of high-resolution methods of DNA analysis, still we know relatively small number of genes, which in aggregate only partially explain some of the links in the pathogenesis of PD [6; 12; 13; 14].

Many works indicate the influence of NAT2 acetylation polymorphism on the development of various diseases, including some of the neurological, in particular Parkinson's disease [3; 5; 6; 8]. One of the researches [3] informs about the increasing frequency of polymorphism in the "slow acetylators" in the PD group compared with the control group in the UK, but this relationship was not confirmed after the introduction of corrections for multiple comparisons. These results prompted us to further investigation of

association with PD Nat2 polymorphisms as a marker of increased risk of development of the disease.

We set a **goal to search** for associations of polymorphisms S282T of the gene Nat2 with parkinsonism (Parkinson's disease and vascular parkinsonism) in Uzbek people, as well as carrying out gene-phenotype associations in case of discovery of this connection.

Material and methods: We examined 200 patients with parkinsonism, out of which 140 patients with Parkinson's disease and 60 patients with vascular parkinsonism. As a control group of molecular genetic analysis was performed in 80 patients with chronic cerebral ischemia without signs of parkinsonism, comparable age and gender. Nationality all the patients were Uzbek, namely patient's relatives in three generations have been Uzbeks.

Material for DNA was 1 ml of blood from the cubital vein. For blood collection, storage and transportation, we used vacutainers or disposable plastic tubes with anticoagulant (conservator) with a volume 0.5 ml. The blood was stored at temperatures below –20 °C for further processing.

DNA isolation was carried out according to standard protocol for DNA isolation using a reagent kit Diatom™ DNA Prep 200 (production of "Izogen Laboratory" Ltd., Moscow, Russia).

Further, the supernatant with DNA was subjected to genotyping by direct PCR amplification.

PCR analysis was performed using a set of reagents for PCR amplification of DNA GenePak™ PCR Core (production of "Izogen Laboratory" Ltd., Moscow, Russia). For these purposes, we used ready for the amplification tubes Master Mix containing Taq DNA polymerase inhibited for "hot start" in lyophilized dry condition, desoxynucleozodthreephosphates, and magnesium chloride with final concentrations 1 u, 200 mkM. and 2.5 mM, respectively, as well as optimized buffer system for standard PCR amplification. We added 5 ml. of a mixture of primers with final concentration of 0.5 mM, 10 ml. of PCR solvent, and 5 ml. of investigated DNA in test tubes Master Mix. For PCR amplification, we used GeneAmp® PCR System 9700 with a gold 96-cell block (Applied Biosystems).

Differentiation of DNA samples for the gene Nat2 was performed with primers 5 'gga-aca-aat-tgg-act-tgg 3' (F) and 5 'tct-agc-atg-aat-cac-tct-gc 3' (R).

Since analyzed mutation is a point nucleotide substitution, for its verification was used RFLP analysis — the analysis of restriction fragment length polymorphism (Restriction Fragment Length Polymorphism — RFLP analysis). For the analysis of the selected mutations we used Restrictase Fok1.

PCR amplification products were fractionated in 2–3 % agarose gel for 60–90 min. at a voltage of 100–120 V., colored with ethidium bromide, and visualized under UV light (Fig.1).
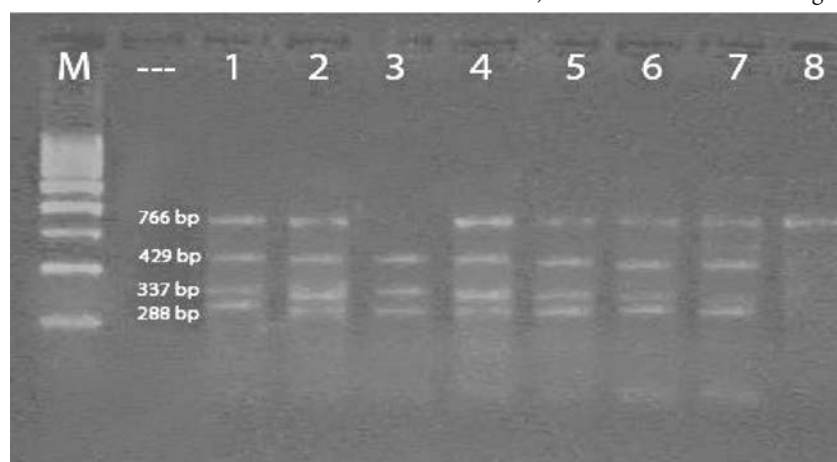
Fig.1. The analysis of Nat2 gene in patients with PD in the DNA samples of 8 patients: M — molecular marker; ---- Control of the reaction; 1–8 — the samples of patients; 1, 2, 4–7 — genotype wt/m; 3 — genotype wt/wt; 8 — genotype m/m

Results of research and discussion

During carrying out of the molecular genetic studies to search for mutations in the gene NAT2 S282T homozygotes by mutant alleles were detected in patients with Parkinson's disease in 15 % (30 patients), which was reliably (p < 0.05) higher than in the control group in which this mutation observed in 6.25 % of cases (5 patients). Study of the odds ratio (OR) showed that the OR > 1, i.e. S282T mutation in the gene NAT2 OR = 2.8 (95 % CI 1.01 to 8.7) and that the chances of developing Parkinson's disease patients with mutations in the gene NAT2 S282T were increased in 2.8 times (Table 1).

Table 1. – The distribution of NAT2 genotypes in patients with parkinsonism and control sample

Genotype	control (n = 80)		patients (n = 200)		χ^2	p	OR
	n	%	n	%			
wt/wt	45	56.25	78	39	6.2	0.01	0.49 (0.28–0.87)
wt/m	30	37.5	92	46	1.35	0.24	1.4 (0.8–2.5)
m/m	5	6.25	30	15	3.9	0.05	2.8 (1.01–8.7)

Note: wt — wild-type allele; m — mutant type allele; χ^2 — Pearson distribution; p — significance level; OR — odds ratio, reliable parameters and high odds ratios marked in bold font.

Comparative analysis of gene NAT2 genotype frequencies between samples of patients with parkinsonism and the control group, we were able to obtain a statistically significant difference in genotype distribution in the case of wt/wt (p = 0.01, χ^2 = 6.2), with OR = 0.49, which indicates that the wild-type allele is not associated with the development of parkinsonism. The table demonstrates that there is a quantitative predominance of genotype wt/m in the group with par-

kinsonism (46 %) compared with the control group (37.5 %), however, significant differences were not found between the groups (p = 0.24).

Genotypes within which there is a wild-type allele, associated mainly with the phenotype of rapid acetylators, while homozygotes for mutant alleles — with a phenotype of slow acetylators.

We also investigated the frequency of occurrence of different genotypes of S282T polymorphism, depending on the clinical

form of parkinsonism. The analysis revealed significant differences in the incidence of genotype m/m in patients with PD (17.98 %) compared with the control group (6.25 %) ($\chi^2 = 4.9$, p = 0.02). The value of OR = 3.26 indicates an association of genotype with the development of PD. In analyzing the distribution of the genotype wt/wt revealed that the "wild" genotype was significantly more common in the control group (56.25 %) compared with PD (32.1 %) ($\chi^2 = 11.2$, p = 0.001). The value of OR = 0.37 suggests an association of the genotype with resistance to the development of PD. In patients with VP frequency of occurrence of different genotypes of S282T polymorphism of NAT2 gene had no statistically reliable differences with the control group, but with the PD group had significant differences in genotype wt/wt, a value of OR = 0.39 (Table 2).

Table 2. – The distribution of NAT2 genotypes depending on the clinical forms of parkinsonism

Genotype	Control (n = 80)		Patients with PD (n = 140)		Patients with VP (n = 60)		P1	P2	P3
	n	%	n	%	n	%			
wt/wt	45	56.25	45	32.1	33	55	0.001	0.1	0.005
wt/m	30	37.5	70	50	22	36.7	0.09	0.1	0.1
m/m	5	6.25	25	17.9	5	8.3	0.02	0.9	0.13

Note: wt — wild-type allele; m — mutant allele of type; P1 — reliability of differences between control subjects and patients with PD; P2 — reliability of differences between control subjects and patients with VP; P3 — reliability of differences between patients with PD and VP, reliable parameters marked in bold font.

We examined the association between genotype m/m with various clinical features of Parkinson's disease. In this case two of them were identified: association with the variant of the disease and the rate of progression: this genotype was associated with an akinetic-rigid form of the disease (60 %) and rapid progression (48 %)

Conclusions: The study of S282T polymorphism of NAT2 gene shows increase in frequency of genotype m/m in patients with PD ($\chi^2 = 4.9$; p = 0.02). Homozygous by mutant alleles of the S282T polymorphism of NAT2 gene is associated with increased risk of PD, development of its akinetic-rigid form and rapid progression.

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Opportunities of radiologic diagnostics in case of malignant tumors of pancreas

Abstract: Pancreatic cancer is the 10th most common malignancy and the 4th largest cancer death cause in adults [1]. Surgery offers the only chance of curing these patients. Complete surgical resection is associated with a 5-year survival rate of between 20 and 30 % [1]. About 48,960 people (24,840 men and 24,120 women) will be diagnosed with pancreatic cancer. About 40,560 people (20,710 men and 19,850 women) will die of pancreatic cancer [2]. Rates of pancreatic cancer have been fairly stable over the past several years. Pancreatic cancer accounts for about 3 % of all cancers in the US, and accounts for about 7 % of cancer deaths [3]. The average lifetime risk of developing pancreatic cancer is about 1 in 67 (1.5 %). We review all information's and method during past 20 years.

Keywords: pancreas, diagnosis, tumor, imaging.

Imaging methods

The main aim of imaging tests is early detection as well as an accurate staging of lesion extension and possible vessel invasion. This is done in order to choose the best clinical and therapeutic management. Multiple methods have been developed in the last few decades to improve pancreatic cancer detection. However, taken individually these imaging tests have variable sensitivity.

Endoscopic Retrograde Cholangiopancreatography (ERCP)

This procedure allows for visualization of the hepatobiliary tree, sampling of pure pancreatic juice and assessment for genetic analysis of tissue from biopsies and brushings [4]. The role of ERCP in the diagnosis of pancreatic cancer is considerably reduced, if compared to the past. Due to the post-procedural risk of pancreatitis, it is mainly a therapeutic modality with stent placement in patients with obstructive disease, whereas its diagnostic role has been replaced by EUS and MRCP, where available [4].

Transabdominal Ultrasound (TUS)

Transabdominal US is commonly the first line imaging test for patients with suspected pancreatic cancer, due to its wide availability, safety and low cost. Limitations of pancreas visualization are represented by the patient's body habitus, overlying bowel gas, as well as sonographer experience [4]. The sensitivity of US in detecting pancreatic tumors can be up to 95 %. If the lesion is more than 3 cm. Recent studies have shown an increased sensitivity for small lesions (< 2 cm.), similar to CT scan, as well as a better characterization (adenocarcinoma and neuro-endocrine tumors), and vascular staging [5]. Though US is a sensitive method to detect small liver metastases [4], US alone can't guarantee enough accuracy in diagnosis and staging of pancreatic tumors. Therefore, it should be considered a useful tool for initial assessment in suspected pancreatic lesions.

Intraductal Ultrasound (IDUS)

IDUS is a relatively new ultrasonographic modality that uses small-caliber, high-frequency catheters (5–10 Fr., 12–30 MHz). IDUS can visualize both ductal systems and intraluminal strictures. The imaging process can be performed during ERCP, offering complementary information to this procedure. IDUS seems to be particularly beneficial in the differential diagnosis between pancreatic neoplasms and chronic pancreatitis if a main pancreatic duct stenosis is present, with very high sensitivity and specificity, reaching 100 % and 92 % respectively [6]. This method is also beneficial when an IPMN is suspected, with a more detailed resolution imaging comparing to traditional endosonography [4]. This is also true for the diagnosis of pancreatic mass invading the common bile duct (CBD), with a high sensitivity and specificity, (respectively > 90 % and > 80 %) [6].

Endoscopic Ultrasound (EUS)

Numerous early publications indicated thatEUS is highly sensitive for the detection of pancreatic tumors with rates higher than 90 % [6]. The advantage of EUS over classical CT was especially evident for lesions less than 3 cm [1]. Sensitivity of EUS 99 %, CT 55 % [6]. This advantage of EUS continued when compared to helical CT for lesions up to 1.5 cm: EUS 100 %, CT 67 % [12]. In a recent review of the literature by Hunt et al. EUS had a clearly superior rate in the detection of pancreatic tumors: EUS 97 %, helical CT 73 %.

Computed tomography (CT) and Magnetic resonance imaging (MRI)

Older studies have indicated that CT and MRI perform equally in assessing the respectability of pancreatic cancer. In a recent comparative study, MRI had a 96 % accuracy versus 81 % of helical CT in predicting resectability of pancreatic cancer [14]. Contrast enhanced MRI was found to be as accurate as contrast enhanced helical CT in the detection and staging of pancreatic cancer. MRI was more sensitive in the detection of small abdominal metastases [15]. MRI pancreato-cholangiography (MRCP) was founded more accurate and non-invasive method for diagnosing of extrahepatic bile ducts and main pancreatic duct. A newly published retrospective study [16] evaluated the sensitivity and specificity of multiphasic thin slice helical CT in the detection of cancers 2 cm. or smaller at pathological examination. The sensitivity was 97 % and specificity 100 %.

Positron Emission Tomography (PET)

PET has a marginal role in detection and staging of pancreatic cancer, due to poor spatial resolution, whereas it can be relevant in the detection of distant metastases, as in the evaluation of loco regional tumor recurrence [5]. A recent retrospective analysis described pre-radiation FDG-PET parameters as a significant tool in the prediction of prognosis, in patient with locally advanced non-resectable pancreatic cancer [7].

The most used PET radiotracer is 18-fluoro-deoxy-glucose (18-FDG), a glucose analog, which is transported intracellularly via glucose transporters, highly expressed in tumoral cells [4]. Its sensitivity in detecting pancreatic cancer ranges from 71 to 92 %, with a specificity of 64–94 % [8]. Lytras *et al.* recently reported a comparable accuracy to CT in pancreatic assessment, without any additional information in patients with equivocal findings [9]. Frolich et al. showed an overall specificity of 95 % in detecting liver metastases, with a better yield for larger lesions (specificity of 97 % for > 1 cm.

masses, whereas 45 % specificity for < 1 cm. ones) [10]. False positive results can be reported in several inflammatory diseases like pancreatitis, or hyperglycemic states 4. Preliminary studies have shown that a combination of functional information, provided by FDG-PET and anatomic information provided by CT can be relevant in pancreatic cancer imaging. The positive and negative predictive values of PET/CT for the diagnosis of pancreatic mass are 91 % and 69 % respectively, allowing a change in patient management. Due to its high positive predictive value in the detection of distal metastases, this novel method should be considered before pancreatic resection [11].

Conclusions

Radiologic methods are important for understanding of tumors of pancreas. Main role of radiologic methods is to early detection of pathologic process and find distant metastasis. Combination of radiologic methods is superior for detection, good staging, tissue diagnosis and potential therapy for the tumors of pancreas.

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Autoimmun pancreatitis mimiking multiple pancreatic cancer: case report

Abstract: Autoimmune pancreatitis is a rare type of chronic pancreatitis that can mimic pancreatic cancer. Our clinical report was about a case of autoimmune pancreatitis with separated location and false-positive findings of imaging on CT, MRI, ERCP, US, and PET/CT suggestive of pancreatic tumor. When the tumor marker CA 19–9 is not elevated in cases involving a pancreatic mass, pancreatic cancer should be differentiated from mass-forming pancreatitis. However, the results of these auxiliary examinations could not be ignored minimally invasive biopsy was the safest choice in this case, since no other method, including tumor marker assessment, could provide a clear diagnosis.

Keywords: Autoimmun pancreatitis, pancreas, cancer, diagnosis, radiology, positron emission tomography, markers.

Introduction

Autoimmune pancreatitis is a rare type of chronic pancreatitis that can mimic pancreatic cancer [1]. It accounted for 5–6 % of all patients with chronic pancreatitis. Autoimmune pancreatitis (AIP) typically affects middle-aged patients who lack the risk factors associated with chronic pancreatitis. Although AIP primarily affects the pancreas, several other organs systems including the bile ducts, the kidneys, the retroperitoneum, and the salivary glands may be involved. Elevation of serum Ig-G4 is the best serologic marker. The predominant histologic feature of AIP is infiltration of Ig-G4-positive lymphocytes into pancreatic or extrapancreatic tissue.

The clinical presentation of AIP can vary widely. Most patients present with jaundice or abdominal pain. The hallmark of this disease entity is a periductal infiltrate of CD4-or CD8-positive lymphocytes and IgG4-positive plasma cells. At the initial stages, there is a cuff of lymphoplasma cells surrounding the ducts but also more diffuse infiltration in the lobular parenchyma. Interstitial fibrosis and acinar cell atrophy appears in later stages. Focal masslike or segmental enlargement of the pancreas is seen in 30–40 % of patients with AIP. On CT, the enlarged segment of the pancreas is typically isoattenuating or hypoattenuating to the spared, nonenlarged segment of pancreatic parenchyma and may be indistinguishable from PC.

We report a rare case of a patient with histologically proven AIP mimicking multiple pancreatic ductal adenocarcinomas.

Case report

A 74 — year old man was admitted for his regular check-up. Multiple pancreatic mass like lesions were found on ultrasound. He had no abdominal symptoms. The serum tumor markers carcinoembriogenic antigen (CEA), carbohydrate antigen (CA 19–9) was normal.

Abdominal CT scan showed swelling of the pancreas and multiple hypovascular lesions in the head, neck and tail of the pancreas (fig. 1). The largest one in the tail measured 7 cm.

MRI also revealed hypovascular lesions in the head, neck and tail of the pancreas (fig. 2). They were hypointense on precontrast T1-weighted images and slightly hyperintense on T2-weighted images. Splenic vein was obliterated by the mass. Peripancreatic fat infiltration also was noted.
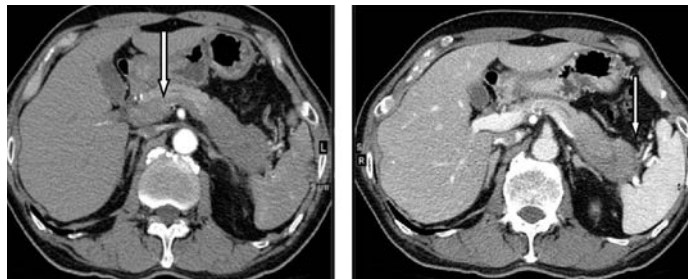
Fig. 1. CECT
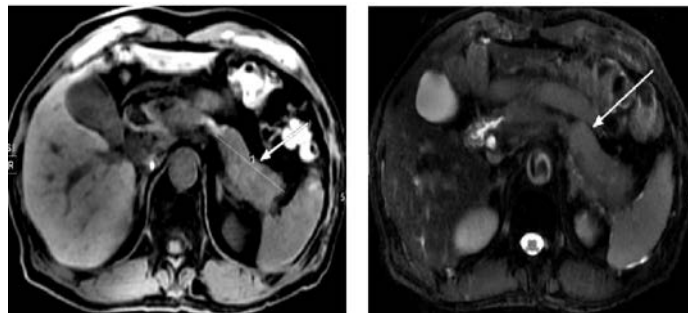
Fig. 2. MRI

We suspected multiple pancreatic ductal carcinomas. Although hypovascular mass like lesion strongly suggest the pancreatic cancer, the other findings such as mild pancreatic ductal dilatation compared to size of the mass and multiplicity were not common feature for the pancreatic ductal carcinoma.

Therefore, the patient underwent PET/CT. On F18-FDG-PET/CT mass lesions in pancreatic neck and tail showed intensely increased FDG uptake which is highly suggesting of malignant lesions. The lesion in pancreas head showed mildly increased FDG uptake.
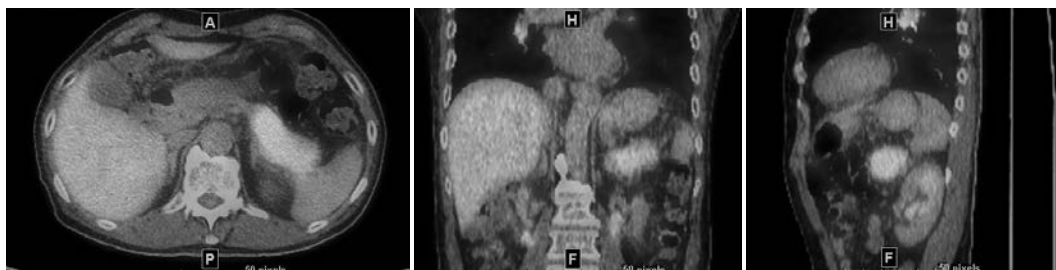
Fig. 3. PET/CT

Endoscopic ultrasound (EUS) showed solid, anechoic, inhomogenous lesions in the head, neck, highly suspecting pancreatic cancer. Fine needle aspiration (FNA) of the pancreatic mass-like lesion aspirate cytology was epithelial cells with moderate dysplasia, but due to lack of sample to making conclusive histologic diagnosis was difficult.

Under the high suspicion to pancreatic tail cancer, patient was planned for laparoscopy assisted distal pancreatectomy. However, the intraoperative ultrasound showed multiple pancreatic tumor infiltration to colonic mesentery after what provided laparoscopy assisted total pancreatectomy with splenectomy (fig. 4).
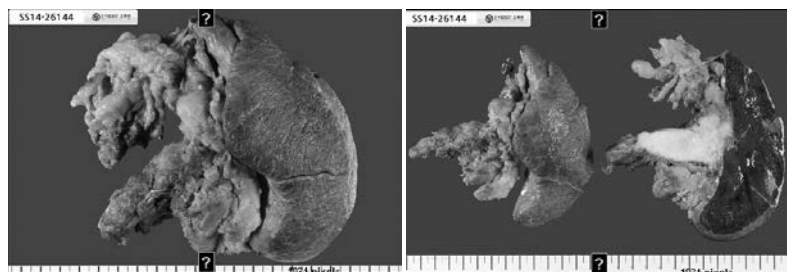
Fig. 4. Surgical specimen

Hispathologic examination revealed severe lymphoblastic infiltration and fibrous changes and obliterative phlebitis in the pancreatic stroma and adhesions to spleen and adrenal gland which were consistent with IgG4-related pancreatitis (type 1 autoimmune pancreatitis). Immunohistochemical stain showed positive IgG (110/HPF) and IgG4 (75/HPF), and IgG4/IgG ratio was about 68 %. Repeated serum tumor markers were also within normal limits.

Discussion

Autoimmune pancreatitis (AIP) is a rare pancreatic disorder that in recent years is drawing the attention of many clinicians because of the differential diagnosis with pancreatic cancer [1]. AIP is currently still a rare disease and is difficult to distinguish from pancreatitis and pancreatic cancer in the early period [2]. Unlike usual chronic pancreatitis, AIP is a relatively painless disease, despite histology showing chronic pancreatic inflammation and evidence of pancreatic edema, peripancreatic inflammation, and in some cases pancreatic calculi [3].

AIP is thought to comprise two distinct clinicopathologic syndrome, designated as type 1 and 2. Type 1 AIP is thought to be a prototype of IgG4-related systemic disease with predominant involvement of the pancreas.

Patients with type 1 AIP usually present obstructive jaundice associated with high level of IgG4 in serum and a pancreatic mass at radiological imaging. IgG4-related diseases affect many organs such as the pancreas, biliary tract, liver, central nervous system, thyroid gland, prostate, kidney, retroperitoneal, and lymph nodes. It affects mainly middle-aged and elderly men with male to female ratio 4–7.5:1. The initial remission rate is high with corticosteroid therapy; however, type 1 AIP has a high 3-year relapse rate of up to 60 %.

Both AIP and PC have common clinical manifestations, such as preponderance in elderly men, presentation with obstructive jaundice, and elevated level of serum tumor markers, making it difficult to distinguish these two entities. Although the diffuse form of AIP usually can be distinguished from PC on imaging, differentiating focal AIP from PC is challenging. In our case, multiple focal hypovascular lesions made it difficult to diagnose correctly.

North America, about 2.5 % of patients with a preoperative diagnosis of pancreatic cancer are diagnosed with AIP postoperatively. Because the inflammatory lesion in AIP sometimes produces a whitish, fibrosclerotic, tumour-like mass in the pancreas (most frequently in the head of the pancreas), pancreatic cancer represents the most important differential diagnosis [4]. Autoimmune pancreatitis frequently causes the appearance of a mass in the pancreas in radiological tests and it is confused with cancer of the pancreas. CECT and MRI with MRCP gives chance to confirm diagnosis of AIP. CECT in pancreatic cancer cases can show Positron emission tomography (PET) scanning with F18–2-deoxyglucose (FDG) shows an increased uptake in AIP, but this is also seen in pancreatic cancer [5]. Ozaki et al. [6] examined FDG uptake in 15 AIP patients and 26 pancreatic cancer patients. They observed FDG accumulation in pancreatic lesions in all AIP patients, but only in 73 % of the cancer patients. The accumulation pattern more frequently showed a nodular shape in pancreatic cancer, while it had a tendency to be more longitudinal in AIP, but also in the diffuse type of pancreatic cancer [6]. Another study showed a diffuse uptake in 53 % of AIP patients, but only in 3 % of pancreatic cancer patients [7], Kamisawa et al. [8] reported that 27 % of AIP patients had focal pancreatic changes in the pancreatic head. In another study, the focal type of AIP was found in 53 % of pancreatic resection specimens which were originally removed due to the suspicion of pancreatic cancer, but which postoperatively turned out to lack pancreatic malignancy [9]. CT in pancreatic cancer shows poor contrast enhancement and low density mass with duct dilatation. Our patient CECT and MRI presented with atypical radiologic pattern of AIP, such as low density mass in head, body and tail of pancreas. In these cases of AIP differentiation between pancreatic cancers is more difficult. EUS-FNA gives more accurate in this situation. Due to small sample of FNA we need to provide every method for accurate diagnosis of AIP and pancreatic cancer.

Conclusion

Our clinical report was about a case of autoimmune pancreatitis with separated location and false-positive findings on CT, MRI, ERCP, US, and PET/CT suggestive of pancreatic tumor. However, the results of these auxiliary examinations could not be ignored minimally invasive biopsy was the safest choice in this case, since no other method, including tumor marker assessment, could provide a clear diagnosis. When the tumor marker CA 19–9 is not elevated in cases involving a pancreatic mass, pancreatic cancer should be differentiated from mass-forming pancreatitis.

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A modified open surgical technique for the management of posterior urethral injuries

Abstract: The results of modified urethroplasty of 17 patients with urethral injuries at the age from 18 to 62 years have been retrospectively studied. The authors maintain that new technique is optimal for the repair of posterior urethral injuries and may reduce the incidence of postoperative restructure.

Keywords: Urethroplasty, posterior urethral stricture, operative technique, urethral injury, pelvis fracture.

Introduction

Urethral strictures have always been common. As long ago as in ancient Greece, urethral stricture disease was cited in reports that described bladder drainage through the use of various catheters. Urethral stricture is the result of the development of scar tissue after either traumatic or inflammatory injury of the urethra. The condition has challenged urologists in the past and is still one of the most testing situations for the surgeon [11; 15].

Urethral injuries from external trauma are among the most serious affecting the genitourinary system, with major debilitating complications that include urine retention, impotence, incontinence, stricture, fistula and abscess formation and they lead to the lethal outcomes, long — termed disability and invalidity [5; 13].

Post-traumatic urethral injuries frequently occur as a result of pelvic fractures during vehicular accidents and catatrauma. In the structure of the combined injuries of pelvis and lower urinary tracts consist from 4.4 to 12.8 % [13]. As the membranous urethra is fixed to the tough perineal membrane, which is attached firmly to the pubic arch, any major force causing pelvic fracture leads the prostate to rise towards the abdominal cavity, stretching and straining the bulbous urethra [6].

The choice of management of posterior urethral injury remains controversial [17]. Initial supra pubic cystostomy is based on the Johanson principle, and delayed urethral re-construction had been considered as a reference standard for managing anterior urethral injuries [14]. This approach has problems like need of a supra pubic drainage for prolonged period (6 weeks to 3 months) as well as formation of an inevitable urethral stricture requiring reconstructive urethroplasty [10], but it has become widely accepted in the past

three decades, as it avoids surgical interventions in the presence of major pelvic haematomas, therefore implying a greater risk of infection and excessive blood loss [4]. Recent advances in endourological techniques have made primary realignment feasible to perform with minimal manipulation. But there is great variation in recurrence rates reported after urethral dilatations and urethrotomies with a 50 to 60 % success rate in short strictures without spongiofibrosis. In longer strictures with spongiofibrosis, the recurrence rate is about 80 % because of scarring contraction [16], so the idea is to use the external metallic frame ring during the immediate urethroplasty for preventing recurrence based on mechanical interference to prevent the scarring process that ends in contraction.

At Republican research center for emergency medicine till 2011 we managed all male patients with urethral disruption from blunt trauma with suprapubic cystostomy and later stricture repair when necessary. And for last 5 years we manage the patients with posterior urethral injuries by using external metallic frame ring during the immediate urethroplasty without supra pubic cystostomy.

We herewith retrospectively analyse our experience with immediate realignment of posterior urethral injuries.

Purpose

The aim of this work is to describe and assess the results of a modified open surgical technique use of the external metallic frame ring in the immediate treatment of posterior urethral injuries.

Materials and methods

We carried out our study in the Urology department of Republican research center for emergency medicine from April 2012 to September 2015. It included 17 male patients with posterior urethral

injuries, who were diagnosed and treated at our center and underwent urethroplasty during this period. The mean age was 32 years (18–62). Of 17 patients presented, 5 (29.4%) patients had car accident, 8 (47%) patients fall from high, and 4 (23.5%) patients had history of urethritis and three of them had history of traumatized catheterization and one experienced internal urethrotomy. Patient with post-traumatic urethral injuries 13 (76.5%) and 8 (61.5%) of them had complete and other 5 (38.5%) patients had partial disruption.

Patients had acute retention of urine and/or bleeding per urethra and were treated on emergency basis. A detailed clinical evaluation was performed and previous treatment records were reviewed to know the exact pathology in the urethra.

Prior to surgery physical examination, urinalysis, postvoiding residual urine volume measurement, urethroscopy, ultrasound scan of the urinary tract and retrograde urethrography were performed. Patients who had suprapubic catheters also had a micturiting urethrogram performed. In all cases, the surgeon would be present in the fluoroscopy room during the urethrogram so as to ensure that the radiographic study adequately demonstrates the extent and location of the urethral stricture (Fig.1).
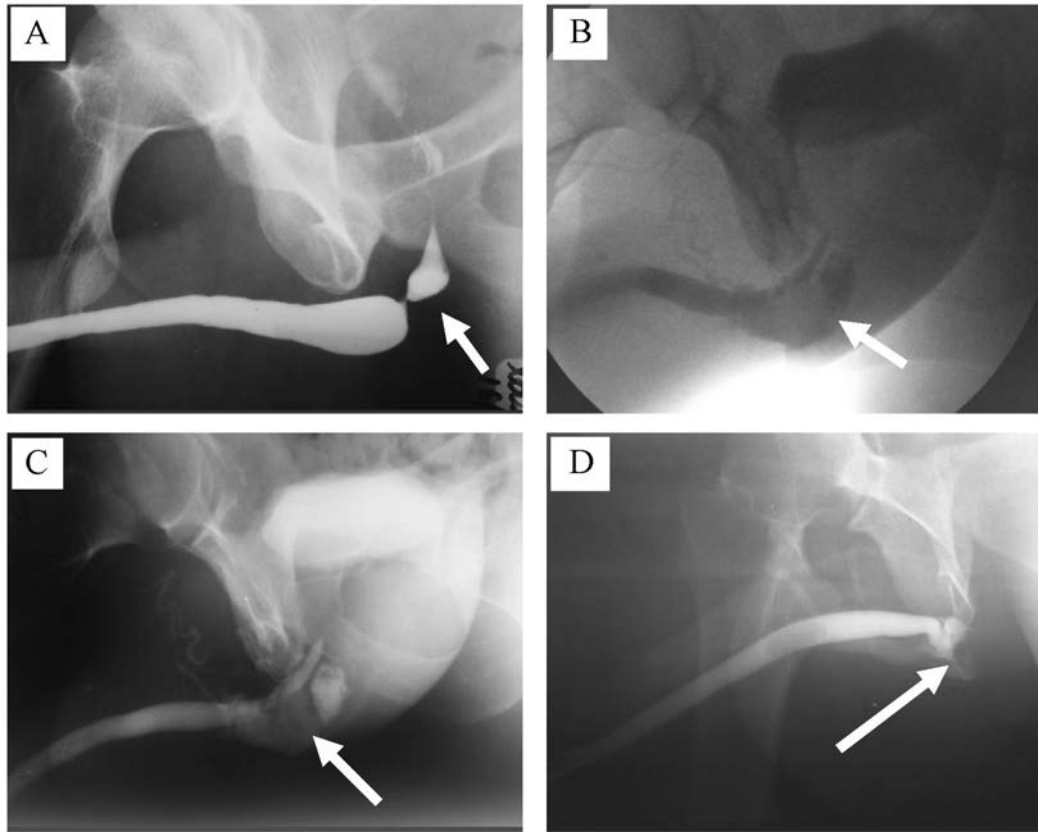
Fig. 1. Retrograde urethrography: A. Shows short 0.5 cm. subtotal stricture of bulbar urethra. Patient had endoscopic treatment. B. C. D. Show extravasation typical of prostatomembranous rupture

For 2 (11.7%) patients with post-traumatic urethral injury we performed cystourethroscopy. Perioperative antibiotic prophylaxis with single dose intravenous 2nd generation cephalosporins were administered in all cases and postoperative antibiotics prescribed routinely.

All patients underwent to the immediate reconstructive urethroplasty with using an external metallic frame ring and urethral repairs were routinely stented with a size 18F siliconised catheter. This innovation was registered at the Patent Bureau of Uzbekistan IAP 20130237 (Fig. 2).
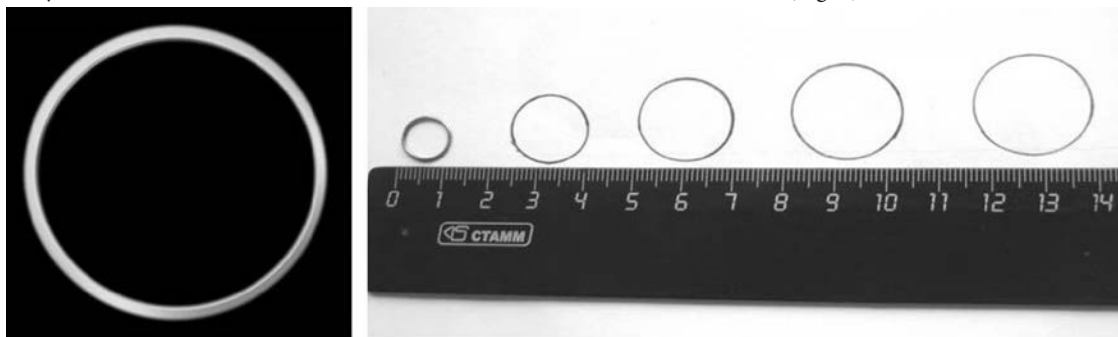
Fig. 2. Titan ring that used as external frame for anastomotic urethroplasty.

Follow-up protocol included urethrograms at 3 and 6 months and 1 year. Subsequently, they were reviewed annually. For patients unable to visit the clinic, telephone interviews were conducted regarding their current voiding symptoms. Descriptive statistical analysis was conducted with MS Excel 2000 (Microsoft).

Operative technique

Under general anaesthesia in lithotomy position with the legs on adjustable leg supports. The patient receives 2nd generation cephalosporins as perioperative antibiotic prophylaxis and also during the formation of anastomosis in patients with post — traumatic

injury of urethra the surgical field irrigated with mixture of antibiotic and solution of furatsilin.

Perform a longitudinal perineal incision as the Y. The bulbospongiosus muscle may be incises with the electrocautery (set to "cut") or sharp dissection. Patients with complete disruption of the posterior urethra sometimes the proximal urethral stump is difficult to find because of hematoma and tissue damage. So to find the proximal stump of the urethra we could use 16F or 18F siliconised catheter and also we will solve the retention of the patient. Then if it is necessary the proximal stump of the urethra spatulates without damaging the external sphincter. We have to resect the distal stump of the bulbous urethra economly till the normal urethral mucosa because of ruptured fragments that could not be used for reconstruction. For better preparation, we mobilize the urethra and the spongy body of the penis from the cavernous corpora about 2.0–2.5 cm. If necessary, we mobilize the urethra proximally and distally with sharp and blunt dissection for better anastomosis construction.

Then titan ring placed to the distal side of urethra externally. Then we place 5 sutures at the 10, 12, and 2 o'clock positions to the dorsal urethra and at the 7 and 5 o'clock positions to the ventral urethra of proximal urethra with absorbable sutures. The choice of suture material clearly evolves based on the surgeon's experience and bias; however, absorbable suture is the rule in urethral surgery. Then an 18F transurethral siliconised catheter placed. After all 5 sutures placed, each corresponding suture is placed into its proper spot in the distal urethra (mucosa-to-mucosa). We support two-layer closure of anastomosis: first — layer the urethral mucosa – to-mucosa with multiple interrupted 6–0 PDS sutures. And the second — layer is suturing of muscularis and adventitia of urethra that closed with multiple interrupted 5–0 PDS sutures. After that the titan ring fixes with the sutures of the second-layer as external frame (Fig. 3 and Fig. 4). We advocate performing immediate urethroplasty without suprapubic catheter. In generally the urethral catheter removed about 15–18 days after the operation.
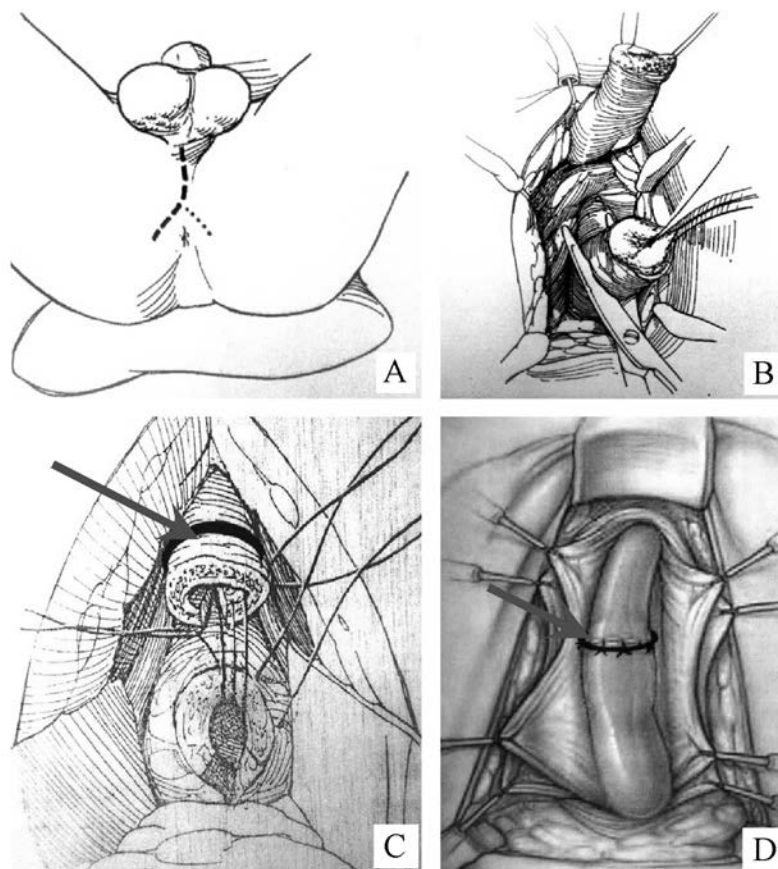
Fig. 3. A — Lithotomy position and longitudinal perineal incision as the Y; B — Excision of damaged area;
C — Formation of end-to-end anastomosis with using external frame titan ring (frame titan ring set with arrow);
D — Final appearance of urethra-urethra anastomosis with external frame titan ring

Results and discussion

The clinical presentation of patients with urethral stricture were acute urine retention in 9 (53 %) patients, bleeding per external urethral meatus in 13 (76.4 %) patients, and weak urinary stream and straining to void in 8 (47 %) patients. All 17 patients were treated by end-to-end urethroplasty with external metallic frame ring no patients had intraoperative complications. May be the following period is not so much but for that period no patients had recurrent stricture. Urinary continence was achieved in all patients.

The length of strictures ranged from 0.5 cm. to 1.8 cm., and the average length of the stricture was 1.2 cm. In patients with inflammatory urethral strictures mean duration of urethral stenosis was 2.6 years (1.1–5.8). Of the 17 patients 1 patient developed early postoperative complications inform of wound infection, and dehiscence that healed by secondary intention. Mean blood loss was 350 ml. (range, 200–800 ml). The average operating time was 2.5 h. in the perineal approach. None of our patients required neither intra- operatively nor post-operatively blood transfusion. Mean follow-up has been 2 years, with the shortest 3 months. 3 (17.6 %) of the patients had erectile dysfunction, but 1 regained potency after 5 months and other 2 (11.7 %) regained after 1 year.

Postoperative urethrograms were performed between 1 and 3 months after surgery, depending on the extent of surgery. 2 patients admitted with suprapubic catheters after operation demonstrated satisfactory voiding per urethra then the suprapubic catheters were removed.
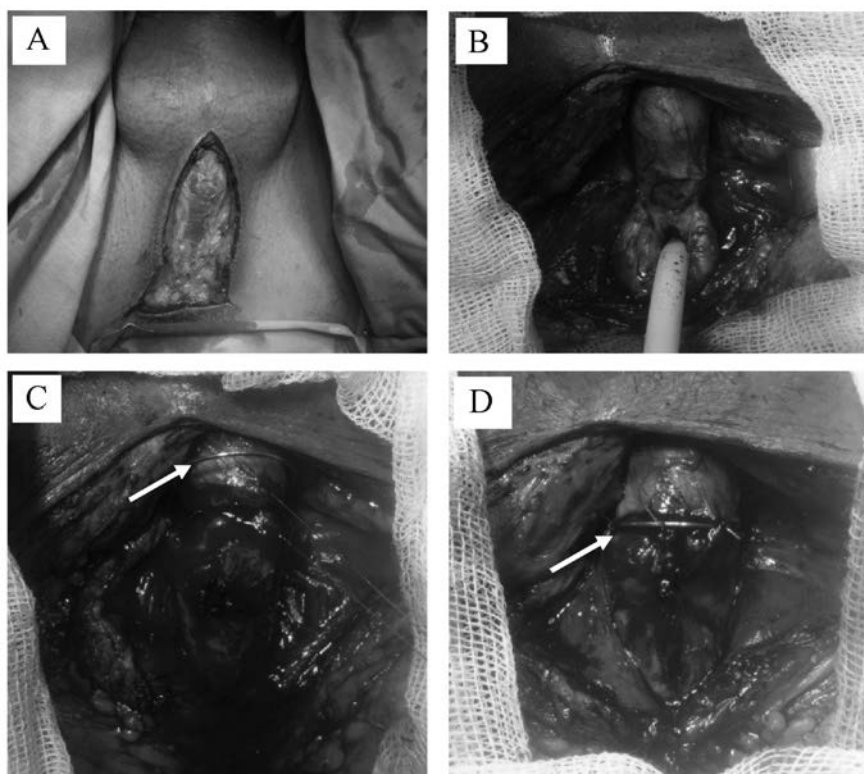
Fig. 4. Steps of anastomotic urethroplasty: A — Longitudinal perineal incision as the Y; B — Catheterization the proximal stump of the urethra to solve the retention of the patient; C — First layer closure (mucosa-to-mucosa); D — Second layer closure with fixation of titan ring as external frame of anastomosis

There were no cases of urethral fistula, urethral, diverticulum, hair growth or penile curvature/shortening. Other minor complications included epididymo-orchitis (1) and wound infection (1).

Controversy continues regarding proper management of traumatic urethral disruption. The suggested surgical treatment modalities include: a) immediate primary simple realignment over a stenting catheter; b) immediate primary suture repair; c) immediate suprapubic cystostomy alone, with delayed elective urethroplasty for the resulting stricture. Many urologists believe that delayed urethral reconstruction is the safest method [1; 5; 14]. However, placement of suprapubic catheter significantly impairs the patient's quality of life. With respect to urethral stricture, immediate management with realignment of a complete disrupted urethra is supported by the data of Ku et al. [7], who found a stricture rate of 31 % when immediate management was performed, compared with 69 % in patients in whom management was delayed. In addition, the degree of urethral stricture in patients who underwent delayed management was more severe than in those with immediate realignment.

The advantage of immediate careful urethral catheter realignment was underlined by Herschorn et al. [4]. They found it to be a safe maneuver that obviated urethral closure. If posttraumatic urethral obliteration of less than 2 cm. develops, it can be managed successfully with a one-stage perineal bulboprostatic anastomotic repair. An overall long-term success rate of up to 97 % has been reported after that procedure. Problems generally arise when the urethral defect is not subjected to anastomosis without tension; for such patients, urethral substitution tissue is necessary.

Elliot and Barret [3] followed 56 patients with posterior urethral disruptions who underwent primary urethral realignment within 6 h. of injury; the pelvis was fractured in 52, and 53 were available for the long-term follow-up. In all, 36 patients (68 %) had strictures after re-alignment and 13 (25 %) had more significant strictures that required a repeat procedure under general anaesthesia.

Moudouni S. M. et al. described early endoscopic realignment of posterior traumatic urethral disruption [9]. On follow up of 68 months they concluded that the urethral continuity could be established without any increase in the incidence of impotence, stricture formation or incontinence. In case of failure, endoscopic realignment doesn't compromise the results of secondary urethroplasty.
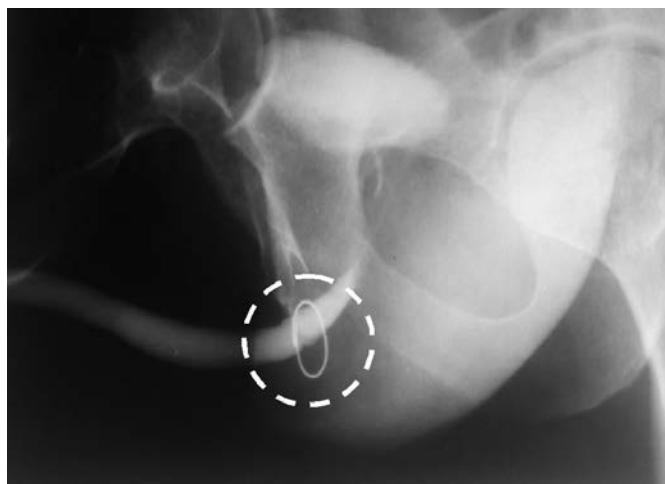
Fig. 5. Retrograde urethrography 6 months after primary reconstruction for urethral trauma

Due to low success rates of internal urethrotomy and difficulty in the urethroplasty technique, clinicians searched for alternative methods which can be used in the treatment of urethral strictures including metallic urethral stents. Milroy et al. reported a 63 % success rate at long term follow-up of the permanently implantable "Urolume" stent [8]. Also Sertcelik et al. reported their clinical experience with urethral stent. In that study they reported an 87 % success rate at a mean of 3.8-year follow-up in 60 patients who had recurrent bulbar urethral stenosis [12].

Based on our experience we feel that immediate reconstructive urethroplasty with using an external metallic frame ring realignment of post-traumatic posterior disruption is feasible, safe and effective. The major drawback of our study is small number of patients and lack of comparison with patients who were managed by delayed method and immediate urethroplasty without external metallic frame ring.

Conclusion

Immediate open reconstructive surgery realignment with external metallic frame ring posterior urethral disruption is a feasible, safe and effective treatment modality for management of these patients. Our suggested technique is optimal for the repair of posterior urethral injuries and may reduce the incidence of postoperative restricture and we believe that it will find a place in reconstructive surgery of urethra.

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Phacoemulsification of diabetic cataract with pseudoexfoliation syndrome

Abstract: It is carried out the analysis of intraoperative and postoperative course of diabetic cataract phacoemulsification combined with pseudoexfoliation syndrome, depending on the methodology used by phacoemulsification.

Keywords: diabetic cataract, Pseudoexfoliation syndrome, phacoemulsification.

Relevance

Today significantly expanded the indications for phacoemulsification of diabetic cataract, in connection with the increased attention to the prognostically unfavorable situations in terms of occurrence of intraoperative and postoperative complications. Pseudoexfoliation syndrome — the age-associated pathology of the extracellular matrix, accompanied by excessive production and accumulation of abnormal extracellular material in various intraocular and extraocular tissues. These ultrasound biomicroscopy in the preoperative examination of the patient adequately assess the degree of damage Zinn ligaments [2, 27–38]. This situation is exacerbated when combined with diabetic cataract, which has its own characteristics: localization of opacities in the posterior subcapsular layers, a sharp increase in the core, the rigidity of the front lens capsule, opacification posterior lens capsule and so on, as well as concomitant diabetic changes in the surrounding tissue: rubeosis of the iris, the presence of mooring in the vitreous humor, diabetic retinopathy, increased fragility of blood vessels eye, bleeding tendency

and so on [1, 1–22; 3, 15–19; 6, 1041–1047]. Taking into account the initial state of this pathology is necessary to perform ophthalmic surgery phacoemulsification with minimal time ultrasound to reduce the negative impact of its (time absorbed tissues ultrasound) on the structure of the eye [4, 1–27; 5, 61–65]. The above mentioned features of diabetic cataract combined with pseudoexfoliation syndrome contribute to the development of intraoperative and postoperative complications during phacoemulsification.

Purpose: To analyze the perioperative phacoemulsification for diabetic cataract combined with pseudoexfoliation syndrome, depending on the methodology used by phacoemulsification.

Material and methods

The results of 86 patients with phacoemulsification complicated by diabetic cataract combined with pseudoexfoliation syndrome. Among patients 51 women, accounting for 59.3 %, men 35–40.7 %, the average age was 60.2 ± 1.0 years. Diabetes mellitus type I suffered 17 patients, II type — 69.

Age, sex, stage of the disease and other clinical parameters were identical to both groups.

All patients underwent standard ophthalmic research. In order to assess ligament lesions lens Ultrasound biomicroscopy was performed. Distribution pseudoexfoliative syndrome by groups was as follows: in the main group of I degree — 24 eyes, II degree — 13 eyes, III degree — 5 eyes; a control group I degree — 29 eyes, II degree — 19 eyes, III degree — 8 eyes.

Eye diagnosis included a visometry, perimetry, tonometry, tonography, biomicroscopy, gonioscopy, ophthalmoscopy, A-, B-scan, ultrasound biomicroscopy, optical coherence tomography (if transparent eye fluids), fluorescent retinal angiography (if indicated).

Studies of patients carried out on the basis of informed consent in accordance with international ethical requirements (Helsinki, 1975).

All patients underwent clinical examination, includes laboratory diagnostics, counseling therapist, endocrinologist, otolaryngologist, dentist, according to testimony consulted a cardiologist, neurologist.

To ensure the prevention of operational and postoperative complications in patients revealed the presence of vascular, immunological, inflammatory and other bodily changes such as hypertension, atherosclerosis, diabetes, varicose veins, thrombophlebitis, blood disorders, vasculitis, uveitis, surgeries, acute disorders stroke, acute myocardial infarction, and others.

Patients were divided into two groups according to the technique of phacoemulsification: I group (basic) — 40 patients (42 eyes), operated by the "fakochop" on Nagahara our modification using ultrasound in "Burst" mode (patent number the IAP 04320 from 18.03.2011 "The method of cataract surgery by ultrasound phacoemulsification" State Patent Office of the Republic of Uzbekistan in 2011). Group II (control) — 46 patients (56 eyes), operated by phacofragmentation "crosswise" or 4 quadrants on Shepherd c ultrasound in the "linear" and "pulse". To carry out operations using the apparatus for phacoemulsification «SERIES 20000tm EVERESTtm LEGACY SYSTEM» company Alcon (USA) with an ultrasonic tip «NeoSoniX» model. The frequency of the ultrasonic oscillations of the tip is 29 ± 2 kHz. and a maximum power ultrasonic generator — 22 watts. All patients received standard preoperative preparation adopted in the joint-stock company "Republican Specialized Center of Eye Microsurgery" for patients with diabetic cataract.

Bimanual phaco ultrasound diabetic cataract with implantation of flexible intraocular lens was performed by the method of "fakochop" Nagahara on our modification using ultrasound in "Burst An" mode. The corneal tunnel incision is made «Many» knives calibrated 2.55 mm. The optimal length of the tunnel to maintain the integrity of the anterior chamber during the ultrasound needle diameter of 0.9–1.5 mm. The most comfortable and optimal for all stages of the work is with the angle of the needle to 30°. Use high vacuum numbers 350–400 mm. Hg. aspiration flow — 28–30 ml/min. These parameters and technology allow "safe" to implant the lens on the ultrasonic tip to prevent falling off, repulsion, rotation of the lens nucleus, and perform controlled grinding using "chopper". In the production of the first ultrasonic fracture handle and pull back up so that the lens moves to the area of the section, the upper part is lifted somewhat upward, while its lower part is lowered in some depth capsular bag, the space between the capsulorhexis opening and lens nucleus. In this space is inserted «chopper», smooth movement plunges deeper into the nucleus, and then output back towards the tip. Just before reaching the ultrasonic tip, the hook moves to the left and down, and at the same time, the tip moves to the right and up — thus produced fragmentation.The maneuver is continued until the fault does not affect the entire thickness of the core and does not extend to the equator. As a result of the wedge fractures formed material of the lens nucleus, which can be captured by introducing ultrasonic handpiece of the ultrasonic handpiece using ultrasound «Burst» mode. The introduction of the fragment should be performed until the middle of the thickness and length, as this will exclude the probability of a defective capture, and the ability to derive reliable in the plane of the pupil of the first track to the center for emulsification Capsulorhexis just above the capsular bag. Parameters: Ultrasound power — 60–85 % vacuum — 400 mm. Hg. aspiration flow — 28–30 ml/min. Removal of the first fragment is required, since this greatly facilitates the rotation of the core in the capsular bag, there is sufficient space for «chopper», greatly facilitates manipulation «chopper» and ultrasonic tip. After five or six subsequent fragmentation usually becomes possible to remove the core of any degree of hardness; Nevertheless, if very volumetric core and the outer layer is low or no nucleus, in which case it is recommended to form a greater number of small sized core segments.

After the phacoemulsification of the lens in the capsular bag of the corresponding flexible implanted intraocular lens from different manufacturers.

According to the ultrasound biomicroscopy, 5 eyes of the patients of the first (main) group and 4 eyes in the second (control) group was marked gap Zinn ligaments in one quadrant. In the eyes of 6 patients of the main group and 8 eyes in the control group was observed in 2 quadrants. In the eyes of 3 patients of the main group and 3 eyes in the control group was observed gap Zinn ligaments in 3 quadrants. In both groups, with pseudoexfoliation syndrome I degree mechanical devices for expanding the pupil were not applied at pseudoexfoliation syndrome II degree used Malyugin's ring, with pseudoexfoliation syndrome III degree iris retractors used to suspending the capsular bag and the implantation of intracapsular Malyugin's ring. It should be noted that when using the ring Malyugin's and iris retractors in patients of the control group in 5 cases mentioned touch the iris, and in 2 cases the anterior capsulorhexis touch ultrasound needle that was associated with the need to form a groove for dividing the core into 4 quadrants. At the same time, the use of our technology fakochop modifications in the basic group it possible to avoid these problems.

Subsequent steps were standard phacoemulsification with implantation of flexible intraocular lens in the capsular bag. Intraoperative and postoperative complications were not.

Results and discussion

As a result of phacoemulsification by our method using ultrasound mode «Burst» depending on the lens density 2–6 times decreases the time used ultrasound reduced while the absorbed tissues ultrasound eyes, its negative impact on all the structures of the eyeball, especially endothelium and choroid. Thus, the time of ultrasound used depending on the density of the lens was as follows: group I in the main extent — 0 seconds, II degree — 0.1 seconds, III degree — 0.3 seconds, IV degree — 0.6 seconds, V extent — 0.8 seconds; a control group I extent — 0.2 seconds, II degree — 0.6 seconds, III degree — 1.1 seconds, IV degree — 1.6 seconds, V extent — 2.0 second.

According to the results of studies of patients with a core group of visual acuity on the first day after surgery was 0.49 ± 0.033, and in the control group 0.45 ± 0.043. Visual acuity at 10 days after surgery in patients of the main group was at the level of 0.71 ± 0.032, while in the control 0.64 ± 0.039. Visual acuity after 1 month in the main group was 0.81 ± 0.033 vs. 0.71 ± 0.035 in the control group. By the end of the first year after surgery, visual acuity was 0.89 ± 0.032 and 0.79 ± 0.036, respectively.

Conclusions

Application of the method phacochop in this modification using ultrasound «Burst» mode and controlled crushing through «chopper» patients with complicated diabetic cataract combined with pseudoexfoliation syndrome significantly reduces the load on the ligaments of the lens tends to minimize complications during surgery, early and late postoperative period, allows you to get an early and complete visual rehabilitation, helps to ensure a high visual results of operations.

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Clinical and functional results modified method of surgical treatment of neovascular glaucoma

Abstract: The analysis of the effectiveness of the proposed modified method of surgical treatment of neovascular glaucoma.
Keywords: neovascular glaucoma, antiglaucomatous operation ksenokollagenovy drainage.

For decades worldwide glaucoma is a leading cause of irreversible blindness and becomes a social problem. The secondary neovascular glaucoma (NVG) is of particular severity, severe pain, high intraocular pressure, as well as rapid and complete loss of visual function [1, 162–193]. By the development of iris rubeosis and neovascular glaucoma may lead a number of both intraocular and systemic diseases. Among the intraocular diseases at the forefront diabetic retinopathy and retinal vascular occlusive disease (primarily thrombosis of the central retinal vein). In recent decades the tendency to quantitative growth and "rejuvenation" of the group of patients with vascular disease, leading to the emergence of neovascular glaucoma. Neovascular glaucoma is characterized by a poor prognosis and hard over due to fibrous degeneration of the newly created liquid outflow tract of the eye [2, 43–49]. Because byway pathogenesis of neovascular glaucoma treatment of this prognostically unfavorable disease remains a serious problem in ophthalmology [4, 357]. The low efficiency of drug treatment NVG and the relatively low success of current surgical treatment methods do develop new methods of treatment of the problem of NVG one of the most important in ophthalmology [3, 368–371]. The urgency of improving technology performance deep sclerectomy in NVG prompted us to conduct research aimed at optimizing the treatment of patients with NVG.

In this regard, we have the main **purpose** of scientific research has been formulated — to develop a modified method of surgical treatment of NVG with ksenokollagen drainage and to evaluate its effectiveness.

Material and methods

The results of surgery in 80 patients (80 eyes), neovascular glaucoma sufferers of them were males — 46 (57%) of women — 34 (43%). The average age of patients was 61 ± 1.9 years. Among the examined patients with NVG, according to the classification M. Shields [5, 269–286], II stage was recorded in 13 patients, accounting for 16%, III stage — in 26 patients (33%), IV stage — in 41 (51%). Of patients, depending on the method used, the surgical treatment was allocated to two groups. The main group consisted of 40 patients (40 eyes) who underwent surgery for antiglaucomatous offered us the original procedure — with implantation of deep sclerectomy xenokollagen drainage (DSE with XDI) (patent number 04336 issued by the IAP State Patent Office of the Republic of Uzbekistan in 2011). Application of drainage Xenoplast developed in the clinic Eye Centre East Insight, (Moscow) in

patients with nonvascular glaucoma approved at a meeting of the National Ethics Committee of Ministry of Health of the Republic of Uzbekistan dated December 26, 2008. The control group consisted of 40 patients (40 eyes) who antiglaucomatous operations traditional deep sclerectomy (DSE) was held. Studies of patients carried out on the basis of informed consent in accordance with international ethical requirements (Helsinki, 1975). To ensure the prevention of operational and postoperative complications in patients revealed the presence of vascular, immunological, inflammatory and other bodily changes such as hypertension, atherosclerosis, diabetes, varicose veins, thrombophlebitis, blood disorders, vasculitis, uveitis, surgeries, acute disorders. Stroke, acute myocardial infarction, and others carried out by us of clinical and laboratory studies have allowed to determine that 38 % of patients from the general contingent suffer from diabetes, 23 % — hypertension, 9 % — coronary artery disease. In 30 % of patients with various other diseases have been identified, to link that we have not succeeded with the development of neovascular glaucoma.

Age, sex, stage of the disease and other clinical parameters were identical to both groups.

Mean follow-up after surgery was 12 months.

Eye diagnosis included a visometry, perimetry, tonometry, tonography, biomicroscopy, gonioscopy, ophthalmoscopy, A-, B-scan, ultrasound biomicroscopy, optical coherence tomography (if transparent eye fluids).

In carrying out the scientific studies used clinical, mathematical, medical — statistical methods.

For the statistical analysis of the results of treatment of patients used the technique of selection of the data, which were recorded in a thematic map we developed examination of the patient with neovascular glaucoma.

Based on his own observations, and taking into account the experience of the literature we have identified indications and contraindications to the use of the method antiglaucomatous operations using xenokollagen drainage. The main criteria for the definition of the indications and contraindications for the DSE with XDIs were:

–   The feasibility of the operation, due to the forecast in respect of visual function after surgery;
–   The degree of risk, due to the severity of the initial state of the eye and diseases of the body;
–   The technical capability of the operation — the availability of the necessary equipment, qualified surgeon and adequate anesthetic.

In determining indications for ICD operation with HSE took into account the risk of surgery related to the initial severity of the operated eyes and conditioning the severity of surgical complications, the technical feasibility of the operation, as well the forecast of visual function in the postoperative period. The surgeon conducting the operation with NVG must be highly qualified and ready to various complications. Patients with stage III and IV glaucoma for 2–3 days prior glaucoma surgery performed intraocular angiogenesis inhibitor.

Operation technique

Preparation for surgery and treatment of traditional surgical field. The incision and the conjunctiva and Tenon's capsule held, departing from limb by 7 mm. to 7 mm. in any place convenient for surgery (free of scars from previous operations) segment of the eyeball. After coagulation of vessels from the surface layers of the sclera to 1/3 the thickness and cut out the basis for limb rectangular patch size 6 × 6 mm. Overlap 2 preliminary seam 8 (0) in the corners of the surface of the sclera of the valve without tightening. Makes 2 paracentesis of the cornea, through which the moisture is

released from the anterior chamber for dose reduction in intraocular pressure (IOP). Then, in order to avoid a sharp drop in IOP in the anterior chamber is entered viscoelastic. Under a cut surface flap incision is made through the X-shaped length of each beam to 6 mm in the deep layers of the sclera.

Triangle deeper layers of the sclera facing the limb is removed along with the scleral sinus, corneascleral trabeculae and corneal limbus part. Basal iridectomy is done. In exposing the ciliary body vertically stacked preformed xenokollagen drainage in the form of strips of 4 × 1 mm., which proximal end is introduced into the anterior chamber (or coloboma of the iris with pseudophakic), and the body and a distal portion thereof located under formed between the side flaps of the X-shaped incision of the sclera tunnel. On the top side scleral flaps superimposed nylon suture anchor 1 with 11.0 drainage stitching to prevent its displacement. The superficial scleral flap is laid in place, tied 2 pre-seam 8.0. conjunctival wound is sutured continuous suture 8.0. Buried disinfectant drops, eyes sealed with aseptic bandage.

Thus, the proposed method allows to reliably locate and fix drainage device rectangular and tubular shape in the tunnel between the deep layers of the sclera and the choroid at antiglaukomatous operations, leading to a free outflow of intraocular fluid from the anterior chamber into supraciliar in subtenon and subconjunctival space and is the prevention scarring in the area of operations and the achievement of a stable hypotensive effect.

The results of our many years of research lie in the fact that you have the clinical features of the course, taking into account the efficiency of NVG previous therapy. Average visual acuity before surgery was 0.1 ± 0.02. Observation of postoperative patients showed that visual acuity in the study group was significantly increased and amounted to an average of 0.2 ± 0.02 by the end of the observation period, whereas in the control group, we are watching its gradual decline 0.08 ± 0.01.

The average value of tonometry index measured 10 g. tonometer before surgery was 31.4 ± 0.1 mm. Hg. Such high figures IOP accompanied by severe pain in the eye, headaches and nausea and were stopped by conventional methods of antihypertensive therapy.

Initially, the high numbers of intraocular pressure in patients of the main group immediately after surgery greatly reduced, passing in persistent hypotension. In the control group by the end of 1 month after the operation normal IOP, and 6 months after surgery tonometry indicators point to a trend of increasing pressure. In 8 cases (20 %) the IOP in patients in the control group were normalized to the level of the upper limit of normal 25–26 mm. Hg. appointment of local antihypertensive drugs. In 10 % of cases due to the rise in IOP of relapse in patients in the control group required re-operation of our proposed method. eye hydrodynamics indicators point to a statistically significant reduction of the true intraocular pressure and intraocular liquid production in patients of the main group at 1 month after surgery, whereas in the control group found a slight increase in the production of intraocular fluid. After 6 months of operation control studies tonography rates in patients of the main group did not change, whereas the control group showed a decrease in the coefficient of outflow of intraocular fluid ease, despite the parallel decrease in the volume of production of intraocular fluid. This led to an increase in the coefficient of Becker compared to the norm, that is showing signs of glaucoma relapse.

In the study group we observed the expansion of the total field of view (213° ± 22.2° to 241.4° ± 21.1 ° on the sum of 8 meridians) and long-term (6 months), regarding this patient population stabilization achievements. In some cases, due to progression of

the underlying disease of the total boundaries of the field narrowed below baseline by the end of the observation period. In the control group 6 months total field of view narrowed (from $225.5° \pm 22.8°$ to $169.0° \pm 22.8°$).

Ultrasound biomicroscopy structures responsible for the drainage function of the eyes, carried out after antiglaucomatous surgery showed significantly higher values of the parameters indicators of filter pads and intrascleral cavity height, area and volume, in the study group compared with the control group. On 2 (5 %) eyes of the control group patients filtration cushion completely isn't. In other cases researches parameters in patients of the control group was lower than in patients of the main group. In 2 eyes (5 %) in the control group revealed blockade anterior chamber iris root angle. At the same time it was combined with the disappearance of the filter pad.

Thus, a comparative assessment of the immediate and long-term results in the treatment of NVG, revealed the lack of effectiveness of the immediate outcomes and low efficiency deep sclerectomy in long-term period, in comparison with deep sclerectomy implantation xenokollagen drainage. Implementation of the developed modified surgery with implantation xenokollagen drainage at NVG will ensure the long-term normalization of intraocular pressure, the stabilization of visual function and decrease the intensity of antihypertensive therapy.

Conclusion

The use of a modified method of surgical treatment of neovascular glaucoma helps reduce the number of postoperative complications, not only provides a stable hypotensive effect, but also increase visual function in most patients.

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Study of interrelation of I/D polymorphism in ace gene with a stage of chronic kidney disease in children and teenagers of Uzbek population with D1 according to guidelines K/DOQI (2012)

Abstract: The aim of the research was the evaluation of the functional condition of kidneys and the study of interrelation of I/D polymorphism in ACE gene with a stage of chronic kidney disease in children and teenagers of Uzbek population with D1 according to new guidelines K/DOQI (2012). 120 children and teenagers with type 1 diabetes, 53 (44.2 %) males and 67 (55.8 %) females, were examined. The average age of the patients was 13.8 ± 2.7 years old (Me 15.0; IQR 13.0–16.0). The stages of the chronic kidney disease were classified in accordance with guidelines K/DOQI (2012). In the course of work, it was revealed that the use of new classification K/DOQI (2012) for children and teenagers with D1 of Uzbek population allows detecting the decrease in kidney function at earlier stages: 61.9 % of children and teenagers with D1 showed GFR 80.6 ± 7.5 ml/min/1.73m^2 at the stage of normal albuminuria, which corresponds to stage II of CKD and 16.7 % had GFR 45.1 ± 9.5 ml/min/1.73m^2, which corresponds to stage III of CKD. Also, 28.6 % of children and teenagers at MAU stage showed stage II of CKD and 75.0 % showed stage III of KCD respectively. Frequency distribution of ACE genotypes in children and teenagers with D1 was characterized by significant correlation of DD genotype interrelated with the severity of KCD of GFR reduction, which confirms the influence of genetic factors in KCD development. I/D polymorphism in ACE gene is a molecular-genetic marker of disposition to CKD D1 in children and teenagers of Uzbek population.

Keywords: diabetes, children and teenagers, CKD, polymorphism in ACE gene.

Type 1 diabetes (D1) is one of the most severe endocrine diseases in children and teenagers. The dramatic nature of the problem of D1 in the population of children and teenagers is determined by expressed disruption of quality of a child's life, early development of complications with disability in patients and reduction of life expectancy [7; 10].

The main risk is posed by late complications of diabetes, particularly, diabetic nephropathy (DN). DN mainly develops in 5–10 years from the beginning of the disease and leads to chronic kidney insufficiency (CKI) quite quickly — every 4th–5th patient with D1 dies of CKI [6; 11].

According to the screening conducted in Uzbekistan in 2012, the distribution of DN of 4th–5th category was 4.8 % among children and 10.8 % among teenagers with D1 [21].

To develop an optimal strategy of patient management with progressive reduction of kidney function, unified, agreed in the entire nephrology world, definitions and classification were required. The creation of guidelines within the Kidney Disease Outcomes Quality Initiative — KDOQI of the National kidney fund of the USA in 2002 (with revision in 2012), the first part of which contained definition and division into stages of a new over-nosological notion «chronic kidney disease» (CKD) contributed to it [2; 15; 16; 17].

The term CKD was used in pediatrics for the first time in 2003 by Hogg R.; definition and classification of the given state are not different from such in adults [14]. K/DOQI guidelines define CKD, regardless the age of the patient, as kidney lesion for 3 or more months characterized by structural and functional disruptions of kidneys with or without reduction of glomerular filtration rate (GFR) [16].

One of the leading directions in the development of nephrology is a molecular-genetic study of the role of hereditary endogenic/genetic factors leading to the disease. The definition of polymorphic markers of genes-candidates is used to study the role of heritable factors in the disease development [8]. Genes coding the components of renin–angiotensin–aldosterone system are primarily viewed as genes-candidates, products, the expressions of which can define the speed of progression of kidney insufficiency [1; 3; 5]. The study of clinical-genetic peculiarities of CKD in order to understand the pathogenic mechanisms of formation of nephrosclerosis and improvement of preventive measures is relevant. The study of polymorphic markers of genes coding regulators and receptors of renin–angiotensin system allows detecting a group of patients with increased risk of development of progression of pathological process, micro-vascular complications. Genetic studies may become a basis for personalization of kidney diseases.

In the literature for the last 5–10 years, there is no data on the evaluation of GFR depending on I/D polymorphism in ACE gene in diabetes. The interrelation of I/D polymorphism in ACE gene with a stage of chronic kidney disease in children and teenagers of Uzbek population with D1 according to new guidelines K/DOQI (2012) will be studied for the first time.

Aim of research: to evaluate functional condition of kidneys and study the interrelation of I/D polymorphism in ACE gene with a stage of chronic kidney disease in children and teenagers of Uzbek population with D1 according to new guidelines K/DOQI (2012).

Materials and methods

120 children and teenagers with type 1 diabetes, 53 (44.2 %) males and 67 (55.8 %) females, were examined. The average age of the patients was 13.8 ± 2.7 years old (Me 15.0; IQR 13.0–16.0).

For the quick evaluation and monitoring of kidney function, a GFR value that reflects the condition of kidneys very informatively was assessed. There is a close connection between the GFR level and presence of these or those manifestations or complications of CKD.

GFR (eGFR) for all children was calculated according to Schwarz formula considering sex and age:

GFR = (0.0484* height (cm.))/blood creatinine (μmol/l), the obtained data was standardized to body surface [4].

Stages of the chronic kidney disease were classified in accordance with guidelines K/DOQI (2012) on GFR:

I stage — GFR $\geq$ 90 ml/min/1.73m^2;

II — GFR 89–60 ml/min/1.73m^2;

III — GFR 59–30 ml/min/1.73m^2;

IV — GFR 29–15 ml/min/1.73m^2;

V — GFR 15 and less ml/min/1.73m^2.

Isolation of genomic DNA and genotyping under I/D polymorphic marker of ACE gene (was conducted at the laboratory of Functional Genomics of a Man of the Institute of genetics and experimental biology of plants of the Academy of Sciences of the Republic of Uzbekistan). Isolation of DNA according to the method of R. Higuchi, H. Erlich (1989) with the use of a dry set of reagents Diatom™ DNA Prep 200.

Statistical processing of the results was conducted with the help of STATISTICA 6 and Biostat programs. Odd ration (OR) and 95 % confidential interval (95 % CI) were calculated with the use of logistic regression. The significance of differences of indicators was evaluated with the help of non-parametric test χ^2 (Pearson's test). The quantitative indicators were presented in the form of M ± SD, as well as a median (Me) and 25 and 75 percentiles (IQR). The differences between groups were considered statistically significant at p = 0.05.

Results

According to CKD concept, the evaluation of a stage of kidney pathology is done according to the value of GFR accepted as the one that reflects quantity and total volume of nephron work, including the one related to the execution of non-excretory functions, to the fullest (Table 1).

During the analysis of CKD stage depending on the age of disease onset, significant differences between the groups of the examined were not revealed. During the analysis of duration of the disease, it was revealed that as the duration of the disease increases, the occurrence of progression of CKD III and IV stages increases.

The analysis of HbA1 c level depending on CKD stage showed that even the children with diabetes in the stage of compensation (HbA1 c $\leq$ 7.5 %) show CKD II (23.8 %) and III (8.3 %) stages.

It was revealed that the use of new classification K/DOQI (2012) allows detecting the decrease in kidney function at earlier stages: 61.9 % of children and teenagers with D1 showed CKD II stage at the stage of normal albuminuria and 16.7 % had stage III of CKD. Also, 28.6 % of children and teenagers at MAU stage showed stage II of CKD and 75.0 % showed stage III of KCD respectively (Table 2).

Conducted studies showed that 69 (57.5 %) patients with D1 showed high and optimal GFR at CKD I stage (> 90 ml/min/1.73m^2). The average value of GFR corresponded to 168.9 ± 58.4 ml/min/1.73m^2 (Me 157.2; IQR 126.2–200.1).

Insignificant reduction of GFR at CKD II stage (60–89 ml/min/1.73m^2) was revealed in 21 (17.5 %) patients and average GFR was 78.4 ± 8.6 ml/min/1.73m^2 (Me 78.7; IQR 74.3–87.4). Moderate reduction of GFR at CKD III stage (59–30 ml/min/1.73m^2) was observed in 12 (10.0 %) patients and average GFR was 38.2 ± 5.9 ml/min/1.73m^2 (Me 38.3; IQR 33.5–40.5). CKD IV stage (15–29 ml/min/1.73m^2) was revealed in 18 (15.0 %) patients. The average GFR was 22.8 ± 3.8 ml/min/1.73m^2 (Me 22.6; IQR 19.7–26.8).

CKD V stage (< 15 ml/min/1.73m^2) was not reveled in the examined patients with D1.

Table 1. – Clinical indicators depending on CKD stage

Indicators		I, n = 69 (57.5 %)		II, n = 21 (17.5 %)		III, n = 12 (10.0 %)		IV, n = 18 (15.0 %)	
		n	%	n	%	n	%	n	%
Sex	male	34	49.3	7	33.3	5	41.7	7	38.9
	female	35	50.7	14	66.7	7	58.3	11	61.1
Age of disease onset									
from 1 to 5		17	24.6	5	23.8	2	16.7	3	16.7
from 5 to 10		30	43.5	11	52.4	6	50.0	10	55.6
≥ 10		22	31.9	5	23.8	4	33.3	5	27.8
Duration of disease									
Up to 1 year		5	7.3	3	14.3	1	8.3	–	–
from 1 to 5		21	30.4	1	4.8	4	33.3	3	16.7
from 5 to 10		23	33.3	5	23.8	2	16.8	6	33.3
≥ 10		20	29.0	12	57.1	5	41.7	9	50.0
HbA1 c ≤ 7.5 %		22	31.9	5	23.8	1	8.3	–	–
HbA1 c > 7.5 %		47	68.1	16	76.2	11	91.7	18	100.0
Age, years		13.2 ± 3.1		14.5 ± 1.6 $p_I = 0.07$		14.2 ± 2.2 $p_I = 0.28$		14.9 ± 1.6 $p_I = 0.03$	
Age of disease onset, years		7.3 ± 3.7		7.1 ± 3.4 $p_I = 0.83$		7.9 ± 4.0 $p_I = 0.61$		6.9 ± 2.8 $p_I = 0.67$	
Duration of disease, years		6.1 ± 3.9		7.4 ± 3.9 $p_I = 0.19$		6.2 ± 3.9 $p_I = 0.94$		8.1 ± 3.2 $p_I = 0.05$	

Note: p_I — significance towards the indicator in the group CKD I stage.

Table 2. – GFR depending on the stage of albuminuria and CKD

Indicators	I, n = 69 (57.5 %)		II, n = 21 (17.5 %)		III, n = 12 (10.0 %)		IV, n = 18 (15.0 %)	
	n	%	n	%	n	%	n	%
NAU (A1)	37	53.6	13	61.9	2	16.7		
MAU (A2)	32	46.4	6	28.6	9	75.0	3	16.7
HPU (A3)			2	9.5	1	8.3	15	83.3
GFR (ml/min/1.73 m²)								
Average indicators	168.9 ± 58.4		78.4 ± 8.6 $p_I = 0.0001$		38.2 ± 5.9 $p_I = 0.0001$		22.8 ± 3.8 $p_I = 0.0001$	
NAU (A1)	181.6 ± 61.4		80.6 ± 7.5 $p_I = 0.0001$		45.1 ± 9.5 $p_I = 0.0001$			
MAU (A2)	154.1 ± 51.8		76.4 ± 10.6 $p_I = 0.0001$		36.6 ± 4.6 $p_I = 0.0001$		20.3 ± 2.4 $p_I = 0.0001$	
HPU (A3)			70.6 ± 5.2		38.2 ± 5.9 $p_{II} = 0.0001$		23.3 ± 3.9 $p_{II} = 0.0001$	

Note: p_I — significance against the indicator in the group with CKD stage I; p_{II} — significance against the indicator in the group with CKD stage II; NAU — normal albuminuria; MAU — microalbuminuria; HPU — heavy proteinuria.

Thus, the majority of examined (75.0 % OR 9.0; 95 % CI 5.02–16.1; p < 0.0001) children and teenagers with D1 is classified into I and II stages of chronic kidney disease according to guidelines K/DOQI (2012).

During the analysis of GFR depending on the stage of albuminuria and CKD, it was established that even at the stage of normal albuminuria, when there are no clinical signs of development and progression of diabetic nephropathy, the level of GFR may be significantly reduced against the group of CKD I stage in 61.9 %.

The analysis of ACE gene distribution demonstrated that 49 (40.8 %) patients are the carriers of II genotype; I/D genotype was revealed in 28 (23.4 %) and DD genotype was revealed in 43 (35.8 %) patients with D1 (Table 3).

The homozygous carriers of genotypes II (40.8 %) and DD (35.8 %) of ACE gene prevail among the examined children and teenagers of Uzbek population with D1.

The analysis of distribution of genotypes of ACE gene depending on the onset of disease showed the absence of statistically significant differences between groups with various age of the onset of the disease and polymorphism of ACE gene.

During the analysis of distribution of polymorphism of ACE gene depending on the duration of the disease, it was established that the occurrence of polymorph alleles of ACE gene were not significantly different between the groups, i. e. the occurrence of genotypes is identical in all groups with various duration of the disease.

Genotype II was established in the majority, 46 (66.7 % OR 4.0; 95 % CI 1.97–8.12; p = 0.0002), of the examined with stage I CKD. Genotype DD was revealed in the same percentage (66.7 % OR 4.0; 95 % CI 1.11–14.4; p = 0.06) of the patients with stage II CKD (Table 4).

Table 3. – Clinical indicators depending on I/D polymorphism in ACE gene

Indicators		Genotype					
		II n = 49 (40.8 %)		ID n = 28 (23.3 %)		DD n = 43 (35.8 %)	
		n	%	n	%	n	%
Sex	male	25	51.0	12	42.9	16	37.2
	female	24	49.0	16	57.1	27	62.8
Age of disease onset							
from 1 to 5			30.6	3	10.7	9	20.9
from 5 to 10			40.8	13	46.4	24	55.8
≥ 10			28.6	12	42.9	10	23.3
Duration of disease							
Up to 1 year			8.2	3	10.7	2	4.6
from 1 to 5			24.5	10	35.7	7	16.3
from 5 to 10			30.6	10	35.7	11	25.6
≥ 10			36.7	5	17.9	23	53.5
Age, years		13.3 ± 3.2		13.3 ± 2.6 $p_I = 1.0$		14.6 ± 1.8 $p_I = 0.02$	
Age of disease onset, years		6.9 ± 3.8		8.4 ± 3.7 $p_I = 0.10$		6.9 ± 3.0 $p_I = 1.0$	
Duration of disease, years		6.7 ± 4.0		4.9 ± 3.7 $p_I = 0.06$		7.8 ± 3.4 $p_I = 0.16$	
NAU (A1)		29	59.2	11	39.3	12	27.9
MAU (A2)		20	40.8	14	50.0	16	37.2
HPU (A3)				3	10.7	15	34.9
Albuminuria, mg/ml							
NAU (A1)		13.2 ± 2.8		14.6 ± 3.5 $p_I = 0.06$		31.7 ± 44.9 $p_I = 0.005$	
MAU (A2)		29.8 ± 15.3		27.9 ± 14.6 $p_I = 0.60$		101.2 ± 50.8 $p_I = 0.0001$	
HPU (A3)		–		83.3 ± 57.7		374.0 ± 189.8 $p_I = 0.0001$	

Note: p_I — significance against the indicator in the group with CKD stage I; p_{II} — significance against the indicator in the group with CKD stage II; NAU — normal albuminuria; MAU — microalbuminuria; HPU — heavy proteinuria.

Table 4. – Frequency of occurrence of polymorphism of ACE gene and level of GFR depending on the stage of CKD

CKD stage / Genotype	I n = 69		II n = 21		III n = 12		IV n = 18	
	abs.	%	abs.	%	abs.	%	abs.	%
II	46	66.7	3	14.3				
ID	23	33.3	4	19.0	1	8.3		
DD			14	66.7	11	91.7	18	100
GFR (ml/min/1.73 m²)								
II	166.9 ± 56.1		77.1 ± 13.5 $p_I = 0.0001$					
ID	172.9 ± 63.8		77.3 ± 9.6 $p_I = 0.0001$		38.2			
DD			79.0 ± 8.0		38.2 ± 6.2 $p_{II} = 0.0001$		22.8 ± 3.8 $p_{II} = 0.0001$	

Note: p_I — significance against the indicator in the group with CKD stage I; p_{II} — significance against the indicator in the group with CKD stage II.

Among the patients with CKD stage III, the majority (91,7 %) were the carriers of genotype DD, whereas the patients with CKD IV showed no case of presence of allele I (genotypes ID and DD), and all patients (100 %) were the carriers of genotype DD, which once again proves the significance of the role of polymorphism of ACE gene in development and progression of CKD in children and teenagers with D1.

In average, the GFR indicator in patients with genotype II was 161.4 ± 58.6 ml/min/1.73m² (Me 151.0; IQR 124.7–195.4) at average; in the carriers of heterozygous genotype — 154.4 ± 70.7 ml/min/1.73m² (Me 135.0; IQR 110.7–181.7); in patients with genotype DD — 45.0 ± 25.4 ml/min/1.73m² (Me 33.6; IQR 24.0–74.2).

Herewith, the presence of genotype DD correlated with the severity of CKD (r = 0.66; P < 0.05). Consequently, the presence of genotype DD predisposes an increased risk of development or progression of CDK, whereas, genotype II is a predictor in the development and progression of CKD in children and teenagers with D1.

Discussion

Thus, we confirm that as the duration of the disease increases, the occurrence of progression of CKD III and IV stages increases (which corresponds to the literature data) [9]. Dependences of CKD stages on the age of onset were not detected.

The reduction of GFR was observed in one third (31.7%) of children and teenagers with the inclination to the disease up to 5 years. Similarly, (31.6%) of children and teenagers with D1 showed the reduction of GFR, which corresponds to CKD II, III and IV stages.

Intensive glycemic control significantly reduces the risk of microvascular disorders both in D1 and in D2, although, optimal level of HbA1 c required for prevention of the progression of CKD at diabetes hasn't been defined yet. According to Oh S. et al. 2011 [20], the level of HbA1 c < 6.50% is associated with the reduced risk of development of terminal stage of CKD, which certifies about the importance of glycemic control in patients with high risk of progression of nephropathy. In DCCT research, it was proved in patients with D1 that HbA1 c < 7.5% reduces the risk of DN to 55%.

The analysis conducted by us showed that even children with diabetes in the stage of compensation (HbA1 c ≤ 7.5%) demonstrate CKD II (28.6%) and III (4.8%) stages. The duration of the disease in children with HbA1 c ≤ 7.5% was 5.53 ± 4.09 years (Me 5.0; IQR 2.0–10.0 years).

Modern classification of CKD (K/DOQI, 2012) promotes the detection of kidney disease at earlier stages and allows timely correction of therapy and improvement of the patient's forecast.

The results of our research showed that in significant number of children and teenagers with D1, the patients with II (61.9% and 28.6% respectively) and III (16.7% and 75.0% respectively) CKD stages were already detected at the stages of NAU and MAU.

Genetic factors, including ethnic or inter-population differences, play a notable role in CKD pathogenesis. In the recent years, more attention has been paid to the impact of genetic polymorphisms of ACE genes on the development of kidney complications [13; 18; 22].

We established that homozygous carriers of genotypes II (40.8%) and DD (35.8) of ACE gene prevail among the examined children and teenagers of Uzbek population with D1. It was revealed for the first time that the frequency of genotype DD was 91.7% in children and teenagers with D1 of Uzbek population at CKD III stage, and the frequency of genotype DD was 100% at CKD stage IV. The occurrence of CKD stage V was not observed among the examined.

The results obtained by us correspond to the data of the studies that relate D allele of GFR gene with the disease occurrence and progression of chronic (glomerular and tubulo-interstitial) kidney diseases [12; 19].

It was established for the first time that the frequency of genotype DD was 91.7% in children and teenagers with D1 of Uzbek population at CKD III stage, and the frequency of genotype DD was 100% at CKD stage IV. The occurrence of CKD stage V was not observed among the examined.

Thus, guidelines K/DOQI (2012) in relation with polymorphism of ACE gene and calculation of GFR allowed performing a new assessment of frequency of kidney lesion in children and teenagers with D1 of Uzbek population. The conducted research showed that the development and progression of CKD in children and teenagers with D1 is associated with I/D polymorphism of ACE gene; herewith, DD genotype is the marker of progression of CKD.

Conclusions

1. The use of new classification K/DOQI (2012) for children and teenagers with D1of Uzbek population allows detecting the decrease in kidney function at earlier stages: 61.9% of children and teenagers with D1 showed GFR 80.6 ± 7.5 ml/min/1.73m^2 at the stage of normal albuminuria, which corresponds to stage II of CKD and 16.7% had GFR 45.1 ± 9.5 ml/min/1.73m^2, which corresponds to stage III of CKD. Also, 28.6% of children and teenagers at MAU stage showed stage II of CKD and 75.0% showed stage III of KCD respectively.

2. The conducted analysis shows that GFR reduction can be observed even at the duration of the disease up to 5 years (38 children and teenagers — 31,7%). Among children and teenagers with D1, 31.6% (12 patients) showed GFR reduction, which corresponds to CKD II, III and IV stages.

3. Frequency distribution of ACE genotypes in children and teenagers with D1 was characterized by significant correlation of DD genotype interrelated with the severity of KCD of GFR reduction, which confirms the influence of genetic factors in KCD development. I/D polymorphism in ACE gene is a molecular-genetic marker of disposition to CKD D1 in children and teenagers of Uzbek population.

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Prediction role of risk factors assessment to immediate results of surgical treatment of concomitant lesions

Abstract: The authors aim was to investigate the impact of risk factors by SMART assessing tool, on the immediate results of surgical treatment of patients with concomitant lesions of the aortic arch branches, terminal part of abdominal aorta and lower limb arteries.

Keywords: atherosclerosis, risk factors, tools of the scoring.

Introduction

There are a lot of ways of assessing the impact of both — various risk factors within the development processes of the course and outcomes from treatments taken for atherosclerosis. Assessing risks for each individual patient is crucial. Moreover, most of risk factors have an independent effect on atherosclerosis and related complications, which can be reduced through a course of treatment of the latter. Risk assessment tools help review the impact of individual risk factors and their focus on selection of an appropriate treatment which is based on the diagnostic methods applied [1; 2; 3; 4].

In the last 25–30 years developed dozens of risk assessment tools (methods, calculators) which include main predictors such as age, gender, systolic blood pressure, diabetes, smoking, cardiovascular diseases (myocardial infarction, angina pectoralis, stroke, arrhythmia (arterial fibrillation), left ventricular hypertrophy, cholesterol, etc. [4; 5; 6; 7; 8].

SMART study group (Second Manifestations of ARTerial disease) (2009) looked into the impact of various risk factors in 800 patients with peripheral atherosclerosis and developed a sensitive method for determining of a 1–5-year long risk of stroke, heart attack and death, with a statistical certainty (95 %CI) (tab. 2) [4].

Accordingly, the aim of study was to investigate the impact of risk factors by SMART assessing tool, on the immediate results of surgical treatment of patients with concomitant lesions of the aortic arch branches, terminal part of abdominal aorta and lower limb arteries.

Material and methods

Analyzed results of the assessment of risk factors by SMART of 181 patients operated with combined lesions of the aortic arch branches and lower limb arteries. All of them were operated in the Department of Vascular Surgery from 2000 to 2015. Patients were divided into three groups exposed to different surgical interventions at the initial stage: Group I — patients exposed to reconstruction of the aortic arch branches (31 patients); Group II — those operated on the terminal portion of the abdominal aorta and the arteries of the lower limb arteries (120 patients); and Group III — patients operated simultaneously on both arterial beds (30 patients). The age of the patients ranged between 51 and 70 years (average 60 ± 1), it is noteworthy that 97.2 % of all subjects were male patients (tab. 1).

Table 1. – Characteristics of patients per Group

		Group I (n = 31)		Group II (n = 120)		Group III (n = 30)	
Age		60 ± 1		61 ± 1		60 ± 1	
Risk Factors		5.35 ± 0.28		5.24 ± 0.2		4.87 ± 0.27	
SMART		326 ± 14		354 ± 9.3		328 ± 16	
CLI*/ulcers (%)		38.7 %	6.45 %	71.7 %	23.3 %	51.7 %	10.3 %
Stroke history (%)		29 %		17.5 %		6.9 %	
AIM* history (%)		22.6 %		28.3 %		20.7 %	
Hypertension (%)		61.3 %		74.1 %		96.2 %	
Diabetes mellitus (%)		16.1 %		18.33		13.8 %	
Type of aorta ileac lesions by TASC II* (%)	A	2 (6.45 %)		14 (11.7 %)		2 (6.9 %)	
	B	9 (29 %)		14 (11.7 %)		4 (13.8 %)	
	C	2 (6.45 %)		8 (6.7 %)		6 (20.7 %)	
	D	11 (38 %)		71 (60 %)		10 (34.5 %)	
Type of PAD* lesions by TASC II L/R* (%)	A	4 (13 %)	3 (9.7 %)	15 (12.5 %)	11 (9.2 %)	2 (6.9 %)	4 (13.8 %)
	B	8 (26 %)	4 (13 %)	27 (22.5 %)	29 (24.2 %)	7 (24 %)	6 (5 %)
	C	2 (6.4 %)	6 (19.3 %)	33 (27.5 %)	28 (23.3 %)	11 (38 %)	7 (5.8 %)
	D	1 (3.2 %)	1 (3.2 %)	3 (2.5 %)	6 (5 %)	1 (3.4 %)	2 (1.7 %)
ABI* (left/right)		0.7 ± 0.06	0.73 ± 0.06	0.51 ± 0.03	0.5 ± 0.027	0.64 ± 0.05	0.56 ± 0.05

Notes: CLI — critical limb ischemia; AIM — acute myocardial infarction; TASC II — trans atlantic Society Consensus II; PAD — peripherial arterial disease; L/R — left/right; ABI — ankle brachial index.

Various risk factors including age (above 60), sex, smoking, obesity, hypertension, chronic bronchitis, heart failure and stroke detected through the anamnesis were taken into account when assessing the patients. All patients appeared to have nearly five risk factors.

In view to define possible impairments of the arterial beds the patients were exposed to a series of diagnostic tests, such as ultrasound investigation of main arteries, ECG, echocardiography, MRI, MSCT angiography and X-ray contrast angiography.

All of them were identified by risk assessment SMART techniques and the findings were compared with the immediate results of surgical treatment of these patients. This calculation used a well-known table on the SMART (Table 2).

Table 2. – Risk assessment chart for SMART

Score chart	Indexation	Score	
Age above 55 years	Every yearsX 8	+	
Presence or history of cerebrovascular disease	If yes + 86	+	
Presence or history of heart disease	If yes + 86	+	
Systolic Arterial pressure		+	
Smoking	If yes + 107	+	
Creatinine	mmol/l.	+	
Sum	+	–	
LDC–L	mmol/l. × 74	–	
Ankle-brachial index (ABI)	ABI × 157	–	
Subtract	–		
Summary score			
Summary risk		1-year	5-year
Low	> 100	0 %	1 %
Middle	101–225	1 %	5 %
High	226–350	3 %	12 %
Very high	> 351	10 %	28 %

Results

Risk assessment using SMART techniques proved that over 85 % of patients had high and top levels of risk of developing complications of the immediate and late postoperative period. In I group patients average score was 325.98 ± 13.9, in II Group — 354.64 ± 9.38, and in III group respectively 327.2 ± 16.27 (Tab.3).

Table 3. – Distribution of patients according to SMART risk assessment technique

Group/score	Average score	Middle risk	High risk	Very high risk
I-group	325.98 ± 13.9	4 (12.9 %)	14 (45.2 %)	13 (41.9 %)
II-group	354.2 ± 9.3	10 (8.3 %)	52 (43.3 %)	58 (48.4 %)
III-group	328.4 ± 16.03	4 (13.3 %)	12 (40 %)	14 (46.7 %)

Assessment by SMART indicate that, the first group of patients with proximal (SMART = 272 ± 15.2) and distal (SMART = 341.6 ± 12.5) type of lesions of aortic arch branches statistically significantly differed (P < 0.05). This status is reflected in the next objective results of surgical treatment, so as in the proximal type there were no complications. But in the distal type of aortic arch branches lesions, in 3 (9.7 %) cases occurred complications. There was an acute myocardial infarction and acute cerebrovascular accident (in the ratio 1:2) (tab. 4).

In second group of patients at the immediate postoperative period occurred 8 (13.3 %) complication. Four (6,67 %) of them with shunt thromboses operated with good results. And in 3 (2.5 %) of them, on the background of the cases of thrombosis aorto-femoral bypass (AFB, there was an acute myocardial infarction (acute cardiovascular insufficiency) with a fatal end. Complications analysis showed that, died patients initially had SMART score 300.2; 457.4 and 499.5, respectively, which initially had high level of risk of complications by SMART (table 4).

In the third group at the immediate postoperative period occurred 4 (13.3 %) complications. Three of them, so as bleeding and intestinal obstruction, impossible to predict before operations. At last one (3.3 %) case after reconstruction (CEA + aorto-bifemoral bypass) occured shunt thrombosis with irreversible ischemia, about what was produced amputation of the left lower limb. In this patient 4 days after surgery occurred an acute myocardial infarction with fatal end (tab. 4). This patient initially is referred to very high risk group of developing complications (SMART– 438.3).

Table 4. – Characteristics of the complicated patients per groups

Operation	Risk Factors	SMART	CLI/ulcers	Stroke history	AIM history	TASC II	Complication
Group I: 3 cases complicated by 31, but no mortality							
CEA*	7	297.5	+	+	–	–DD	Stroke
CEA	4	271.5	–	+	–	–/–B	Stroke
CEA	4	292.5	+	–	–	DAC	AIM
Group II: 8 (6.7 %) cases complicated by 120, and 3 (2.5 %) of them with lethal end							
AFB*	7	499.5	+	–	–	BBB	Lethal end
FPB*	5	300.21	+	–	–	A–C	Lethal end
Endo CIA*	9	457.4	–	+	+	A –	Lethal end
AFB	6	405	+	–	–	DAA	Stroke
AFB	4	227	+	–	–	D –	thromboses
AFB	3	268	+	–	–	DDD	thromboses
AFB	5	428	+	–	–	DCC	thromboses
AFB	6	343	+	–	–	C–C	thromboses
Group III: 4 (13.3 %) cases complicated by 30, and 1 (3.3 %) mortality							
CEA + AFB	5	438.3	+	–	+	D–C	lethal end
CEA + Lumbal Sympatectomy	3	219	+	–	–	–/–D	Retroperitoneal bleeding
CEA + FPB	7	260.7	–	–	–	–CA	erosive bleeding
CEA + AFB	3	172	–	–	–	D–/–	Intestinal obstruction

Notes: CEA — carotid endarterectomy, AFB — aortae femoral bypass, FPB — femoro-popliteal by pass, Endo CIA — endovascular intervention in common ileac artery.

Discussion

Initially SMART study group (2009) used this tool so as long term prediction model for patients with established PAD [4]. But our study was directed to learn information value for concomitant atherosclerotic lesions. The main finding of our study is that the risk assessment tool of SMART, usably to predict immediate results of the surgical treatment of patients with concomitant atherosclerotic lesions.

The study revealed that such factors as cardiac (myocardial infarction, angina, heart failure, atrial arrhythmia), vascular (aortic aneurysm, intermittent claudication, pain at rest, ischemic ulcers), somatic (diabetes mellitus, metastatic tumors, renal hepatic failure), and urgent surgeries may have a significant impact on long-term outcomes of surgical treatments (p < 0.01, 95 % CI), however neither referring to a female gender (p = 0.48) nor to a white race (p = 0.99) did have such an impact [8; 9].

After 10 years of a research on 905 asymptomatic atherosclerotic patients, Laura G. et all. (2000) found out that the mono-variation analysis performed based on only 6 factors (age, sex, systolic blood pressure (SBP), pulse pressure (PP), total cholesterol, HDL–C) had a significant effect (P < 0.05) within a disease course. Based on the multivariate modeling the researchers identified that the progression of stenosis largely depended on the pulse pressure and HDL. The risk level' increase by 1.12 times is caused by the increased PD by 10 mm. Hg., while a decrease in HDL–C by 10 mg/dL causes the risk level increment by 1.2 times [10].

The incidence rate of cardiovascular complications in patients with diabetes mellitus is several times higher (ischemic stroke (IS) – 1.4; Myocardial infarction (MI) – 2.4; angina (heart failure) – 2; chronic lower limb ischemia (CLLI) – 8; cardiovascular disease (CVD) – 6-fold) than in patients with no diabetes [1].

Welten G. et all. (2007) 2 268 patients studied cardiac risk (Lee Index) which includes a 6 characteristics (high-risk surgery, ischemic heart disease (coronary artery disease), history of myocardial infarction, chronic cerebrovascular insufficiency, chronic renal failure (CRF), diabetes mellitus). The result showed that the Li index does not include a sufficient number of risk factors and little informative patients over 70 years [12].

According to previous researches described in scientific literature both — the scope and the severity of surgery operations in this particular category of patients — affect immediate and late outcomes; all interventions are therefore categorized as low-, medium-, high- and top risk level interventions. Welten G., et all. (2007) proved significant differences in numerous MACEs (major adverse cardiac event) depending on an operation risk level: 2.4 % – low, 11.6 % – medium, 12.3 % — high and 24 % – top [12].

Jonston S. et all. studied 4 799 patients with transient ischemic attack (TIA), which have been inspected within 48 hours of the onset of the disease and developed based on a scale of 6 cohorts ABCD². Scale ABCD² — is rapid clinical tool that helps to predict the early risk of stroke within the first 2, 7 and 90 days after TIA. Recently, it has been found that the scale is also useful in predicting the risk of recurrent stroke in the first few hours after a small stroke or TIA [12].

Pros N. et all. (2013) proposed a method for risk assessment at the patient discharge from hospital to determine the annual mortality

and complications. Analysis methods in 640 patients with peripheral atherosclerosis showed that the incidence of complications are at low risk (< 0) in 2 % of cases, with an average (0.5–2) – 12.8 %, with a high (2.5–4) – 23 %, and very high (< 4.5) – at 42.2 % cases (C – 0.76) [13].

Numerous methods listed above can only help assess the impact of risk factors on a disease course. Each tool has its own limitations. Studies revealed that all cardiovascular diseases and the majority of subjects initially entered at high risk group.

Conclusions

Thus, patients with combined lesions of arterial beds initially treated in a group with high risk for complications such as myocardial infarction, ischemic stroke and mortality. Application assessment SMART technique allows to predict possible complications in the postoperative period. Patients with a high grade of SMART score must pass before operating, adequate therapy directed to the elimination of risk factors.

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Types of aortic arch branches lesions in the patients with concomitant atheroscleroses

Abstract:

Objectives: to study types of lesions of the aortic arch branches of the patients with concomitant lesions of the aortic arch branches, terminal part of the abdominal aorta and lower limb arteries.

Material and methods. analyzed the results of examination of 181 operated patients with concomitant lesions of aortic arch branches and lower limb arteries. All patients were divided into three groups: Group one — patients who underwent the first stage of the reconstruction carried out in the aortic arch branches (number of patients — 31 (17.1 %)); Group two — patients

who underwent the first stage of reconstruction of a terminal portion of the abdominal aorta and lower limb arteries (number of patients — 120 (66.4 %)); and Group three — patients who were operated simultaneously on both arterial basins (number of patients — 30 (16.5 %)).

Results

The analysis of angiosemiotics of aortic arch branches shows, four types of lesions that influences to choice of surgical tactics:

- only stenoses in carotid and vertebral- subclavian segment;
- stenoses in carotid and occlusion vertebral — subclavian segment;
- occlusion in carotid and stenosis in vertebral- subclavian segment;
- Occlusion in the carotid and vertebral- subclavian segment.

Conclusions

Analysis of the results of our study shows, that the recommended classification well reflects the degree of severity of aortic arch branches lesions and usably to choice of surgical tactics.

Keywords: multifocal atherosclerosis, concomitant lesions, brain vascular circulation insufficiency.

Introdiction

The notion of multifocal atherosclerosis (MA), which brings together a special category of patients with hemodynamically significant lesions in multiple vascular beds [1; 3; 5]. The defeat of several arterial beds requires to study lesions angiosemiotics and develop new perspectives for choice of tactics.

In the past 10 years, several anatomical classification of lesions of different arterial beds have been proposed, which determined the tactics of further management of patients and selection of adequate treatment [3; 6; 7; 8].

Analysis of the literature shows that the lesions of lower limb arteries studied enough and has the necessary guidance in the choice of tactics intervention [6]. In our opinion, the defeat of the aortic arch branches require further research and development of new methods for choosing the tactics, depending on the types of lesions.

The introduction of modern imaging techniques has allowed to identify the various isolated and combined lesions. The variety of options for the defeat, the different types of course and clinical manifestations of multifocal atherosclerosis necessitate the creation of anatomical classifications, which would serve as a basis for the development of surgical tactics [3; 9; 10]. Classification Trans-Atlantic-Society-Consensus II (TASC II) for aorto-iliac and femoral-popliteal level of lesions are the best tactics to select the appropriate surgical or endovascular intervention [6].

It is shows that, there are anatomical classification of aortic arch branch lesions are not widely used as TASC II recommendations.

Accordingly, the purpose of the study to examine types of lesions of the aortic arch branches and its role in the choice of surgical treatment tactics of patients with concomitant lesions of the aortic arch branches, terminal part of abdominal aorta and lower limb arteries.

Material and methods

Retrospectively analyzed the results of examination and surgical treatment of the 181 patients with combined aortic arch branch and lower limb arteries operated in Vascular Surgery Department from 2000 to 2015years. All patients were divided into three groups: 1 group — 31 (17.1 %) patients whom performed the first step in the reconstruction of the aortic arch branches, 2 group consisted of 120 (66.4 %) patients, which the first stage was completed on reconstruction terminal portion of the abdominal aorta and lower limb arteries and 3 group consisted of 30 (16.5 %) patients operated simultaneously on both arterial basins. The age of patients was 51 to 70 years (average 60 ± 1), male patients was 97.2 %.

Various risk factors including age (above 60), sex, smoking, obesity, hypertension, chronic bronchitis, heart failure and stroke detected through the anamnesis were taken into account when assessing the patients. All patients appeared to have nearly five risk factors.

In view to define possible impairments of the arterial beds the patients were exposed to a series of diagnostic tests, such as ultrasound investigation of main arteries, ECG, echocardiography, MRI, MSCT angiography and X-ray contrast angiography.

Table 1. – Characteristics of patients per Group

	Group I (n = 31)		Group II (n = 120)		Group III (n = 30)	
Age	60 ± 1		61 ± 1		60+1	
Risk Factors	5.35 ± 0.28		5.24 ± 0.2		4.87 ± 0.27	
SMART	326 ± 14		354 ± 9.3		328 ± 16	
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Stroke history (%)	29 %		17.5 %		6.9 %	
AIM* history (%)	22.6 %		28.3 %		20.7 %	
Hypertension (%)	61.3 %		74.1 %		96.2 %	
Diabetes mellitus (%)	16.1 %		18.33		13.8 %	
ABI* (left/right)	0.7 ± 0.06	0.73 ± 0.06	0.51 ± 0.03	0.5 ± 0.027	0.64 ± 0.05	0.56 ± 0.05

Notes: CLI — critical limb ischemia; AIM — acute myocardial infarction; TASC II — trans atlantic Society Consensus II; PAD — peripherial arterial disease; L/R — left/right; ABI — ankle brachial index.
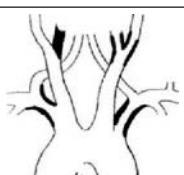
Results. The analysis of angiosemiotics of aortic arches lesions in 181 patients we found a pattern that influences the choice of surgical tactics:

- only stenoses in carotid and vertebral- subclavian segment;
- stenoses in carotid and occlusion vertebral-subclavian segment;
- occlusion in carotid and stenosis in vertebral- subclavian segment;
- occlusion in the carotid and vertebral-subclavian segment.

In connection with our classification of types of aortic arch branches lesions were offered (table 2).

Table 2. – Types of aortic arch branches lesions

Type	Image	Description	Type	Image	Description
I		Only stenosis in carotid and vertebral-subclavian segment	III B		Both side occlusion in carotid and stenosis in vertebral-subclavian segment
II A		Stenoses in carotid and occlusion vertebral-subclavian segment	IV A		Ipsilateral occlusion in carotid and vertebral-subclavian segment
II B		Stenoses in carotid and both side occlusion of vertebral-subclavian segment	IV B		Contralaterial occlusion in carotid and vertebral-subclavian segment.
III A		Occlusion in carotid and stenosis in vertebral-subclavian segment	IV C		Occlusion in carotid and both side occlusion in vertebral-subclavian segment

The study showed that the majority of our patients had type I lesions –65 %. In the I- group patients according to frequency of occurrence greater prevailed I and II types. In other groups, most patients had I -type lesion of the aortic arch branches (Tab. 3). Depending on the type and severity treatment was determined by the choice of a surgical scope.

Table 3. – Types of aortic arch branches lesions by groups

	Type I	Type II	Type III	Type IV
I-gr. (31)	9 (29 %)	10 (32.25 %)	7 (22.6 %)	5 (16.15 %)
II- gr. (120)	87 (72.5 %)	18 (15 %)	13 (10.8 %)	2 (1.7 %)
III- gr. (30)	21 (70 %)	5 (16.67 %)	3 (10 %)	1 (3.33 %)
Total: 181	**117 (64.5 %)**	**33 (18.2 %)**	**23 (12.7 %)**	**8 (6.6 %)**

Thus patients with type I lesions shows the first stage of endarterectomy or endovascular intervention on the side of a greater percentage of stenosis. In type II — the first priority is to correct by a greater percentage of stenosis in the carotid. At the III and IV- type lesions in 100 % of cases, the first step is shown at the distal lesion — endarterectomy from external carotid artery (ECA), when in lesions of the proximal segment performed of the different types of bypass surgery on the side of carotid occlusion. The data of visualization techniques of terminal part of abdominal aorta and lower limb arteries were classified according to the recommendations of TASC II aorto — iliac and femoral- popliteal segment.

In 82.3 % of patients showed losions of aorto-iliac segment. In all groups of patients according to frequency of occurrence greater prevailed type A lesions (Table 4). Patients C and D types of lesions performed open surgical correction, when A and B types of lesions and the absence of the second unit — endovascular intervention.

Infrainguinal lesions was classified by TASC II recommendations, which stands 4 — type lesions femoro-popliteal segment (tab. 5). The frequency of lesions of the femoro-popliteal segment studied in the number of the lower extremities in the studied group of patients (181). One patient had a history of lower extremity amputation (181 patients and 361 final).

The frequency of femoro-popliteal lesions was 60.4 % (n 218/k s). In II -III- groups of patients according to frequency of occurrence longer prevalent type C, while in Group I — A type of lesion (Table 4). Patients with B, C and D types of lesions performed an open surgical repair.

Table 4. – Types of aorta ileac lesions of TASC II by groups

Lower limb l/l	Type A		Type B		Type C		Type D	
	n	%	n	%	n	%	n	%
I-gr. (31)	13	42.0 %	7	22.6 %	3	9.7 %	–	–
II-gr. (120)	36	30.0 %	23	19.2 %	12	10.0 %	33	27.5 %
III-gr. (30)	12	41.4 %	4	14.0 %	5	17.2 %	1	3.4 %
Total: 181	61	41.0 %	34	22.8 %	20	13.4 %	34	22.8 %
149 (82.3 %)								

Table 5. – Types of femoro-popliteal lesions of TASC II by groups

Lower limb	№	Type A		Type B		Type C		Type D	
		left	right	left	right	left	right	left	right
I-gr.	25	7	5	2	3	2	4	1	1
II-gr.	152	23	21	20	18	33	28	3	6
III-gr.	41	5	8	4	2	12	7	1	2
(361)	218	35	34	26	23	47	39	5	9
	60.4 %	69 (31.6 %)		49 (22.5 %)		86 (39.5 %)		14 (6.4 %)	

Discussion

The first work on options for the development and classification of lesions of multifocal atherosclerosis is found in the works of M. DeBakey. According to him, among 14,000 patients with atherosclerosis in 40 % of cases, the process developed according to the embodiment 1, 30 % as 2 variation. Less than other options of variations 3 (3 % of all patients). At the same time, patients with lesions of options 2 and 3 were younger age, with respect to types of patients from 1, 4, 5 [1].

According to the anatomical and functional significance has 4 arterial beds.

1. The aortic arch branches.
2. Coronary artery.
3. Visceral branches of the abdominal aorta.
4. Terminal Division of the abdominal aorta and the lower extremities arteries.

According to the predominance of clinical lesions for atherosclerosis has 5 options:

1) the aortic arch branches;
2) coronary arteries;
3) visceral branches of the aorta;
4) the terminal abdominal aorta and lower extremities arteries;
5) Ta combination of any of these beds.

L. A. Bokeria et al. (2006) in his classification divided the patients with combined lesions of the aortic arch branches and coronary arteries (CA) to 4 groups depending on the location of the brachiocephalic arteries lesions [3].

B (bifurcation) — defeat of the carotid bifurcation (CB).
S (subclavian) — subclavian- vertebral steal syndrome (SSS).
V (vertebral) — defeat of the vertebral artery.
M (multiple) — multiple lesions of aortic arch branches.

Today widely used type is the classification of coronary lesions ACC/AHA, which takes into account not only the X-ray morphology directly affected segment, but also a host of other factors that affect the outcome of invasive treatment. Currently, this classification is used most widely, not only for the risk assessment of the upcoming endovascular intervention, but also for prognosis of coronary heart disease in general. According to ACC/AHA classification, there are three types of coronary artery stenosis (A, B, C) [5; 9].

In 2000, 14 vascular societies of Europe and North America have adopted recommendations for the defeat of the terminal part of abdominal aorta, iliac and lower extremities arteries (TASC I). Thus allocated aorto-iliac and femoro-popliteal lesion segments, each divided into 4 types (A, B, C, D). With the accumulation of evidence of using TASC I, in 2007, a recommendation has been updated and TASC II (Tab. 3–5) has found wide application of practical public health. On the recommendations of TASC II (2007), the defeat of the aorto-iliac segment: the C and D types of treatment choice is surgical, with the A and B types are recommended endovascular interventions [6].

Conclusions

An analysis of the aortic arch branches visualization of results proposed a new classification of types of lesion of aortic arch branches, reflecting the severity of atherosclerotic changes in the arterial beds.

When combined atherosclerotic lesions of the aortic arch branches, the terminal part of the abdominal aorta and the arteries of the lower extremities; tactics and volume of surgical intervention were determined by comparing the types of arterial lesions pools individually for each patient.

Analysis of the results of our study shows this classification well reflects the degree of severity of the branches of the aortic arch, and needs further study and additions to prospective multicenter studies.

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Prevalence and character of the oral cavity mucosa in the workers of the manufacture of the synthetic detergents

Abstract: It is established, that among working in manufacture of synthetic washing and cleaning agents the allergic disorders and diseases of a mucous environment of a cavity of the mouth and lips with the tendency to development hyperkeratosis — exfoliate cheilitis and leukoplakia of the red border of lips and cheek mucosa are widely distributed. In development of these lesions the certain negative influence is rendered by the adverse factors of manufacturing synthetic washing and cleaning agents.

Keywords: oral mucosa, the synthetic detergents, the cleaning agents, allergic stoma-titis, cheilitis, leukoplakia.

At the present time due to the deep social and economical changes in Uzbekistan the main principle of the state policy was warranting the safe working conditions and saving health of the working population. However, under the real conditions there are noted exceeding con-tents of the substances over the allowable concentrations (AC) that results in damage of the wo-rkers health. Particularly this concerns of the prior pollutants of the environment for which the enormous powers of manufactories, stability in the environment, ability of the chemical substa-nces to the distribution are characteristic [1; 2].

To these manufactures the plants of the production of the various household chemicals including synthetic washing and cleaning means on the basis of superficial-active substances may be related. The modern synthetic washing and cleaning products gradually supplanting non-synthetic cleaning compositions have gained the greatest prevalence (to 80 %) among the goods of the household chemistry.

The leading unfavourable factor of the industrial environment on the enterprises producing washing and cleaning substances seems to be the dust of the raw material and ready product, and the last has the most hygienic significance because practically all worker of these plants are exposed to them without dependence of the equipment, stations of the powder transfer from the transport devices, accidents during packages [3]. Thus their greatest danger consists in sensibilizing properties capable to call allergic diseases [2; 4; 5]. In the workers having contacts with these substances there are frequently (3.3–18.5 %) found nasal catarrh, stuffiness in nose, nasal hemorrhage, sneezing, inflammation and pruritus of the nasal and eye mucosa. It should be noted that now there is registered the growth of the number of allergic diseases of chemical etiology among the workers and adult population not having professional contact as well as in children (to 65 %). The researchers noted "eczema of the housewives" which is registered in wo-men using synthetic detergents at home, "napkin-area dermatitis" in children of young age as the result of the effect of the residual amount of the synthetic washing substances on the bed-clothes [1; 4; 7].

At the same time the researches on study of influence of the synthetic washing and cleaning means on the mucosa of the oral cavity of workers were not performed.

The aim of this investigation was to study frequency and character of the oral mucosa damages in the workers engaged in the manufacture of the synthetic detergents in comparison with control group.

Materials and methods

The study of a condition of the oral mucosa was undertaken on 500 workers of the Navoiy and Almalik chemical plants producing household chemicals in Uzbekistan (main study group) using the WHO strategies. As the control there were examined 500 employees of administration, electrical engineers, mechanics, watchmen, population living in the surroundings of the plants, but without exposure to the effect of the chemical enterprises.

Results and discussion

The results of the researches performed have shown, that among workers participating in the manufacture of washing and cleaning agents there is determined higher ($p < 0.001$) frequency of the oral cavity pathology than in the control group. So, there were more frequently observed allergic stomatitis (20.3 %), leukoplakia (17.8 %), allergic cheilitis (14.4 %) and chronic recurrent aphthous stomatitis (10.4 %), a some less often — allergic glossitis (9.8 %) and desquamative glossitis (9.6 %) and more less — exfoliate cheilitis (8.6 %) and chronic ruptures of lips (6.5 %). At the same time at workings of control group the first place is occupied by chronic recurrent aphthous stomatitis (7.5 %), second place — by desquamative glossitis (7.4 %) and upward allergic stomatitis (5.6 %) and exfoliate cheilitis (2.2 %).

It is necessary to note, that in workers at manudacture of the detergents there were oc-curred such diseases of the mucous mucosa (33.5 %), as hyperkeratosive and erosive-ulcerative forms of leukoplakia, allergic cheilitis and chronic ruptures of lips which were absent in the stu-died participants of the control group. Allergic stoma-titis and allergic glossitis were found in the both comparative groups, however their frequency among the working people was 3.9 times mo-re frequent ($p < 0.001$) than in the control group.

Thus, the most often pathology of the oral cavity mucosa in the workers engaged in the manufacture of the washing and cleaning agents seems to be allergic damages of the oral mouth and lips (44.5 %), which were observed consequently 5.7 times more often ($p < 0.001$) than similar parameters in control group (7.7 %). And anamnesis showed clearly the link between occurrence of allergic stomatitis and industrial activity of the workers. Thus in the workers there were often observed hyperemia of the vestibular part of the oral mucosa including the tongue and red edges of lips, sometimes the swelling mucosa with prints of teeth on the cheeks and lateral surface of tongue.

The special characteristics of the mouth mucosa damages in the workers engaged in the production of the detergents is the fact that during the process of investigations there was found increased

keratinization of the mucosal epithelial of the oral cavity as the manifestations of such diseases as leukoplakia (17.8 %) and exfoliate cheilitis (8.6 %), and the interrelation between a level of keratinization, duration and degree of the contact of the workers with manufacture pro-cess has been revealed. So, the most high level of keratinization was observed in workers manu-factured washing and cleaning agents 5.2 times higher (p < 0.001), than in the persons of control group.

Thus, on the basis of results obtained from the studies performed, it is possible to conc-lude, that among working engaged in the manufacture of the washing and cleaning agents the al-lergic diseases and diseases of mucosa of the oral cavity and lips with tendency to development of hyperkeratosis including exfoliate cheilitis and leukoplakia of the red edges and cheek mucosa are widely distributed. It indicates that the unfavourable factors of the manufacture of the synthetic washing and cleaning agent have negative effects on frequency and character of patho-logical processes in the oral cavity mucosa and lips of the workers participating in this process.

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Frequency and nature of family aggregation at probands with the burdened inheritance of the inactive adenoma of hypophysis (The genealogic status in panmixia with inheritance of inactive adenoma of hypophysis)

Abstract: Study of frequency of inactive adenoma of hypophysis (IAH) cases among relatives is of great importance for a choice of strategy and tactics of treatment of these patients, development of methods of forecasting in population families with genetic predisposition to this disease. In this regard the purpose of our research in which 104 patients with IAH were included there was studied nature of family aggregation at probands with the burdened family anamnesis.

Keywords: inactive adenomas of hypophysis, tumor, family, differential diagnostics, probands, genealogical status, symptoms.

Hormonal-inactive or the nonfunctioning adenoma of a hypophysis (IAH) — one of the most frequent (25–48 %) among all tumors of a hypophysis, proceeding without any manifes-tations of the raised production of hypophyseal hormones. Frequency of IAH in the general population makes about 10 new cases a year on one million population [1–3].

Problem of diagnosis of hormonal and inactive adenomas of a hypophysis (IAH) remains extremely actual that is directly connected with that now there are no the sensitive and reliable laboratory techniques allowing to define at a presurgical stage existence of pathological hormo-nal secretion among IAH [4].

In recent years efforts of researchers on studying of etiopatogenesis of IAH are directed on clarifications of molecular and genetic factors [5]. Family forms of adenomas of a hypophysis are renowned for many years and now, according to literature make from 1–2 % to 5 % of all cases [6].

Identification of a role of heredity in origin of IAH is one of actual problems of modern neuroendocrinology. Aspects of identification of frequency of IAH cases among relatives of probands are also essential. It is of great importance for a choice of tactics of treatment of these patients, development of methods of prevention and forecasting in population families with genetic predisposition to this disease.

Materials and methods

104 patients with IAH are examined. In the anamnesis of 83 (79.8 %) surveyed (1st group) was absent the presence of incidence of IAH among close and dis-tant relatives — grandfathers, grandmothers, fathers, mothers, brothers and sisters, etc. At 21 (20.2 %) of patients (the 2nd group) the disease was connected with heredofamilial predispo-sition. These were representatives of 6 families with the presence of two and more relatives with adenomas of a hypophysis of various types of secretion.

The analysis of the surveyed showed that both in the first and in the second group women met more often. Average age of patients of the 1st group made — 36.1 ± 11.6 years old, the 2nd — 44.5 ± 13.2 years old.

Most patients with IAH without the burdened family anamnesis were aged from 18 till 50 years (84.3 %), and more than a third

of patients of this group were aged from 18 till 30 years (34.9 %), to a lesser extent persons of 50 and more (15.7 %) are met. As for patients with heredi-tary predisposition, persons from 18 to 30, it appeared much less (9.5 %), more than a third of pa-tients of this group were in the age range from 30 to 40 years (38.2 %) and a third of the persons of 50 and more (33.3 %). At considerable part of patients with IAH of both groups disease duration is from 1 year to 10 years.

For clinic and diagnostics of IAH the tumor size has signifi-cance [7]. The diagnosis of IAH, as a rule, is established already when the tumor reaches the considerable sizes, causing sight viola-tions, the headache, vegetative frustration connected with pressure of structures of a forward part of a hypophysis [8; 9].

According to Computer Tomography (CT)/Magnetic Resonant Tomography (MRT) at most of patients (65–62.5 %)

macroadenomas are revealed, at 38 (36.5 %) — microadenomas and only one patient has had huge adenoma.

In the analysis of clinical records it is established that 6 (12 %) patients have diseases of stomach and intestines (chronic gastroduo-denitis — 3 cases, a chronic ulcer — 2 cases and chronic nonspecific ulcer colitis — 1 case), liver diseases at 7 (14 %) including chronic hepatitis B — 3 cases, C — 2 cases, hepatocholecystitis — 2 cases. At 9 (18.0 %) patients it is revealed earlier postpo-ned craniocerebral traumas (brain concussion — 7 cases, a fracture of an occipital bone combined with fractured wrist — 1 case, the combined injury of a brain with a spine injury — 1 case), at 14 (28 %) is revealed the chron-ic stress caused by continuous quarrels in a family (financial prob-lems, unsatisfied with work not by profession, loss of profession).

At an assessment of the genealogical status six families which had sibs from parents of patients are allocated (fig. 1 and fig. 2).
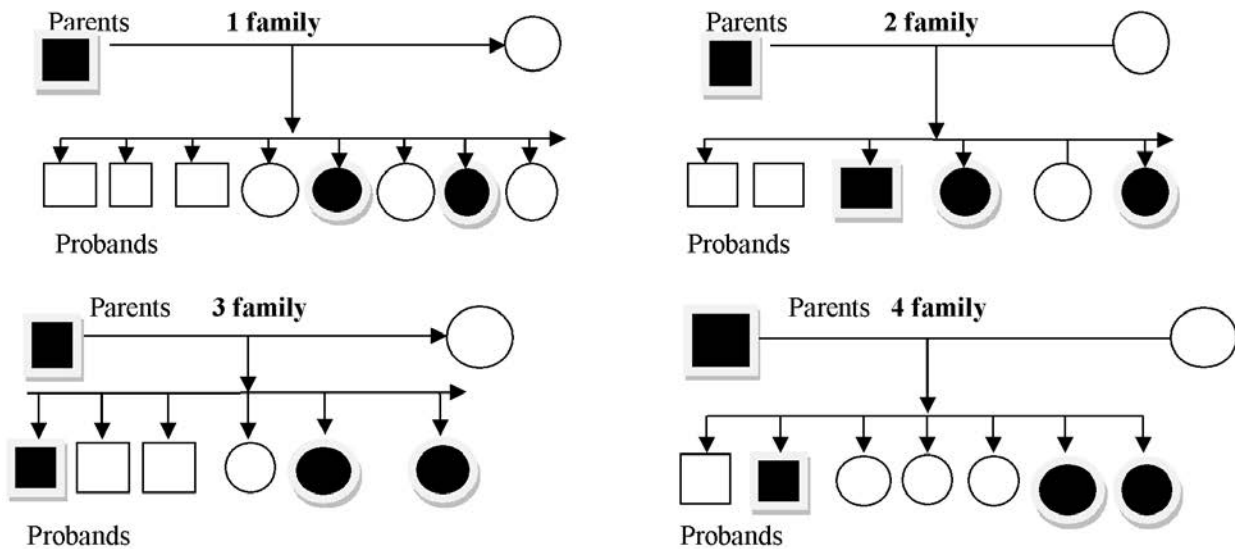
Fig. 1. The genealogical status in 4 families in which at probands fathers are with IAH
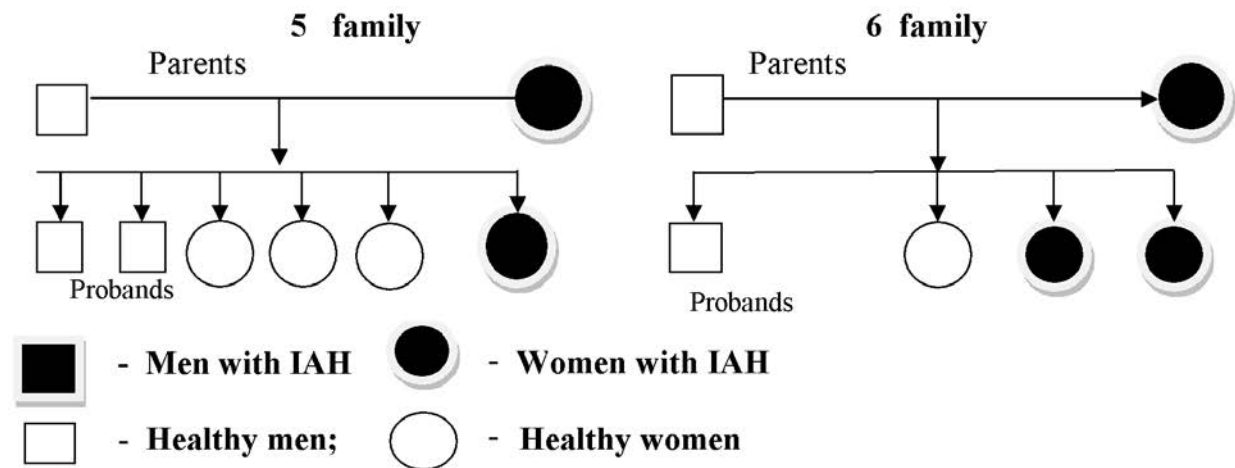
Fig. 2. The geneological status in 2 families in which at probands mothers are with IAH

Conclusions:

1. The carried-out analysis consisting in an individual assessment of sibs linked to sex in posterity from sick parents showed that in group with a panmixia a ratio of men and women on the line when mother is sick with IAH occurs 2: 3, on the line of the father 4: 12 and in a case when the father and mother are healthy, 2: 1 thus female sibs occurs 2.8 times more often than man's.

2. Contributing factors (a disease of bodies of a gastrointes-tinal tract, a chronic stress, craniocerebral injuries, smoking, alco-holism, frequent intake of strong medicines, ecological pol-lution),

serve as the progressive reason of acceleration of growth of a tumor of a hypophysis, expressiveness of clinical symptomatology as in population among patients with the sporadic, and family anam-nesis with IAH.

3. Adverse factors of internal and environment provoke in-crease in frequency of second-dary cases at patients with IAH with the burdened family anamnesis that is explained by total action of these factors and early identification of clinical symptoms of disease and frequency of cases of detection of macroadenomas in popula-tion among groups with a panmixia and inbree-ding.

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Features of formation and clinics depressive disorders in patients after myocardial infarction

Abstract: Now the problem of depression and somatic diseases, in particular, a cardiovascular profile is extremely actual. In the given research the factors contributing to formation of post infract depression are considered, the characteristic actually post infract is given to depression.

Keywords: acute myocardial infarction, depressive disorders, post infract depression, risk factors.

Depression is very often connected to one another, somatic, to diseases, and in such cases of disease of two different spheres — mental and somatic — aggravate each other, at times leading to serious consequences. In special degree it concerns diseases of cardiovascular system [1]. Among patients with cardiovascular diseases (CVD) frequency of accompanying depression makes 22–33 % [2]. At 17–27 % of patients with the ischemic heart trouble, undergoing procedure coronary angiography depressions [3; 4] come to light, and in patients in post infarct the depression (PID) period are found out in 16–45 % of cases [5; 6]. Presence of depression at patients of CVD not only complicates a current and therapy of these disorders, but also reduces life expectancy of patients. Connected to a heart attack depression predetermines three-quadruple increase in cardiovascular death rate. Though the quantity of the researches devoted to depression at patients of post infract, is rather insignificant, there is a number of proofs of that without treatment it within a year after the transferred myocardial infarction (MI) gets chronic character [7–9].

All of the above, and especially poorly known immediately PMI depression in patients late after suffering a MI, and in the first days after an acute attack has defined the purpose of this study, which is a part of a larger research work.

The aim of the research — studying of the factors promoting occurrence of depressive disorders (DD) at patients with acute myocardial infarction (AMI).

Materials and methods

The given research was spent on the basis of cardiological department of Bukhara branch of the Republican Scientific Center of Emergency Medical Care and a Regional Cardiological Dispensary to the period from 2010 to 2014. 121 patient has been included in research with the established diagnosis of a AMI by criteria MCB-10, given the informed consent and not finding out the expressed changes of the person interfering inspection.

Patients have been divided into 2 groups. In the 1st, the basic, 88 patients with AMI which in the subsequent the DD confirmed clinically and by means of diagnostic scales have developed have entered; the 2nd group have made 33 patients who also have transferred AMI, but not suffering in the subsequent the depression symptoms. Clinic dynamic supervision over patients in the period of PMI has been carried out.

Patients have been included in research as man's (52 persons (59.1 %) in the basic group and 27 persons (81.8 %) in comparison group), and female (36 (40.9 %) and 6 (12.2 %) the person accordingly). At the analysis of distribution of patients on age at the moment of the beginning of carrying out of research it has been revealed that the most part of patients both in the basic group, and in comparison group is made by patients at the age from 61 years and is more senior (50 % of patients of the basic group and 45.4 % of patients of group of comparison). At all investigated patients DD were a consequence of the PMI, that is the fact of a AMI became the psychologic traumatic

factor promoting occurrence of DD. Patients have not been included in research with endogenous depression, the DD which have developed owing to other psychologic traumatic situation.

In the carried out research methods such mathematical, statistical, clinic psychopathological, clinic catamnesis were used.

Results and discussion

By the time of primary inspection of 74 % surveyed patients (76.1 % of patients of the basic group and 69.7 % of patients of 2 groups) initially arrived in a cardiological hospital with the diagnosis a AMI; at all remained patients the considered case of a AMI happened repeatedly.

At the analysis of a clinical-dynamic currents of the basic disease and its comparison in two groups the following has been revealed. There is no authentic correlation between degree of defeat of a myocardium and probability of occurrence PID though and it is possible to notice that in group of comparison frequency transmural heart attacks was below (80.7 % basically against 54.5 % in comparison group). Clinically doubtfully also to establish interrelation between presence/absence of complications after a PMI, character of the acute phase — on the one hand and frequency of occurrence PMI depressions — with another. However accurate distinctions among compared groups are traced at an estimation of duration of actually ischemic attack. So, in group of patients with developed post infract depression almost at half of patients (47.7 %) duration of painful attack has made more than 20 minutes, and at 38.6 % of representatives of this group it proceeded from 15 till 20 minutes. At the same time in group of comparison at the overwhelming majority surveyed duration of ischemic attack did not exceed 15 minutes (72.7 %); the number of at whom this period has made 15–20 minutes and equals more than 20 minutes 15.2 % and 12.1 % accordingly. Also attracts attention that fact that in the basic group overwhelming number of patients (73 persons that makes 83 %) tried to stop an attack nitroglycerine, but unsuccessfully, at 4.5 % of patients of the basic group these attempts have brought some simplification, the remained patients at all did not use nitroglycerine. In group of comparison the quantity of the patients who were not accepting nitroglycerine for simplification of a painful syndrome, has exceeded half of all patients of the given group (51.2 %), it in 4.12 times above an indicator of the basic group. The inefficient accorded welcome of this preparation in 12.1 % of cases (in the basic group this indicator in 6.9 times above), and only with insignificant effect — in 36.4 %.

From resulted above the data it is possible to draw a conclusion that PID influence occurrence possibility such factors of the basic somatic disease, as duration of ischemic attack and possible attempts independently (and it is inefficient!) to stop an attack a preparation of some nitrates (in our case — nitroglycerine). Last fact, possibly, speaks the generated fear before persistence of a painful syndrome and reduction of belief in rendering assistance.

It is obvious that optimum adapt for a condition after a AMI of the person with hyperthymic personality traits and the balanced persons (21.2 %, 48.5 % accordingly), and at disturbing and psychasthenic people DD (52.3 % and 19.3 % accordingly) is more often were registered. Return correlation between probability of occurrence PID and an educational level of the patient is marked: the above an educational level, the more low probability of formation of DD.

Characterizing actually DD (patients of the basic group), it is possible to allocate following key moments:

1. At 63 patients (71.6 %) PID was estimated by means of diagnostic scales as moderate severity level.

2. At 69 patients (78.4 %) formation of DD has begun already in the first 7 days after the transferred ischemic attack.

3. Prevailing component of a classical depressive triad in a case PMI in our research it has appeared depressions affective (48 patients that has made 54.5 %).

4. Among melancholic, disturbing and dysphoretic affects dominates disturbing (59 cases that makes 67 %).

5. 50 patients marked presence of proof suicide thoughts (56.9 %).

Thus, considering the clinical characteristic of a depressive episode, it is possible to consider expedient appointment of antidepressive therapy already in the first week post infarct the period, and, possibly, it is necessary to give preference to energizers with expressed anxiolytic effect. It will allow to warn formation of the expressed DD and to avoid occurrence of the most dangerous result of depression — suicide thoughts and attempts.

Conclusion:

1. The probability of occurrence PID increases with increase in duration of ischemic attack.

2. PID are more subject to occurrence of the person with the low educational level, the burdened heredity on mental diseases and with disturbing and psychasthenic types of the person.

3. Carrying out of antidepressive therapy is expedient already in the first week after the transferred AMI; preference, possibly, it is necessary to give to preparations with expressed anxiolytic effect.

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Pharmacological and epidemiologic features of myocardial infarction in stationary condition and in the remote monitoring phase

Abstract: Results were demonstrated insufficient efficiency of medicamentous therapy as secondary prophylactic in patients with myocardial infarction in stationary condition, as well in the remote monitoring phase. It is established, that remedy preparations in the remote monitoring phase administrated in relatively low-level doses. It is found the low-level adherence of patient's treatment with myocardial infarction in the remote monitoring phase.

Keywords: myocardial infarction, arterial hypertension, diabetes.

Relevance

It is estimated by WHO, that 17 mln. people are died from cardiovascular diseases (CVD) annually in the world. It is expected, that mortality from CVD will reach – 25 mln. people all over the world in 2020 year. IHD, as reason of death among CVD, takes the leading position 26.7 % in Russia Federation (RF) [1]. Most threatening complication of IHD is myocardial infarction (MI). In particular, 1.1 mln. of Americans suffered from MI, 650 thousands from them suffered first time, for more then 45 % of people it became fatal in 2002 year. With the introduction into practice the modern methods of MI treatment, including endovascular and surgical, hospital mortality from this disease decreased from 25–30 % to 17–18 %, and in uncomplicated course of MI to 7–10 % (Ford Earl S., et al., 2007).

Actuality of favors treatment of MI is one of the discussable positions in the modern literature [2]. Observance of the principles of evidence-based medicine decreases mortality and repeated risk of MI at using of a large number of preparations with high evidence base, because efficacy from combination of two preparation is reliable (p < 0.001) comparing to absence of these preparations [3], and model of construction of adgirens principles at MI remains too complicate [4].

Aim of work: Estimation of preparation administration to patients who suffered from MI in stationary condition and in the remote monitoring phase.

Materials and methods of investigation

Work was a retrospective investigation of patients, who admitted to city clinical hospital No 7 of Tashkent with MI. It was included patients of both sexes. In result of screening of patients according to criterions was included 631 patients. 516 patients went till the end of investigation. In the remote monitoring phase 30 % (n = 155) of patients refused from investigation, 5 % (n = 26) patient's destiny is unknown.

Diagnosis MI on stationary stage was established according to existed criterions of national recommendations in diagnostic and treatment of patients with MI with ST segment elevation, 2007 y. All patients, who included, were invited to the interview (remote monitoring phase). In case of patient absence it was indicated a reason: death, aggravation of state, changing of living place, unwilling etc. In case of patient death indicated a date and a reason -coronary death, uncoronary death. In the study, doctor filled individual card of the patient of one example, which consisted of questions of retrospective estimation of features, quality of stationary stage of treatment and remote monitoring phase.

Methods of statistical analysis of investigation results were made using application package statistic programs MEDIOSTAT. It was used standard methods of variation statistics: calculation of average, standard deviation (M ± m), criterions of Styudent (p < 0.05).

Results of investigation

After coming of patients into clinic was administrated standard therapy of MI; which included: antiaggregants 94 % (n = 593), anticoagulants 98 % (n = 616), inhibitors of angiotensin transforming enzyme (IATE) 60 % (n = 378), antagonists of angiotensin2 receptor (AA-2R) 14 % (n = 85), statins 90 % (n = 565), trombolytics 42.4 % (n = 122) (fig.1).
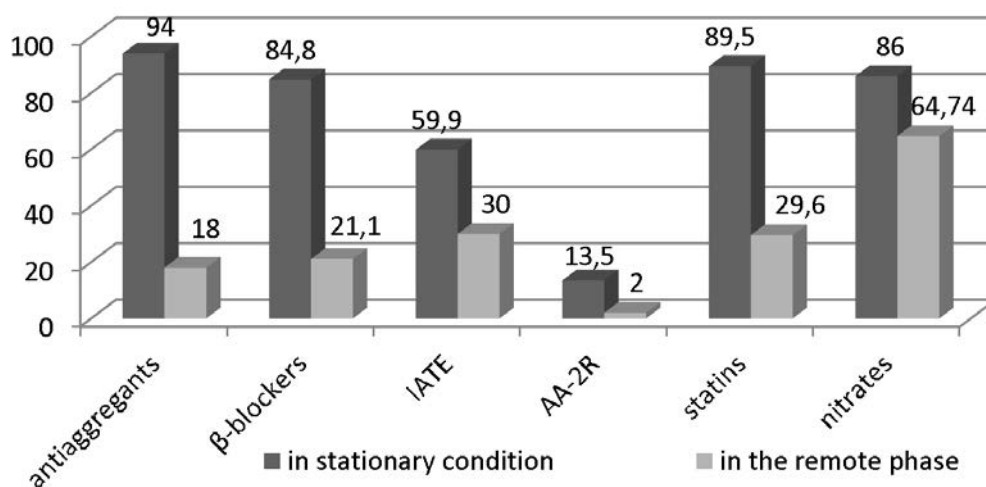
Fig. 1 Characteristics of the therapy to MI patients in stationary condition and in the remote monitoring phase (%)

Double antiaggregant therapy was done in 591 patients (93.7 %) (aspirin in dose 150 mg. and clopidogrel in dose 300 mg). In the remote monitoring phase double antiaggregant therapy (aspirin 75 mg. and clopidogrel 75 mg.) were taken just in 18 % (n = 60) of cases. In 82 % (n = 275) cases patients independently took antiaggregants as a monotherapy (aspirin 82 % (n = 225) and clopidogrel 18 % (n = 50).

High frequency of antiaggregant therapy administration in patients with MI as in moment of hospitalization so in the remote monitoring phase is positive factor.

In stationary condition to 98 % (n = 616) patients were done anticoagulant therapy, 19 % (n = 114) from them heparin, 81 % (n = 502) enoxiparin, 46 % (n = 288) patients came with ST segment elevation, from them to 42.4 % (n = 122) patients was done trombolytic therapy using streptokinase in dose 1.5 ml IU.

β-adrenoblocks in stationary condition took 84.8 % (n = 535) patients. Most frequent administrated preparations for patients with MI among β-adrenoblocks in stationary condition was bisoprolol in 92 % (n = 491) cases; in the remote monitoring phase took 21.1 % (n = 71) patients.

In stationary condition carvidelol 4.5 % (n = 29) and atenalol 3.7 % (n = 20) was administrated rarely. Atenalol was not used in controlled investigations in secondary prophylactic of MI; hence, it was not proved its positive influence to remote indexes survival and mortality.

IATE in stationary condition was recommended to 59.9 % (n = 378) patients, frequency of administration in the remote monitoring phase was 30 % (n = 101). Most frequent administrated ramipril in 28.8 % (n = 182), rarely enalapril 15.5 % (n = 98), lysinopril 6.3 % (n = 40) and perindopril 9.03 % (n = 57) cases.

Inspite of sufficient good tolerance and safety of AA2R in stationary condition was administrated patients with MI just in 13.5 % (n = 85), azilsartan 0.63 % (n = 4), valsartan 0.95 % (n = 6), irbisartan 1.4 % (n = 9), losaratan 10.5 % (n = 66). In the remote monitoring phase frequency of taking of preparations of this group was just 2 % (n = 85) cases.

Statins were administrated in 89.5 % (n = 565) cases. Among them more frequent administrated atorvastatin 76.1 % (n = 480), rarely simvastatin 5.4 % (n = 34), rozuvastatin 4.8 % (n = 30). Preparations of other groups as lipid decreased therapy: preparations of a nicotinic acid, fibrates, and ezetemib's group were not recommended for taking. It was noticed a positive fact of more wide using of statins in the remote monitoring phase as secondary prophylactic CVD. In our investigation according to worlds of patients statins were taken only by 29.6 % (n = 99) cases.

In stationary condition to 86 % (n = 543) patients with MI were administrated nitrates. In the remote monitoring phase nitrates took 64.74 % % (n = 217) patients. More frequently administrated mononitrates 45 % (n = 151), rarely dinitrates 6.41 % (n = 21).Relatively high using of nitrates by patients with MI in the remote phase from one hand one may explain by existence in most number of cases effort angina of different functional classes. From other hand, just little group of patients with MI in the remote monitoring phase underwent to intervention on coronary vessels of heart.

During indicated period intervention cause of revascularization of myocardium made to 5 % (n = 17) patients, ACB 3 % (n = 10), TLBA 2 % (n = 7).

In fig. 2 represented average daily doses of remedy preparations, which were administrated to patients in stationary condition and in the remote monitoring phase.
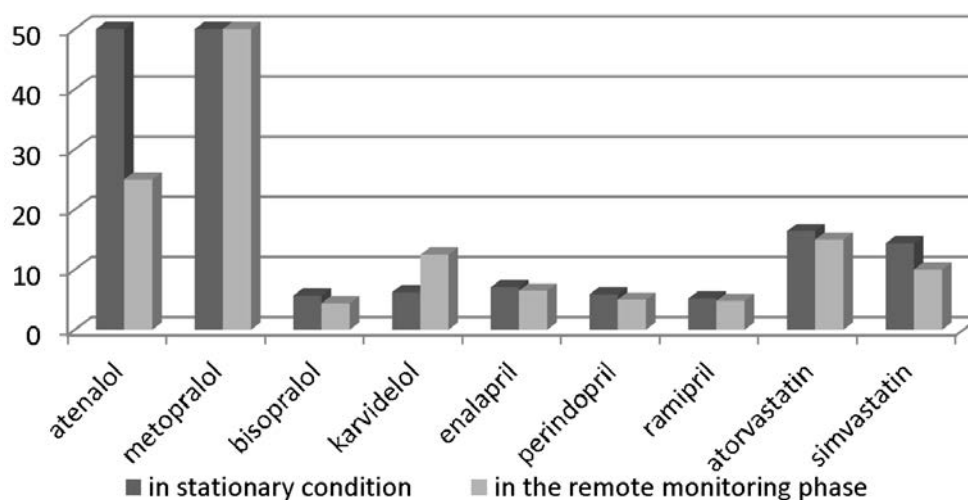
Fig. 2. Characteristics of average daily doses of drug preparations, which were administrated to MI patients in stationary condition and in the remote monitoring phase (mg.)

As we can see from received results, average daily doses of indicated preparations relatively not high and in stationary condition and in the remote monitoring phase, and it does not appropriate to international and national recommendations by treating of MI with ST segment elevation to preparations of secondary prophylactic of CVD at patients with MI after discharging from stationary.

At the moment of hospitalization in 86.5 % (n = 546) patients MI developed on the background of AG, duration of disease was 7.3 ± 4.5 year. At the moment of hospitalization average index of SAP was 156 ± 45, DAP 90 ± 12 mm. Hg. Number of patients who reached target level of SAP and DAP in stationary condition was

69 % (n = 356). In the remote monitoring phase did not reach target level of BP17.2 % (n = 356) patients.

On the background diabetes at 140 (22.2 %) patients was registered MI, when average index of blood sugar was presented 6.14 ± 2.5 mmol/l. From data of patients 121 (86.4 %) had got hypoglycemic preparations and 19 (13.6 %) had got insulin therapy.

At admission in stationary in patients was found hypercholesterolemia, which characterized by increasing of general cholesterol (GCh), triglycerides (TG), lipoproteins of low density (LPLD) and decreasing the level of lipoproteins of high density (LPHD) (figure 3).
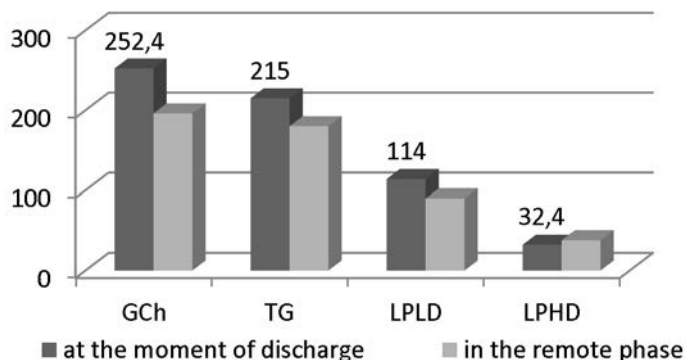
Fig. 3. Indexes of blood lipid profile in MI patients in stationary condition and in the remote monitoring phase (mg/dl)

In the remote monitoring phase the most negative tendency related to absence of reaching a target level of lipids among majority of patients, although it was observed veracious decreasing of GCh (22 %), TG (16 %), LPLD (21 %).

How can we explain insufficient efficacy of ongoing drug therapy in patients with MI in the remote phase?

Results of investigation showed that in 11.7 %cases (n = 39) patients had forgotten to take drug preparations and violated the multiplicity of their taking. In 47.9 % cases (n = 161) violations was not administrated treatment in scheme. But we have to emphasize, that in 40.4 % cases (n = 135) patients independently changed doses of drug preparations and even multiplicity of their taking.

Conclusions:
1. Results had demonstrated insufficient efficacy of drug therapy in scheme of secondary prophylactic in patients, who suffered from MI as in stationary condition, so in the remote monitoring phase.
2. It was established, that drug preparations is administrated in remote phase in relatively low doses at the remaining non-target levels of SAP, DAP, HR, GCh, LPLD, LPHD, and TG.

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Improved results of treatment of purulent wounds with complex use of photodynamic therapy and CO₂ laser in the experiment

Abstract: The aim of research was the evaluation of the effectiveness of photodynamic therapy and CO_2 laser destructive purulent wounds of soft tissues in the experiment. Photodynamic therapy is a very effective non-invasive and gentle treatment of purulent wounds and serve as justification for the use of the method of photodynamic therapy in clinical practice for the treatment of acute local inflammatory processes combined with CO_2 laser and traditional treatments. These laboratory, thermometry, morphological, microbiological and planimetric data suggest that photodynamic therapy and CO_2 laser is very effective non-invasive treatment of purulent wounds and serve as justification for the use of the method in clinical practice for the treatment of local acute purulent-destructive diseases of soft tissues.

Keywords: Photodynamic therapy, photosensitizer, experiment, methylene blue, purulent wound, microbe, CO_2 laser, laser surgery.

Despite the advances made by medical science, questions of treatment of patients with suppurative-septic pathology of the skin and soft tissues do not lose their actuality. Bacterial contamination of the wound supports inflammation and slows down the course of reparative processes. According to the literature information, the number of patients with acute purulent soft tissue diseases are

among the surgical patients 30–60 % (Svetuhin A. M. et.al, 2002; Goryunov S. V., 2004, Fransuzov V. N., 2006). In this connection continues to develop alternative technologies and methods for the topical treatment of infectious diseases of the skin and soft tissues of different etiology (Baranov Y. V., 2011).

For solving this problem recently successfully uses laser photo-dynamic therapy. Photodynamic therapy is a relatively new method of treatment of purulent diseases, and currently PDT has high potential for its use in many clinical directions. In sensitized cells and tissues develops photochemical reaction with the release of singlet oxygen, free radicals and highly active biological objects detrimental effecting, in particular, on tumor cells, microorganisms and etc. (Stranadko Y. F., 2000, Popova N. A., 2007, Ginyuc V. A., 2011, Sibata C. H., 2001).

To study the effects of CO_2 laser and photodynamic therapy on current of acute purulent-inflammation and wound healing dynamics, we decided to perform a simulation in laboratory animals in experimental purulent wounds. The experiment was conducted in a vivarium of TMA.

Objective: Improve the treatment of purulent destructive wounds by topical application of the CO_2 laser and photodynamic therapy in the experiment.

Materials and methods

For the experiment used: laser-photodynamic apparatus (taken emitters with a wavelength of 670 and 470 nm.), the photosensitizer is methylene blue, CO_2 laser machine, Wistar male rats weighing from 180 to 250 grams. As an indicator for the purulent surgical infection strains of microorganisms taken: Staphylococcusaureus, Escherichiacoli, Pseudomonasaeruginosa, Bacteroidesfragilis, Clostridiumdifficile.

All animals were kept on a standard diet in the vivarium of the Tashkent Medical Academy with free access to food and water. Conditions contents of rats were: air temperature in box 18–20 °C at a relative humidity of 55 %. The animals were kept in a dedicated box for 7 days to adapt to the conditions of the vivarium. Prior to the experiment, all animals were weighed, thoroughly inspected for cash the presence of visible pathology and symptoms of disease. If there is no healthy animals are culled and were not included experiment.

Simulation of purulent wounds, her follow-up treatment, the maintenance of animals, removing them from the experiment and sampling of the material took place in a dedicated control box, corresponding all the rules and regulations when dealing with opportunistic microorganisms, in compliance with all the rules of aseptic and antiseptic [3; 4].

Method of modeling acute local inflammatory processes in the experiment

In the pre-depilated femoral-rump skin of rat with marker using a cardboard template applied outline future wounds: a circle with a diameter of 2.5 cm. Skin treated twice with antiseptic and under general anesthesia excised skin and subcutaneous tissue to the superficial fascia. Next Kocher clamp crushes the edges of the wound and underlying muscles. Then, the bottom and the edges of the wound became infected 24-hour suspension of the mixture of microbes, taken in equal volumes, containing in 1 ml. 10^9 microbial bodies (the concentration was determined by turbidity standard). The volume injected suspension of microbes was 2 ml. Then, to create impermeability, to prevent wound injuring and to contamination by micro-organisms around, the edges of the wound stitched plastic ring with a side height of 1.2 cm. and a diameter of 2.5 cm. The ring is fixed on both sides. In the filed thus ring inserted dry sterile gauze ball. The skin was closed by the imposition of leading individual nodal joints. Thereafter, the

rats were in individual cages to prevent cutting of ligatures and doing additional injury to each other. Access to food and water was free.

Depending on the procedure conducted by the local treatment of purulent wounds the animals were divided into 4 groups, characteristics of which are presented in Table 1.

Table 1. – Distribution of the animals selected for experimental studies

№	Monitoring groups	Number of animals
1	Observing the natural course of wound process	20
2	Study of the influence of the traditional method of treatment on the course of wound process	20
3	Study of the effect of photodynamic influence on the course of wound process	20
4	Study the influence of the traditional method of treatment in combination with CO_2 laser and photodynamic therapy on the course of wound process	20

Results and their discussion

The purulent wounds in rats were formed after 48 hours and had all the classic signs of inflammation. The edges of the wound were with necrotic areas, slightly hyperemic, edematous. The bottom of the wounds was wet, had a color from yellow-green and purple-bluish to black-necrotic areas with previously injured muscle necrosis and fibrin overlays. Discharge from the wound, which was soaked gauze ball, delivered on the first day of the experiment, there was purulent in moderate amounts from 0.7 to 1.0 ml. of turbid, yellow-green color with hemorrhagic component, with specific smell. All animals have the same shape, area and location of the wound, which is important for further comparison and subsequent analysis of the dynamics of the wound early healing.

Some animals have evolved putrid infection in the wound, the generalization of infection process. These animals are a further experiment, did not take part, derived from the experiment by an overdose of anesthesia (including provisions for the humane treatment of animals).

All the animals were divided into control and experimental groups, depending on the method of treatment. In each group were of 20 rats. In the course of the experiment for evaluating the effectiveness of the treatment was carried out a thorough dynamic monitoring of the general state of the animals, the local course of wound process, the healing progress. Monitor and evaluate the rate of contraction of the skin, the presence and disappearance of redness around the wound, the rate of formation of primary and secondary scab, the nature of discharge from the wound — its color, smell and number. Watch for changes in the peripheral blood, a qualitative and quantitative change in the dynamics of microbial inoculation of the wound. In this regard, at certain intervals a part of rats was deduced from an experiment. Fence material took place at 3, 7, 10, 14, 21, 28th day from the start of the experiment. Usually in each group in terms were withdrawals of these for 3–4 rats. We have estimated the «survival — mortality», for statistical processing of material. It was conducted a dynamic photo archive.

On the third day from the moment of infection, depending on the intended method of treatment is carried out following manipulations.

The control animals (the 1st group), no therapeutic intervention was used. We monitor and evaluate the natural course of the wound healing process.

Animals (2nd group) whose treatment was carried out only with the help of traditional methods of treatment, on the third day after the infection was removed suggestive stitches, plastic ring and a gauze ball, delivered on the first day of the experiment, and the wound treated with a solution of hydrogen peroxide and after draining inserted Levomekol ointment. And also with the aim of antibiotic therapy Ceftriaxone pricked 1.0 grams in a dosage of 0.3 ml. of 1 times a day.

The next group of animals whose treatment was carried out using photodynamic therapy (3rd group), on the third day after infection apposition sutures removed and wound was opened, bead gauze was removed, placed on the first day of the experiment, and the wound treated with a solution of hydrogen peroxide. Subsequent session conducted with the application of photodynamic therapy bead sterile gauze soaked with an aqueous solution of 0.005 % MB at the wound surface layer to 1–2 mm. with fully closing the wound surface. It was applied opaque bandage. After 30 minutes of application held next treatment session, which consisted of installing irradiation FDD-1 with a power density of up to 200 mW/cm^2 with duration of 10 minutes in the field. The procedure does not require anesthesia.

The animals of the main group (4th group) whose treatment was carried out using traditional methods of treatment, CO$_2$ laser and photodynamic therapy, on the third day after infection, the wound opened after taking out of leading stitches, removed gauze ball, delivered on the first day of the experiment, and the wound treated with a solution of hydrogen peroxide and had a CO$_2$ laser session for early necrectomy and sterilizing wounds. The session ended with the CO$_2$ laser destruction by applying sterile gauze balls soaked in an aqueous solution of 0.005% MB on the surface of the wound bed to 1–2 mm. with fully closing the wound surface. It was applied opaque bandage. After 30 minutes of application held next treatment session, which consisted of installing irradiation FDD-1 with a power density of up to 200 mW/cm^2 with duration of 10 min. in the field. The procedure does not require anesthesia. And also with the aim of antibiotic therapy Ceftriaxone pricked 1.0 grams in a dosage of 0.3 ml. of 1 times a day.

Methods of evaluating the effectiveness of treatment of purulent wounds

The following parameters were included in the complex of the treatment effectiveness evaluation: laboratory, thermometry, the nature and amount of wound, planimetric (changes of the wound area), and clearance of the wounds, the time of appearance of granulation, morphological, bacteriological parameters.

To perform thermometry in rats it's quite suitable conventional mercury thermometer. For morphological evaluation were taken during process of wound tissue samples obtained from a wound and bottom walls at the 1st, 3rd, 7th days after its application. To control for the passage of wound healing in experimental animals immediately before treatment and on the 3rd, 7th and 10th days was used as planimetric method. And also conducted bacteriological research microflora isolated from necrotic wounds and the level of microbial contamination of the wound tissue.

The results of laboratory studies

On the third day, all animals showed signs of intoxication varying degrees of severity, as evidenced by changes in blood leukocyte formula: leukocytosis, increased amounts of immature neutrophils, plasma cells, the appearance, reducing the number of monocytes and lymphocytes, as well as increase in the LII (6-8 conventional units). After 3 hours from the moment of the beginning of the traditional methods of treatment observed decrease in the values of LII — 2.9 conv. units, with the additional effect on wound laser methods (CO$_2$ laser and photodynamic therapy) there is a big reduction in the indicator LII — 1.9 conv. units. After 10 days of the beginning of purulent wounds treatment with using PDT, LII matched normal value of the index, while the control group animals remained elevated — 19.3 ± 0.18 conv. units.

The results of thermometric studies

Immediately prior to the treatment of the initial value of the rectal temperature of the animals of all groups were as follows: 38.7 °C.

In the animals of the 1st group there is a slight decrease in rectal temperature only the 10th day. The animals in group 2 who received conventional standard treatment, there was a decrease in rectal temperature on the 7th day. Similar changes were found in animals of group 3, which received PDT treatment only. The most noticeable drop in temperature, which registered in the animals already on the 3rd day it was 4th group animals, which used for the treatment of a combination of effects of photodynamic therapy and standard methods of treatment.

The results of changes the wound area (planimetry) in dynamics

In experimental animals of all groups on the first day before the start of the treatment the wound area were averaged 745 ± 23.2 mm.

On examination, there was a moderate hyperaemia and swelling of the wound edges, the bottom was covered with a dirty grayish bloom. In the tissues surrounding the wound, there were areas of diapedetic hemorrhage.

The obtained data of the planimetric studies in dynamics are shown in Table 2. It reflects changes in the average index of the area of the wound surface in animals of different groups that have occurred at different times after the start of treatment under the influence of applicable treatments.

Table 2. – Indicators of planimetric studies in the dynamics at different times from the start of treatment

Groups №	Treatment methods	Planimetric injury indicators (mm)			
		Before treatment	On the 3rd day	On the 7th day	On the 10th day
1	Observing the natural course of wound healing	745 ± 23.2	723.0 ± 19.0	661.5 ± 15.9	581.4 ± 11.3
2	Traditional method of treatment	745 ± 23.2	619.0 ± 16.1	518.8 ± 17.1	401.3 ± 10.3
3	Study of the effect of photodynamic influence on the course of wound healing	745 ± 23.2	581.6 ± 10.2	495.8 ± 6.8	381.8 ± 8.3
4	The influence of the traditional method of treatment in combination with CO$_2$ laser and photodynamic therapy on the course of wound process	745 ± 23.2	381.6 ± 8.3	274.6 ± 9.1	121.6 ± 3.6

At evaluating the cleansing of the wound surface in the dynamics of the animals in Group 1, which did not apply the treatment, cleansing the wound surface from necrotic masses observed by day 17 (16.5 ± 0.7), in the 2nd group of animals cleansing of the wound surface was observed by day 10 (9.4 ± 0.8), and the animals of group 3 the cleansing of the wound surface observed by the 7th day (6.3 ± 0.8), animal group 4 on the 6th day (5.2 ± 0.9) from the start of treatment.

According to the results of our study, the performance of wound granulation tissue was observed in the animals of group 1 to the beginning of the 4th week (23.6 ± 1.1), the animals of the 2nd group to the top of the 3rd week (15.1 ± 0.9), animals of group 3 to the 9th day (8.8 ± 0.9), the animals of group 4 to the 7th day of (7.1 ± 0.3) from the start of treatment.

According to studies conducted in animals of group 4 the wound surface area decreased more intensively. Contractation and granulation of wounds observed faster than in the control groups. This proves once again that the combined application of traditional methods of treatment sessions with CO_2 laser and photodynamic therapy clearly effective when compared to other methods studied individually.

The results of histological examination

Before starting the experiment, the animals of all groups were identified inflammatory and necrotic changes in tissue structures on the background of an abundant infiltration of polymorphonuclear leukocytes.
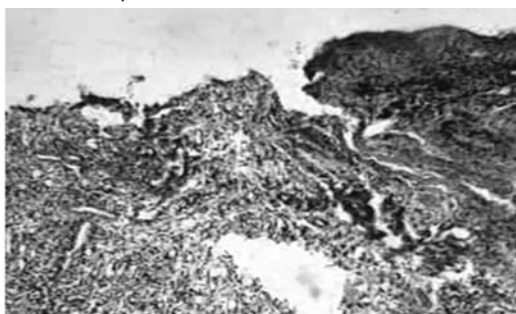
Fig. 1. Home purulent wounds on the 3rd day without treatment. Ulceration of the skin epidermis, edema and leukocyte infiltration of the dermis. Coloring: hematoxylin-eosin. Incr.: oc. 10, ob. 20

On the border with intact tissues are found demarcation leukocyte shaft and expressed frustration hemodynamics and microcirculation in the form of full-blooded vessels, increased permeability of their walls for plasma proteins and blood cells, stasis, fibrinoid necrosis of the vessel walls with perivascular and focal hemorrhages.

Morphological studies have shown that conventional treatment purulent-destructive soft tissue wounds inefficiently and only affects the decrease of the activity of inflammatory and destructive changes in tissue structures of the skin surface. In the deep layers of the dermis and subcutaneous musculature picture pathological changes is maintained until the end of the observation period.
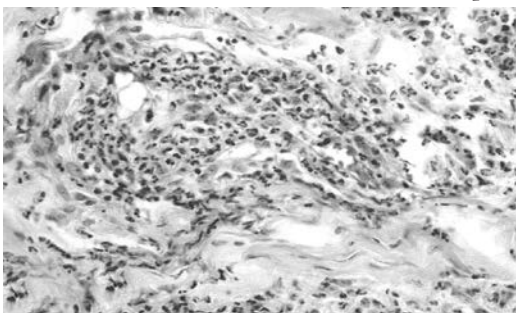
Fig. 2. Saving inflammatory leukocyte infiltration into the intramuscular connective tissue within 7 days after the traditional treatment of purulent-destructive wounds. Coloring: hematoxylin-eosin. Incr.: oc. 10, ob. 90

Identified dyscirculatory disorders also stored until the end of experimental observation, that is, apparently, cause edema and infiltration conservation deeper layers of the dermis. All this leads to delay ripening of granulation tissue fibroblasts and proliferation of the wound surface epithelization.

Treatment of purulent-destructive wounds only by PDT has a less effective impact on the severity of the recovery processes, leading to a slowdown in terms of filling the wound granulation tissue and its subsequent epithelialization.
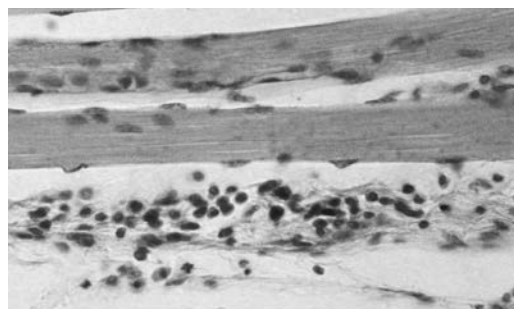
Fig. 3. Saving and interstitial infiltrate perivoskulyarnogo lymphohistiocytic 10 days after treatment with PDT. Coloring: hematoxylin-eosin. Incr.: oc. 10, ob. 90

The use of traditional treatment combined with CO_2 laser and photodynamic therapy is the most effective impact of the intensity of regenerative processes in all areas of purulent-destructive wounds. The use of traditional treatment combined with CO_2 laser and photodynamic therapy is the most effective impact of the intensity of regenerative processes in all areas of purulent destructive wounds.
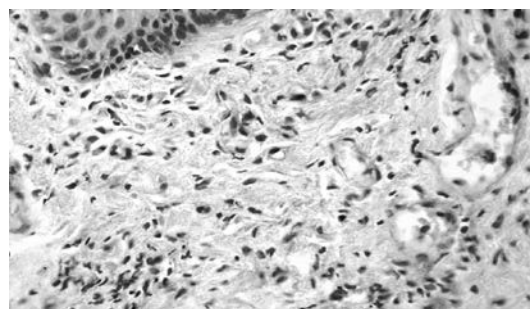
Fig. 4. Reducing the volume of edema, destruction and inflammatory infiltration in the affected area of purulent destructive process through 3 days of traditional treatment combined with PDT. Coloring: hematoxylin-eosin. Incr.: oc. 10, ob. 90

The significant reduction in the microcirculation disorders is responsible for the fast clearance of the wounds from purulent necrotic detritus and enhances the phagocytic activity of neutrophils. All this contributes to a more active and early formation of granulation tissue, activation of cellular proliferation elements macrophage and fibroblastic series, fast maturation and fibrosing granulation tissue, which ultimately leads to a reduction in terms of complete epithelialization of the wound surface.
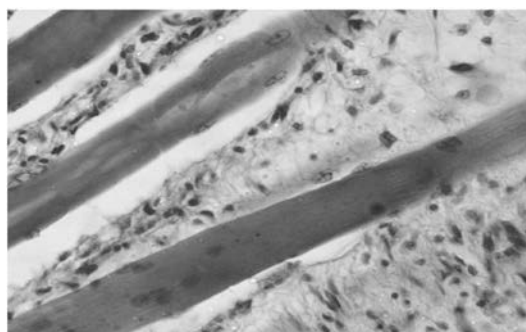
Fig. 5. Saving proliferation of histiocytic cells intramuscular interstitial after 10 days of traditional treatment destructive purulent wounds combined with PDT. Coloring: hematoxylin-eosin. Incr.: oc. 10, ob. 90

The results of microbiological studies

Microbiological studies were carried out to identify the causative agent and determination of CFU, as well as to monitor the effectiveness of the treatment. Gathering pathologic releasing substance from the wound to the qualitative analysis of the microflora was performed using a sterile swab, which was placed in a special tube to transport the coal environment.

The sensitivity of the isolates to antibiotics was determined by the standard technique for disks. In addition, it was conducted quantitative research methods to determine the level of microbial contamination in 1 gram of tissue injury. It should be noted that this method is the most informative.

When determining overall characteristics of the selected agents, it was found, that they mainly represented by staphylococcus and gram-negative flora. The leading role in microbiological study of releasing substance from purulent wounds took St. Aureus (62.5 %); Proteus mirabilis (54.8 %); E. Colli (50.8 %) and a small amount Str. Pyogenus (12.5 %). It should be noted, that the above listed organisms are major pathogens of purulent infection in surgery.

When determining the sensitivity was defined that most of the identified bacteria showed resistance to the most widely used antibiotics and retained sensitivity to cephalosporin, aminoglycoside and fluoroquinolones antibiotics past generations. So, they were the most sensitive to ciprofloxacin, cefazolin and rifampicin and less sensitive to penicillin and erythromycin. Furthermore, they were multi-resistant to several antibiotics simultaneously. These results suggest that the microflora isolated from purulent wounds is often a multi-resistant. Therefore, at the beginning of the complex treatment of purulent wounds it is recommended to appoint ciprofloxacin and rifampicin, ceftriaxone, and after receiving the results of the study of bacterial purulent wounds, antibiotic therapy should be corrected taking into account the sensitivity of microorganisms to antibiotics.

Along with the quality of microbiological studies of quantitative methods of research have been conducted, which today are the most informative, because allows to define levels microbial content per 1 g. of tissue injury.

Results of the study showed that before treatment in all groups of animals determined by the high level of contamination of tissue wounds, an average of $1 \times 10^{6-9}$ CFU/g.

On the third day simulation of purulent wounds destructive level of microbial contamination was in the animals of group 1 — 10^5–10^9 CFU/g. The animals in group 2, treated with the standard treatment, on the 3rd day level of microbial contamination was 10^4–10^6 CFU/g. The animals of the 3rd group, which were received treatment PDT only in these terms the level of contamination was on average 10^3–10^6 CFU/g. The lowest level of microbial contamination is observed in the animals of group 4, which was carried out comprehensive treatment with PDT, it was 10^2–10^5 CFU/g.

On the 7th day from the start of treatment of purulent wound microbial contamination level of performance in the animals of group 1 are without much dynamics. It should be noted that a significant reduction in microbial load of 1 g. of tissue observed in the animals of group 4 (10^2–10^5 CFU/g), compared to the contamination level data tissue wounds of animals in 2nd and 3rd groups (in average 10^3–10^6).

On the 10th day of observation in almost all groups noted a progressive decrease in the level of microbial contamination. However, in the group of animals received a combination treatment of antibiotic therapy with PDT observed sustained reduction in the level of microbial contamination of the wound tissue below the critical. The results suggest greater effectiveness of this type of exposure to destructive purulent wounds as compared to other treatments studied.

Thus conducted studies allow to evaluate the effectiveness of the method of photodynamic therapy of intraoral method of application of the photosensitizer methylene. These laboratory, thermometry, morphological, microbiological and planimetric data show, that photodynamic therapy and CO_2 laser is very effective non-invasive treatment of purulent wounds and serve as justification for the use of the method in clinical practice for the treatment of local acute purulent- destructive diseases of soft tissues.

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Diagnostics and treatment tactics of non-stable pelvis injuries

Abstract: Treatment analysis of 415 patients with non-stable and poly-focal fractures of pelvis bones has been described in the article. All patients have been divided to the groups subject to the types of injury, the optimal algorithm of supplying medical aid was worked-out for each group and according to the severity of the combined injuries an appropriate treatment method has

been chosen: external fixation or combined osteosynthesis. The analysis of using different types of pin-rod devices of external fixation has been given. From 182 patients cured with the use of different types of surgical correction the total reposition has been achieved in 114 (62.9 %) cases with exclusive results. In 48 (26 %) cases the reposition was incomplete, an exclusive functional result in this group was achieved in 15 (31.2 %) patients, good result — in 33 (68.8 %) patients. 20 (11 %) patents had bad reposition and in 13 (65 %) cases the result has been estimated as satisfactory one. In 7 (34 %) patients with vertical and rotary unstability the received results were bad.

So, applying an active surgical treatment combining internal and external osteosynthesis of pelvic ring at severe non-stable pelvic fractures with symphysis pubis rupture allows to perform direct reposition and reliable fixation of bones fragments and thereby to provide optimal conditions for early activation, social adaptation and recovery for patients.

Keywords: diagnostics, treatment, non-stable injury, pelvis.

Introduction

The part of highly energetic traumas leading to the multiple and combined injuries constantly increases in connection with an elevation of induced factor of traumatism intensity. One of the main damages at combined injuries are pelvic fractures which occur in 10–40 % cases. There are noticed frequent development of complications (shock, thromboembolic complications, pneumonia, neurotrophic complications) conditioning the high percentage of fatal outcomes — up to 70 % cases [1; 3; 4; 9; 12; 17; 19].

The diagnostics of pelvic bones fractures and acetabulum at performing urgent medical assistance has significant difficulties and it has been proved by the high frequency of clinical and postmortem diagnosis discrepancies [15; 18]. A limited informativity of X-ray investigation can be increased by the use of special applications offered by P. S. Drachuk (1972) and R. Judet (1981), D. I. Cherkes-Zade with co-authors (1990), A. V. Rumkov (2004), I. L. Shlikov (2004) [7].

Nowadays for successful operative treatment of recent and old pelvic and acetabulum fractures it is necessary to use CT [2; 7; 11; 13; 14; 16] which is not always available to the district level of traumatological service.

Treating ways of pelvic injuries differ by variety but in spite of improving an applied conservative and operative treatment methods, a frequency of unsatisfactory results at severe pelvic injuries even in specialized departments is from 20 up to 38.5 % [1; 2; 4; 7].

Many authors of the aids on treating of pelvic injuries published in Russian, prefer the methods of external fixation [1; 2; 3; 5; 7; 10]. In the guidances and aids edited abroad, the ways of internal stable-functional osteosynthesis are recommended and apparatus of external fixation or pelvic forceps are mostly used for pelvis stabilization at the emergency medicine during the first "golden hour in shock case" [6; 11; 15; 18; 19].

Adoption of modern technologies into modern orthopedics and damage control has allowed to improve treatment results of the patients with pelvis injuries [2; 3; 4; 9; 10]. Though the frequency of unsatisfactory results of surgical cure of the patients with non-stable pelvis injuries like B and C types according to AO classification at combined injury makes from 20 up to 30.5 % [1; 2; 8; 12; 15; 19].

There is no doubt that non-stable pelvic fractures like B and C types according to AO classification are followed by the loss of its supporting function and they are the indication for operative treatment [7; 12; 17; 19].

So, above mentioned statistics, unsolved issues in choosing optimal ways of pelvis injuries fixation, the absence of bio-mechanical reason for bone fragments fixation define the relevance of the subject and require scientific updating.

Objective

To optimize the diagnostics and to improve treatment results of the victims with non-stable pelvic bones fracture using modern technologies and ways of mini invasive osteosynthesis.

Materials and methods

Data of treatment results of 415 patients with different pelvis injuries. The main quantity 315 (76 %) of patients were at the most capable age — 25–55 years. Males were dominated 302 (73 %) patients and females were 112 (27 %) correspondingly. Considering the fact that the main reason of pelvis injuries were road traffic accidents and fallings from a height, combined and multiple origins of trauma has been pointed in 327 (78.7 %) patients. In 298 of them there were craniocerebral injury of the different levels of severity, chest and lungs injuries — in 90 cases, abdominal cavity injuries — in 84 patients, kidney and urinary bladder injuries — in 72 victims and in 317 patients injuries were combined with extremity bones injuries. 244 patients admitted to the hospital had traumatic shock of different levels of severity.

According to clinical-anatomical types of pelvis injuries and treatment tactics the victims have been divided in three groups by AO Documentation Centre's classification.

The 1st — group: **A type —** with a minimal displacement, without abnormality of the dorsal part of pelvic ring integrity; pelvic diaphragm is intact, pelvis is capable to withstand to usual physical activity without a displacement — 178 patients were in this group.

The 2nd — group: **B type —** rotary-unstable, but vertically stable injuries appeared due to effect on the pelvis lateral compressive or rotary forces. The back group of ligaments and pelvic floor remain intact, there is a possible rotary non-stability, 115 patients were in this group.

The 3rd — group: C type — rotary and vertically unstable injuries characterized by a complete separation of the pelvic ring including back sacroiliac complex. Injury can be one or two-sided, the quantity of victims in this group was 122 people.

All patients with pelvis injuries had been performed investigations and treatment according to the standards with a glance of dominating pathology. Being admitting all patients with combined pelvis injuries have been placed into the shock-room where have been examined by the specialists — traumatologist, neuro-surgeon, reanimatologist, general surgeon, urologist and others according to indications. In the case of non-stable hemodynamics the patients have been performed antishock procedures. Simultaneously there have been carried investigations including intaking analysis (general blood analysis, urine analysis, blood for group and rhesus, biochemical blood analysis and coagulogram), X-ray, USD of internal organs, Echo encephaloscopy, CT and MSCT.

From diagnostic point of view a complicated surgical intervention in pelvis cannot be based only on convex radiography. We as mane other authors think that spiral and multy-spiral computer tomography (MSCT) has significant advantages due to more volumetric image of injuries nature.

Pelvic bones CT with 3D image we have done with PHILIPS CT «Aura» (2002) in VOLUM RENDERING, slice — 7 mm.,

Table index — 5 mm,. PITCH-1,5 regime and with PHILIPS «Brilliance 40» MSCT (2006) in spiral regime step 3 mm., layer width 3 mm., PITCH-0,6. 163 patients have been performed CT investigations.

X-ray investigation of patients has been done with PHILIPS «Duo DIAGNOST» (2002) stationary X-ray mashine SIEMENS «POLIMOBIL» (2001) portable apparatus. Performing X-ray investigation in oblique view in compare with other existing ways we did not turn the patients to the lateral position and it coul lead to the aggravation of patient's severity condition, this procedure has been done by the tube flexion at the same 45° angle. At severe combined injuries X-ray investigation has been performed at the patient's bed with the help of portable apparatus.

Diagnostics complicity at a combined injury has been specified by diversity, blurring of clinical presentations of abdominal cavity and retroperitoneal injuries. Specific investigations have been used for diagnostics and correct treatment. Clinical analysis of blood and urine are the most informative ones from applied laboratory investigations. USC of urinary bladder and abdominal cavity have been used for indirect signs imaging. Patients with pelvic bones injuries have been performed urinary bladder catheterization, at detection of blood presence in urine the patients have been performed Zeldovich test. Patients with urinary bladder injuries had positive Zeldovich test. These patients have been done X-ray investigation (urethrography with ascending cystography in two projections).

Treatment of pelvic injuries are only the part of general treating procedures. A great attention has been paid to the severity conditions estimation of victims as the majority of patients have admitted in different levels of shock. It is necessary to point that patients' examination has been done against the background of anti-shock therapy and pain relief, intra-pelvic anesthesia by Sholnikov-Selivanov has been performed.

Applied treatment methods in patients with pelvic injuries

Dislocations in hip joint have been eliminated after diagnosing under the general anesthesia. Patients with combined injuries, chest and abdominal cavity organs injuries required emergency surgical intervention have been performed operations on cavitary organs and extrafocal osteosynthesis sequentially after eliminating a dominated pathology. At the necessity of an operative correction of extremities fractures and pelvis injuries, one-phased operative intervention has been done with the use of small-invasive ways of osteosynthesis worked out at our hospital (Table 1).

Table 1.

Treatment method	Type of injury by AO			Total (%)
	A	**B**	**C**	
Conservative	111	29	28	168 (40.4 %)
Opened reposition and osteosynthesis	15	23	15	53 (12,9 %)
Transosseous osteosynthesis by external fixation	47	51	60	158 (38 %)
Combined osteosynthesis	5	12	19	36 (8,7 %)
Totally	**178 (43 %)**	**115 (27.7 %)**	**122 (29.3 %)**	**415**

The first group of patients (**A type**) as it is seen from the table, have been treated by traditional conservative ways according to the minimal displacements, without continuity damage of dorsal part of pelvic ring and with a nullity anatomic-functional disorders. In this group patients with marginal fractures of iliac crest the osteosynthesis has been performed by compressing screws. At pubic branch fractures in the cases with combined injuries of abdominal cavity and urinary tracts (a presence of epicystostomy required an early activation) a front stabilization with light type of clinic's backbone apparatus has been performed. Later patients underwent physiotherapy keeping orthopedic regimen within 4–6 weeks.

In the second group of patients (**B type**) with rotary-unstable but vertically stable pelvis injuries the ways of mini-invasive transosseous osteosynthesis by our backbone and spoke-backbone apparatus were widely used (Fig. 1, 2). Taking into account the fact that there were no vertical displacements of pelvis half in this patients group and the presence of pelvis injuries on "open book" type they were easily eliminated in apparatus. The optimal way of treatments in this group was osteosynthesis by backbone apparatus. The duration of instrument fixation were 2 months. Patients were activated after 10–12 days. During 3–5 months patients moved with the help of cotters.
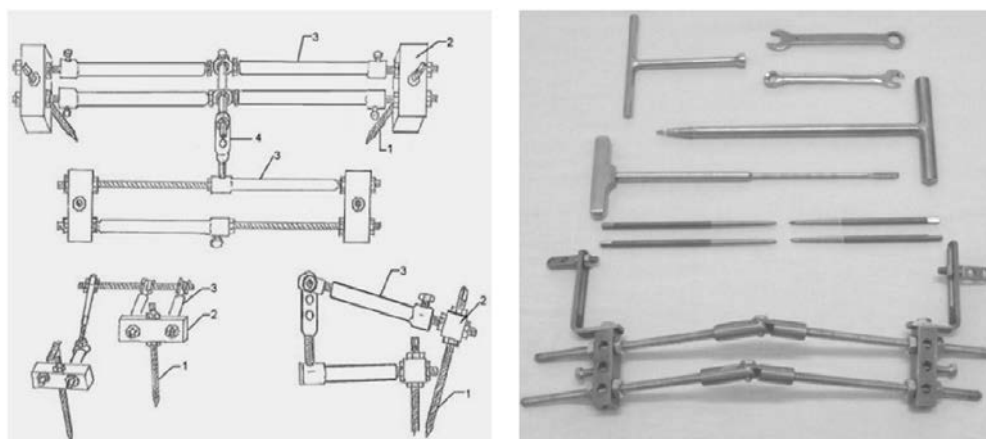
Fig. 1. Pelvic fractures fixation device

The third group was consisted of patients with severe rotary and vertically-unstable injuries characterized by complete separation of pelvic ring including back sacroiliac complex (**C type).** In patients of this group we have used the methods of submersible external osteosynthesis and the ways of percutaneous osteosynthesis of the acetabulum by threaded nails (Fig. 3). Physiotherapy with keeping orthopedic regimen has been conducted according to the duration of pelvic bones biological consolidation.
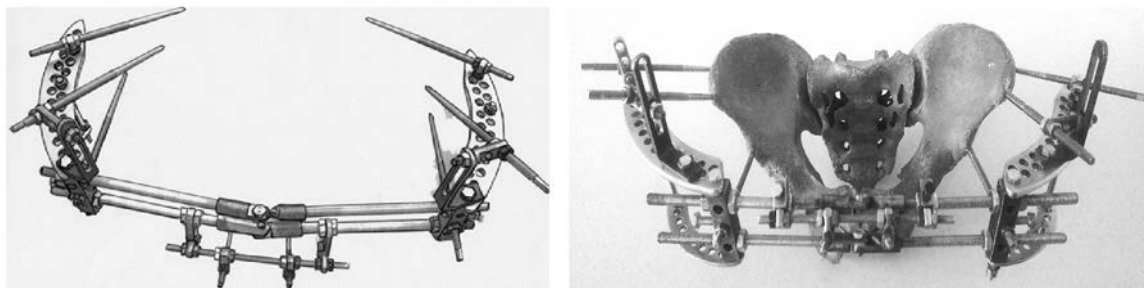
Fig. 2. Upgraded model of backbone device for non-stable and poly-focal pelvic fractures treatment
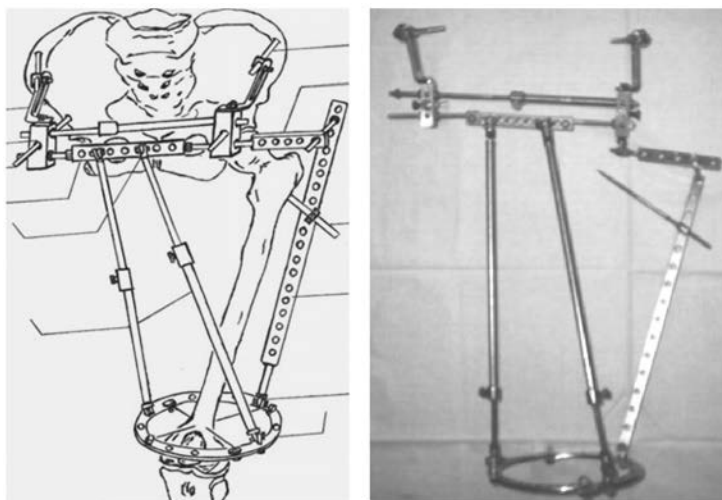
Fig. 3. Acetabular and vertically displaced pelvic fractures fixation device

Results and discussions

Totally there have been performed **247** operative interventions. There were used apparatus of external fixation for treating patients with pelvic bones fractures which were worked-out in the Republic Research Centre of Emergency Medicine. Estimating the reposition quality and recovery of pelvis functions at its non-stable fractures with the use of different types of surgical treatment and their combinations we have determined that the most qualitative reposition and stable fixation has been achieved in patients with B type fractures — 94 patients, C type — 70 people where there have been used the ways of transosseous and external osteosynthesis.

Late fates of patients operative treatment with non-stable pelvic fractures have been studied in 182 patients in the period from 6 months till 3 years. All patients have been operated in early posttraumatic period until 10 days. In all cases the stability of pelvic ring has been recovered and it has been proved by X-ray normal interrelations in symphysis pubis and in sacroiliac joint. Treatment results surely must depend on reposition quality. In 182 patients treated with the use of various types of the surgical correction the complete reposition has been achieved in 114 (62.9 %) cases and there were got excellent results. In 48 (26 %) cases the reposition was incomplete, an excellent functional result in this group was in 15 (31.2 %) patients, a good one — in 33 (68.8 %) patients. 20 (11 %) patients had bad reposition, in 13 (65 %) cases the result has been estimated as satisfactory one. In 7 (34 %) patients with vertical and rotary-unstable injuries there were bad results.

Conclusion

The diagnostics of non-stable pelvis injuries must be complex including clinical and instrumental investigation methods. Applying action algorithm subject to type and nature of injuries, using modern technologies allow to reduce the percentage of diagnostic mistakes and promote the choice of the most optimal treatment method.

Using backbone apparatus of external fixation meets a requirement of the stable osteosynthesis and it is an effective, small traumatic way of pelvis injuries stabilization at the early stage of traumatic disease. Early surgical tactics of treating non-stable pelvic bones fractures with the use of transosseous osteosynthesis and at the presence of indication in the combination with external osteosynthesis allowed to get positive anatomic-functional outcomes in 91.6 % cases.

So, applying an active surgical treatment combining internal and external osteosynthesis of pelvic ring at severe non-stable pelvic fractures with symphysis pubis rupture allows to perform direct reposition and reliable fixation of bones fragments and thereby to provide optimal conditions for early activation, social adaptation and recovery for patients.

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Genetic polymorphism of cytokines in patients with keloids

Abstract: An ongoing study examined the DNA of an interleukin-6 (IL-6) and interleukin-1 (IL-1) in patients with keloids. The results of the research of gene polymorphisms S3953T gene IL-1B and G-174C gene IL-6 is a marker of increased risk of developing the disease, in particular, is clearly expressed with homozygous genotype polymorphism G-174C IL-6 gene. Distribution of allele frequencies of genes IL-1β and IL-6, consistent with the law of the expected Hardy-Weinberg equilibrium (P > 0.05).

Keywords: Keloids, homozygous genotype, gene polymorphism.

Currently, one of the urgent problems of dermatology are skin diseases associated with impaired collagen synthesis (keloid), and manifesting the development of various degenerative lesions of the skin, reducing the quality of life [1; 2].

Purpose of the study

Carrying out the molecular genetic studies of genotype polymorphism S3953T gene IL-1β and G-174C IL- 6 gene in patients with keloids.

Materials and methods

An ongoing study examined the DNA of an interleukin-6 (IL- 6) and interleukin-1 (IL-1) in 25 patients with keloids and 20 apparently healthy donors (control group). All the subjects resided in the territory of Uzbekistan and had no family ties between them. Comorbidities in patients with keloids was introduced diseases of the gastrointestinal tract (70 %), iron-deficiency anemia (30 %), diffuse goiter of varying degrees (23 %).

In the first stage extraction was carried out from genomic DNA of peripheral blood lymphocytes. Isolation of DNA from nuclei of lymphocytes was carried out according to the procedure described in the manual Sambrook et al., with some modifications.

Statistical processing of the results of research carried out by the method of variation statistics using Microsoft Office Excel-2003 program.

Results of the study

In order to determine the frequency distribution of genetic variants of the gene mutation G-174C IL-6 gene, we performed a molecular analysis of DNA among relatively healthy donors and patients with keloids [3]. In 25 patients and 20 apparently healthy donors, G allele of IL-6 gene (G-174C) was found 85 % and 96 % of cases, respectively (Table 1). CC allele gene IL-6 (G-174C) were observed respectively in 15 % and 4 % of cases. In assessing the characteristics of the distribution of genotypes and allelic variants of the IL-6 polymorphism (G-174C) in patients with keloid scars it revealed that the differences in the frequency of alleles and genotypes between patients examined men and women were invalid character. A comparative analysis of the

genotype frequencies of the polymorphism of IL-6 (G-174C) the most significant in the examined groups of men and women were homozygous genotype G/G (75 % of patients and 92 % of normal) and C/C (5 %) only among the patients. Heterozygous genotype G/C IL-6 gene (G-174C) was observed in the group of patients (20 %) and in the control group (8 %).

Table 1. – The frequency distribution of alleles and genotypes of polymorphism G-174C IL- 6 gene

Group	N	The frequency of alleles				The frequency distribution of genotypes					
		G		C		G/G		G/C		C/C	
		n	%	n	%	n	%	n	%	n	%
Core group	20	34	85.0	6	15.0	15	75.0	4	20.0	1	5.0
Control group	25	48	96.0	2	4.0	23	92.0	2	8.0	0	0.0

Alleles: $\chi^2 = 3.3$; p = 0.06; OR = 4.235; 95 % CI 0.8058, 22.26.
Genotypes: G/G: $\chi^2 = 2.2$; P = 0.1; OR = 0.3; 95 %CI 0.65, 22.3.
G/C + CC: $\chi^2 = 2.4$; P = 0.1; OR = 3.833; 95 % CI 0.6569, 22.37.

With regard to the distribution of features allelic variants and polymorphism genotypes S3953T gene IL-1β allele G gene among patients and the control group it was found 87.5 % and 94 % of cases, respectively (Table 2). T allele of the gene IL-1β (S3953T) was found in 12.5 %, respectively (for patients) and 6 % (including the control group) cases. In assessing the characteristics of the distribution of genotypes and allelic variants of the polymorphism IL-1β (S3953T) in patients with keloid scars it revealed that the differences in the frequency of alleles and genotypes between patients examined men and women were invalid character. A comparative analysis of the genotype frequencies of the polymorphism of IL-6 (G-174C) the most significant in the examined groups of men and women were homozygous genotype G/G (75 % of patients and 92 % of normal) and C/C (5 %) only among the patients. Heterozygous genotype G/C IL-6 gene (G-174C) was observed in the group of patients (20 %) and in the control group (8 %).

Table 2. – The frequency distribution of allele and genotype polymorphism S3953T gene IL-1β

Group	N	The frequency of alleles				The frequency distribution of genotypes					
		C		T		C/C		C/T		T/T	
		n	%	n	%	n	%	n	%	n	%
Core group	20	35	87.5	5	12.5	15	75.0	5	25.0	0	0.0
Control group	25	47	94.0	3	6.0	22	88.0	3	12.0	0	0

Total group and control:
Alleles: $\chi^2 = 1.3$; P = 0.3; OR = 2.24; 95 % CI 0.5011, 9.997.
Genotypes: C/C: $\chi^2 = 1.2$; P = 0.2; OR = 0.4; 95 % CI 0.50, 11.8.
C/T: $\chi^2 = 1.3$; P = 0.3; OR = 2.4; 95 % CI 0.5062, 11.8.

In order to determine the effectiveness of a genetic marker were calculated sensitivity (SE), specificity (SP) and the index of AUC (areaundercurve). Prognostic value was determined as follows: if the index AUC < 0.5, the marker — the occasional qualifier; 0.5 < AUC < 0.6 — bad, 0.6 < AUC < 0.7 — average; 0.7 < AUC < 0.8 — good; AUC > 0.8 — a great qualifier. The results of calculation of the efficiency of the studied loci S3953T gene IL-1β and G-174C gene IL-6 as an independent marker of collagen remodeling identified statistically insignificant. However, one could note the relatively high level of sensitivity with the index locus rs1800795 SE = 0.92 (95 %, CI: 0.80 –22.26), with SP = 0.25 (Table 3).

By using the Fisher exact test was to check the distribution of polymorphic loci examined for compliance with the Hardy-Weinberg equilibrium.

Observed races — bution (tab. 4, 5, 6, 7) heterozygous genotypes both loci correspond Augy, Aisne — giving law to the Hardy-Weinberg equilibrium (P > 0.05).

Table 3. – Sensitivity (SE), specificity (SP) component and AUC (area under curve)

Polymorphisms	SP	SE	AUC	OR (95 %CI)	P
rs1143634	0.25	0.88	0.56	2.2 (0.5011, 9.997)	0.3
rs1800795	0.25	0.92	0.58	4.2 (0.80 –22.26)	0.06

Table 4. – The difference between the expected and observed frequencies of heterozygosity polymorphism among patients S3953T gene IL-1β

Genotypes	genotype frequency		χ^2	P
	expected	observed		
C/C	76.56	75.00	0.006	
C/T	21.88	25.00	0.089	
T/T	1.56	0.00	0.313	0.5229
Total	100.00	100.00	0.408	

Table 6. – The difference between the expected and observed frequencies of heterozygosity polymorphism among patients with G-174C IL-6 gene

Genotypes	genotype frequency		χ^2	P
	expected	observed		
G/G	72.25	75.00	0.021	
G/C	25.50	20.00	0.237	
C/C	2.25	5.00	0.672	0.3348
Total	100.00	100.00	0.930	

Table 5. – The difference between the expected and observed frequencies of heterozygosity polymorphism among IL-1B gene controls S3953T

Genotypes	genotype frequency		χ^2	P
	expected	observed		
C/C	88.36	88.00	0.000	
C/T	11.28	12.00	0.011	
T/T	0.36	0.00	0.090	0.7496
Total	100.00	100.00	0.102	

Table 7. – The difference between the expected and observed heterozygosity polymorphism frequencies among the control group G-174C IL-6 gene

Genotypes	genotype frequency		χ^2	P
	expected	observed		
G/G	92.16	92.00	0.000	
G/A	7.68	8.00	0.003	
A/A	0.16	0.00	0.040	0.8350
Total	100.00	100.00	0.043	

The analysis of DNA polymorphisms distribution of two genes involved in the regulation of the functional activity of cytokines found:

– Frequency distribution of alleles IL-1β and IL- 6, consistent with the law of the expected Hardy-Weinberg equilibrium (P > 0.05);

– Among the examined patients with keloid scars in the presence of genotype-national function allele and genotype polymorphism S3953T gene IL-1β detected in 12.5 % and 25.0 %, respectively, compared with 6.0 % and 12.0 % in the control group, and is associated with a than 2-fold increased risk of diseases associated with collagen remodeling. However, these differences were not significant article cally ($\chi^2 = 1.3$; P = 0.3; OR = 2.4; 95 % CI 0.5062, 11.8); The genotype homozygous for the allele C/C, on the contrary, was protective against such states ($\chi^2 = 1.2$; P = 0.2; OR = 0.4; 95 % CI 0.50, 8.11). However, its frequency was statistically insignificant-telno lower in the group of patients with keloids (75.0 %) than in controls (88.0 %). In the studied group of people with homozygous genotype were found;

– incidence functionally inactive alleles and genotypes of G-174C polymorphism in the gene IL-6 in patients with keloids significantly higher than in control group con (6 % and 25.0 % versus 4.0 % and 8.0 %, respectively).

Heterozygous for the presence of allele G/C in the group of patients with keloids met insignificantly more frequently than in the control group (20.0 % vs. 8.0 %, P > 0.05). A combination of two rare allelic variants not significantly more common also in the group of patients (25.0 %) compared with the control group (2.0 %). According to remodeling odds ratio, risk of collagen remodeling in patients in the presence of genotype — G/C + C/C is increased by more than 3.5 times ($\chi^2 = 2.4$; P = 0.1; OR = 3.8; 95 % CI 0.6569, 22.37).

Conclusion

The association between the polymorphic variants of genes IL-1β second IL-6 and the development of pathological conditions involving remodeling call gene. According to preliminary results of polymorphisms of genes S3953T gene IL-1β and G-174C IL-6 gene is a marker of increased risk of disease development, it is clearly expressed with homozygous genotype polymorphism G-174C IL-6 gene. The results reveal some aspects of the genetics of pathological process in keloid scars and indicate the advisability of continuing the first study of polymorphisms of genes involved in the pathogenesis of diseases involving the degeneration of collagen.

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The modern principles of surgical treatment in non-organ retroperitoneal tumors

Abstract: The article provides a data of immediate and long term results of surgical treatment in 208 patients with locally spread nonorganic retroperitoneal tumors. Malignant tumors constituted 152 (71.3 %) while benign tumors 56 (26.9 %). Radical operations were performed to 64.8 % of patients, palliative — 26.7 % and in 8.3 % of cases operations were cytoreductive. From these, in 52.8 % of cases operations had combined character. General, Intra- and postoperative complications constituted 16.4 %, meanwhile postoperative lethal outcomes — 2.4 %. 5-year survival rate of patients with benign tumors reached 83.3 %, and malignant — 12.6 %. The same index after radical operation constituted 41,3 %, and after non radical — 9.6 %. Relapses within 5 years after surgery for a malignant tumor occurred in 73.7 %, and after a benign tumor — 26.3 % of patients.

Kaywords: retroperitoneal, non-organ, tumor, operation, radical, surgical, size, combined, anastomosis.

Relevance

Non-organ malignant retroperitoneal tumors according to WHO (2013) is 0.3–0.4 % in the structure of cancer pathology [4].

According National cancer research center (NCRC) of Uzbekistan recorded annually 80–86 cases of retroperitoneal tumors with non-organ origins representing 0.4 % of all cancer.

Statistical analysis of the last 5 years shows that more than 50 % of tumors are locally advanced character that required conducting combined operations [1; 2].

Due to the inaccessibility of the region and since these tumors often give no or non-specific symptoms until they have reached a substantial size, they are usually large at presentation. Sarcomas comprise a third of retroperitoneal tumors, with two histological subtypes predominating, namely liposarcoma (70 %) and leiomyosarcoma (15 %). Other retroperitoneal neoplasms include primary lymphoproliferative tumors (Hodgkin's and non-Hodgkin lymphoma) and epithelial tumors (renal, adrenal, pancreas) or might represent metastatic disease from known or unknown primary sites (germ cell tumors, carcinomas, melanomas). Benign tumors can cause concern and are often an incidental finding during an investigation for unrelated symptoms [3].

They may be referred on suspicion of being a sarcoma. The most common benign pathologies encountered in the retroperitoneum include benign neurogenic tumors (schwannomas, neurofibromas),

paragangliomas (functional or non-functional), fibromatosis, renal angiomyolipomas and benign retroperitoneal lipomas [6; 10].

Operations in occasion of retroperitoneal tumors are very complicated among the surgeries. Treatment of these tumors demands from the surgeon deep knowledge of anatomy and possessing the high technical skills as well as the creativity and professional courage [4; 7]. However, the operability of retroperitoneal tumors remains quite low. For example, in a large clinical material various reputable researchers have shown that at the time of treatment of such patients for medical assistance only half of them are subject to surgical treatment, and in 21–26 % of cases of the operation is palliative or completed with trial laparotomy [9; 11]. The radical surgical interventions manage to perform according to different authors from 35 to 70 % [5; 8].

Materials and methods

Studies were conducted in 254 patients with retroperitoneal tumors who were in the department of abdominal surgery of NCRC. All patients had the surgery interventions, 208 of them (81.9 %) had removing of the tumor, 46 (18.1 %) patients had exploratory laparotomy. Among patients who had surgery, malignant tumor were in 152 (73.1 %) caces, benign — 56 (26.9 %). From them radical surgery had 64.8 % patients, 26.7 % palliative — 26.7 %, cytoreductive — 8.3 % patients. 52.8 % of them had combined operation. Men were– 144 (69.2 %), women — 64 (30.8 %). The age of patients ranged from 16 to 76 years. The diagnosis is established on the basis of comprehensive studies using diagnostic laparoscopy and MSCT angiography.

Radical surgery involves the removal of a single block of primary retroperitoneal tumor and surrounding structures affected by the mobilization of tissue outside the tumor pseudocapsule.

With the involvement in the process of tumor adjacent organs (kidney, spleen, pancreas, adrenal glands, stomach, duodenum, small intestine, colon, rectum, bladder, uterus, uterus, vagina), or their feeding vessels, during radical surgery are performed combined intervention with the removal or resection of the said bodies. In our study, in 52.8 % of cases have been made combined surgical interventions. The main components of the combined intervention were: small and large intestine and mesentery, liver, spleen, kidneys, ureters, front and side walls of the abdomen, great vessels, ovaries, bladder, pancreas and others. Among the combined operations is considered to be the most relevant in the germination of retroperitoneal great vessels and ureters. These operations accounted for 16 % (22) among patients with combined operations.

In 12 (16 %) cases was detected invasion to the great vessels, in 3 cases invasion to the iliac arteries and veins, in 4 cases to the abdominal aorta, and in 5 cases to the inferior vena cava, in which 2 patients had invasion to above and in 3 patients below the renal veins. In all 3 cases with invasion into the iliac artery was made resection of common and the external iliac artery with iliac-femoral prosthetic repair.

In 2 cases of 3 during the germination the aorta was made resection of the aorta with a prosthetic repair, and 1 case of resection margins with the plastic of wall of the aorta. In all five cases, the tumor invasion into the inferior vena cava had been made resection and plastic of vessel walls. 10 (4.8 %) of patients had resection of the ureter as element of combined operation, length of resection was from 2 to 10 cm, on the right — 6, left — 4. In 5 cases it was possible due to the mobilization of the ureter urethra to overlay urethra-urethro anastomosis. In 3 other cases, when the defect of the ureter, is from 8 to 10 cm., we have developed unique ways to restore the defect of appendicular appendage from the cecum with preservation of the mesentery, a similar operation is performed on the right at 2 and left at 1 patient. In 2 cases with 6 cm. defect was performed the full mobilization the left kidney with renal artery, vein and the proximal end of the ureter, due to this has been bring down the left kidney as a whole by 6 cm. and to form urethra-urethra anastomosis with nephropexy.

Results

General intra- and postoperative complications were in 16.4 % (34 patients). The intraoperative complications were in 24 (11.5 %), and the postoperative complications were in 10 (4.8 %) patients. The intraoperative complications: in 16 patients there was diffuse bleeding from the tumor bed during the mobilization and removal of the tumor, in 2 patients was massive bleeding as a result of damage to major vessels, in 3 cases — the damage of the integrity of the intestine, in 2 — bladder and 1 — spleen. During the postoperative period complications structure directly related to the operation itself was as follows: bleeding from the resected tumor bed — 3, external colonic fistula was formed from colo-colo anastomosis — 1, paralytic ileus in 2, pancreatitis in 2 in 1 thromboembolism, acute cardiovascular failure in 1 patient. Intraoperatively died 1 (0.4 %) patient from the acute cardiovascular failure, due to the continuous bleeding and disseminated intravascular coagulation syndrome. During the postoperative period died 5, 2 cases from the intra-abdominal bleeding, 1 — from thromboembolism, 1 — from myocardial infarction, and 1 patient after relaparotomii to close the intestinal fistula. Postoperative mortality was 2.4 %.

Postoperative complications associated with plastic urethra were observed: in 1 (3.5 %) patient after the formation of urethra, urethra anastomosis with the defect to 3.0, long-term period of up to 3 years in 2 (11.4 %) patients had slight narrowing in the anastomosis area with the development of I-degree hydronephrosis. In the remaining patients urethral patency of anastomoses was estimated very well.

Relapses of not organ tumors after radical surgery revealed within five years in 60.8 % cases: respectively, in 26.3 % of patients with benign tumors and 73.7 % — with malignant, and in most patients (52 %) tumor recurrence occurred within the period of 18 months after surgery. The five-year survival in retroperitoneal tumors after radical surgery was 41.3 %, after non-radical — 9.6 %.

Conclusion

Among the expansion-combined operations, special place is occupied resection and prosthetic large major vessels, and the replacing throughout of the defect of the ureter. When the defect of the urethra was up to 3 cm., continuity can be restored through the mobilization of the distal and proximal urethra. When the defect up to 5.0 cm. can be performed through the kidneys mobilization. When the defect constituting more than 5.0 cm. on the right side can be used appendix with the preservation of mesentery. These methods are aimed at preserving the anatomical and functional features of the body. Contemporary surgical techniques in contrast to traditional methods of treatment have a great advantage in restoring the health of patients, reducing the frequency of complications, reducing the amount of disability, improvement in 3- and 5-year survival and quality of life.

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Analysis of the surgical treatment of the pulmonary metastatic lesions

Abstract: In he department of thoracic oncosurgery of the Republican Oncological Research Center of the Ministry of Health of the Republic of Uzbekistan from 2000 to 2013 the surgical treatment at metastatic pulmonary lesions was performed in 45 patients. The surgeries were performed by thoracotomic approach in 29 (64.4 %) and with videothoracoscopic method — in 16 (35.6 %) patients. The volume of surgeries depended on the character of metastatic pulmonary lesions (size, number of metastases located in the zones in the lungs). There were performed atypical resections — 39 (86.7 %), lobectomies — 4 (8.9 %), bilobectomies — 1 (2.2 %), pulmonectomies — 1 (2.2 %). The patients were made analysis of the postoperative development in thoracotomic and thoracoscopic approaches in the patients with similar volume of operation. On the basis of this there were made conclusions that thoracoscopy seemed to be more preferable, than thoracotomy due to less traumaticity and more favourable postoperative development. The role of videothoracoscopy was determined as diagnostic and therapeutic method at solitary character of the metastatic pulmonary lesion.

Keywords: metastases in the lungs, videothoracoscopy, toracotomy, lung atypical resection.

Introduction

According to the data of literature the morbidity of high level of patients due to result of progressing looking-like metastazing of the malignant tumors is one of the most important problem of the modern oncology [1].

The term "metastasis" was introduced, for the first time, by Recamier in 1829. Metastazing (from the Greeth metastasis – transmission of the malignant tumors into the lungs depended on the common rules, being studied in details in experiment and oncological clinic and together with autonomic growth and invasiveness appeared to be sign of the tumor progression. It is well known that hematogenous way appeared to be the main way of metastazing into the lungs [2; 3; 4].

Metastases in the lungs were defined at the primary examination or in the different time after treatment of malignant neoplasms in 6–30 % of patients with tumors of any localization [4; 5; 6].

According to the autopsies, intrapulmonary metastases were revealed in 20–54 % of patients, having extrapulmonary tumors [7; 8].

Frequency of the metastazing of the malignant tumors into the lungs, according to the data of various authors, varied from 1.6 to 55.4 %, dependently on the localization and histological structure of the primary tumor. Mostly of all metastatic lung lesions occurred in trophoblast disease (55.4 %), of the malignant kidney neoplasms (37.7 %), of the locomotor apparatus (18.6 %), the colon (16.8 %), mammary gland (15.7 %), more rarely — in uterine cancer and sarcoma (4.2 %), gastric cancer (1.6 %) [9; 10; 11]. In 70–90 % of

cases metastases located in the "raincoat" zone of the lungs [1; 12]. Approximately, in 70 % of patients disease progressing asymptomatically, so the neoplasm in the lung is revealed occasionally at roentgenological examination or in the process of dynamic observation. Only at involvement of the visceral pleura, thoracic wall or bronchus the clinical symptoms appear such as cough, thoracic pains, hemoptysis, dyspnea, increase in body temperature [3; 5].

Metastases in the lungs are divided [1; 13] in relation to the quality — solitary (1), single (2–3), multiple (more than 3); in relation to localization — unilateral, bilateral. Accordingly to the efficacy of the presenting methods of treatment of the primary malignant tumors the pulmonary metastases are divided into 3 groups:

- Group 1 — metastases sensitive to chemotherapy and radiation therapy (testicle cancer, osteogenic sarcoma, trophoblast disease, ovarian cancer;
- Group 2 — metastases, practically resistant to effect of chemopreparations (hypernefroma, melanoma, highly differential glandular cancer of the colon and endometrium, uterine cervix squamous cell carcinoma;
- Group 3 — metastases of the tumors, which partially sensitive to effect of the conservative methods of treatment (mammary gland cancer, pulmonary cancer) [1; 13; 14].

At metastases of the tumors of groups 1 and 3 the treatment are advisability to begin with chemohormono-immunotherapy, and at metastases of the second group the method of choice — is operative intervention.

The operative interventions in intrapulmonary metastases are relatively divided into the following types:

1) "radical", when there is possible the complete removal of all metastatic focuses;

2) palliative, with purpose of prevention or elimination of the complications of the tumor process (hemorrhage, pneumothorax, bronchostenosis, abscess formation in the zone of atelectasis, destruction in the tumor node), as well as for reduction of the tumor mass with purpose of preparation of the favourable conditions for performance of the following conservative antitumor treatment.

3) exploratory [3; 4].

The first information about successful result of the surgical treatment of metastases. In the Soviet Union the first resection of the lung due to metastases of the extrapulmonary malignant tumor was performed by B. E. Linberg in 1948 [13].

At present time there have been formulated criteria for selection of patients, in whom the surgical treatment of intrapulmonary metastases is possible: absence of the recurrence of the primary tumor by the data of complex examination of isolated metastatic lesions of the lungs, technical possibility of the metastases removal, functional operability of the patient [2; 6; 15].

Introduction into the clinical practice of the endoscopic methods, particularly of videotheracoscopy, significantly extended potentiality of the surgical treatment of the metastases. Association of the high informativity and small invasiveness of the intervention allowed increase in the contingent of patients undergoing the surgical treatment [5; 6].

Material and methods

In he department of thoracic oncosurgery of the Republican oncological research center of the Ministry of Health of the Republic of Uzbekistan from 2000 to 2013 the surgical treatment at metastatic pulmonary lesions was performed in 45 patients. Among them there were 23 women (53.33 %). Distribution of the patients according to the age categories were following: the number of women at the age of 10–19, 30–39, 50–59 years were 3 (6.67 %) while at the age

groups of 20–29, 40–49 and 60–69 years the number of women were 4 (8.89 %), 6 (13.33 %) and 2 (4.44 %), respectively. The number of men at the age of 10–19 and 30–39 years was 4 (8.89 %) patients; in the group of 20–29 years — 6 (13.33 %) patients, as well as in the category of 40–49, 50–59, 60–69 years — 5 (11.11 %), 2 (4.44 %) and 3 (6.67 %) patients, respectively. Thus, the most number of the patients were treated in the age groups of 40–49 years — 11 (24.44 %) and 20–29 years — 10 (22.22 %) patients. At the age of 10–19 and 30–39 years there were operated 7 (15.56 %) in the each group, and in the categories of 50–59 and 60–69 — by 5 (11.11 %) patients.

All the patients received specific treatment (surgical, chemotherapy, immunotherapy, DLT, their combinations) due to malignant neoplasms of various localizations.

The patient distributions according to the histology structure and localization of the primary tumor there were following: sarcoma of the soft tissues was diagnosed in 16 (35.6 %) patients, breast cancer and kidney cancer — in 8 (17.8 %), testicle cancer — in 5 (11.11 %), rectum cancer lymphoid thymoma, testicle chorionepithelioma in 2 (4.4 %) patients, as well as there was revealed one case (2.2 %) of osteosarcoma and malignant thyroid tumor. In relation to number of pulmonary metastasis the patients were divided into: solitary (1 focus), the focuses of metastatic disease were observed in 25 (57.8 %) patients. Single (2–3 focuses — in 10 (22.2 %) cases, as well as multiple focuses (> 3) focuses — in 9 (20 %) patients.

Distribution of metastases by lobi was different in the right and left lungs. In the right lung the metastases in the upper lobe were observed in 10 (22.2 %) patients, while in the middle lobe — in 3 (6.7 %), in the lower lobe — in 7 (15.5 %), and in different lobi — in 3 (6.7 %) patients. In the left lung in 12 (26.7 %) cases there were diagnosed metastases in the upper dole, in 8 (17.8 %) patients in the lower lobe, and in 2 (4.4 %) patients in the different lung lobi.

The surgeries were carried out by two approaches: thoracotomy and thoracoscopy. Videothoracoscopy (VTS) surgeries were performed under the general anesthesia with separate bronchi intubation. The operation was finished by drainage of pleural cavity with 1–2 drainages which were removed on 1–4 day.

Thoracotomy were use in 29 (64.4 %) patients, of them atypical resection of the lung were performed in 24 (82.8 %) patients, lobectomy — in 3 (10.3 %) patients. Bilobectomy was performed in 1 (3.45 %) patient and the other patient underwent pulmonectomy. Videothoracoscopy was used in 16 (35.6 %) cases, among which in 15 (93.8 %) patients there was carried out surgery looking-like atypical resection, in one case (6.2 %) — as lobectomy.

Thus, atypical resection was performed in 39 (86.7 %) patients, lobectomy — in 4 (8.9 %), bilobectomy — in 1 (2.2 %) and pulmonectomy — in 1 (2.2 %) patients.

Results and discussion

The most frequent surgeries performed in metastatic lung damage in relation to volume appeared to be atypical resections. There were made 39 (86.7 %) from 45 operations. Thoracotomy approach was used in 29 (64.4 %) patients, thoracoscopy way — in 16 (35.6 %) patients. For resolving of the question about advantages of videothoracoscopic operations in comparison with traditional thoracotomy we compared duration of operation, development of the postoperative period. The duration of surgery at performance of videothoracoscopic (main group) atypical resection of the lung fluctuated from 25 to 80 minutes while the control group (patients operated with thoracotomy) surgery duration was from 35 to 110 minutes. There was noted reliable shortening of the time of operation in the main group (on the average, 49.53 ± 3.09 minutes) in comparison with control group (on the average, 64.25 ± 2.97 minutes) in $P < 0.01$.

As appears from the above, in comparison with thoracotomy atypical resection, videothoracoscopic operations have been preferred. Exudation from the pleural cavity and terms of drainage appeared to be significantly higher after atypical resections of the lung, performed by thoracotomy approach in comparison with videothoracoscopy. On the average the terms of drainage of the pleural cavity after videothoracoscopic atypical lung resection appeared to be reliably shorter (3.16 ± 0.15 days) in comparison with thoracotomy operations (4.30 ± 0.31 days) in P < 0.01.

Conclusions

1. Introduction of videothoracoscopy into the clinical practice widens possibilities of the surgical treatment of metastases. Association of the high informativity and small invasiveness of the intervention allowed to increase in the contingent of patients undergone to surgical treatment.

2. The long-term results of the surgical treatment of the solitary metastasis are satisfactory — 5-year survival are observed in the third of cases.

3. The active surgical tactics in single and multiple metastases is also confirmed in the complex treatment allowing achievement of 3- and 5-year survival in this group of patients. In the selective contingent of patients it is possible videothoracoscopic lung resection.

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Neurocorrection of the spina bifida complicate

Abstract: Of 25 patients with lipomyelocele underwent the surgical treatment. The essence of the operation was to conduct an additional laminocktomi with deficsation of a spinal cord.

Keywords: lipomyelocele, spine bifida, tetring hord.

Congenital spinal hernia of the lumbosacral localization in children in mind a variety of morphological forms and severity of clinical manifestations is a complex problem of pediatric neurosurgery. The spina bifida complicate consist of 35 % of all the lumbosacral malformations [1; 3], and the fifth part of them belongs to lipomyelomeningocele. Many aspects of the surgical treatment of spinal neural tube defects are well established. There are different opinions regards the tactics of the surgical treatment of lipomatous processes. Some authors believe it is necessary to undertake the surgery on the progression of the neurological symptoms; other researchers adhere to the earlier surgery [2; 4; 6]. In a standard situation the examination and surgical treatment algorithm of spina bifida is usually carried at the average age of 6–7 years, and in some cases patients are operated in the age of 20–30 years old. In addition, the volume of surgical intervention is often limited to removal of only the part of extravertebral and extradural lipomas just with changing only the cosmetic appearance of the patient. In such cases the spinal cord is maintained to be fixed, and after the surgery the neurological symptoms progresses due to the growth and development of a child [5; 7; 8; 9; 10]. The aim of our work was to improve the results of surgical treatment of spina bifida complicate, by improving the diagnostic process and a rational, reasonable pathogenetic surgical tactics.

Material and methods. Our clinical observations are presented in 25 patients (17.8 %) of all patients with spina bifida complicated

by various lipomas, which are examined and treated from the period of 2004–2011 at the clinic of Tashkent Pediatric Medical Institute and Tashkent Regional Diversified Center. Individuals contained males were 7 and females 18. The main contingent of patients ranged from the age of 1 to 16 years. In 20 observations localization of lipoma was in lumbosacral, 3 in lumbar and 2 in thoracolumbar area. 19 observations of lipomyelocele localization were at a midline and 6 were more often lateralized at the left side. Patients underwent a comprehensive examinations: clinical, neurologic, MRI of the brain and spinal cord, neuroophthalmic inspection, medical and genetic screening, EEG, electro-neuromyography. Next invasive surveys were used: MSCT- hernia-, myelo and cisternography. There were 8 patients with transient form of lipomyelomeningocele, 12 patients with caudal and 5 cases with dorsal forms.

Table 1. – The combination of spina bifida complicate with other disorders

Disorders	Number of observations
Arnold Chiari malformation	12 (48 %)
Diastematomyelia	1 (4 %)
Syringomyelia	7 (28 %)
Dermal sinus	2 (8 %)
Scoliosis	6 (24 %)
Pseudo-dermoid	7 (30 %)
Shortening of limb	4 (16 %)
Clubfoot	5 (20 %)
Violation of fusion of the vertebral bodies	4 (16 %)
Pigment spot	7 (30 %)
Hypertrichosis	4 (16 %)
Low hair growth	1 (4 %)

As it is seen from the above data, in 12 (48 %) cases lipoma is often combined with the Arnold-Chiari malformation syndrome. In 4 cases after the late access of the patients to a neurosurgeon there were observed the trophic disorders of the skin of the buttocks and the lower leg, in 1 case — osteomyelitis of the calcaneus, 1 observation of a gangrene of the foot and the lower third of the leg. The clinical manifestations of patients with diseases have been very diverse and reflected the overall status of disorders. Characteristics and frequency of these symptoms in patients with spinal lipoma is shown in Table 2.

Table 2. – Characteristics and frequency of the clinical symptoms in patients with lipoma

Characteristic symptoms	Number of patients
Epileptic syndrome	1
Local pain in the bulge area	3
Lower flaccid paraparesis	6
Lower flaccid monoparesis	7
Hypoesthesia of both legs	6
Hypoesthesia of anogenital area	3
One leg hypotrophy	11
Both legs hypotrophy	3
Urinary incontinence	11
Bowel incontinence	12
Urinary retention	2
One leg hypotension	5
Both legs hypotension	8
Pasty legs	2
Ankle jerk	1
Bone deformation of the hernia	5

In our material there were patients under of one year of age who were accessed more frequently. There are the key neurological manifestations of this disease, which are: bladder dysfunction (54.5 %), violation of the movements of the extremities (59 %) and wasting of the lower limbs (63.6 %). The incidence of neuro-orthopedic anomalies amounted to — 50 % (scoliosis, clubfoot) cases among patients with lipoma.

Surgical treatment was performed in all 25 patients. Patients with a combination of lipoma and Arnold-Chiari malformation underwent the bone-dural decompression of the cervical-occipital region (12 cases) as the first stage of surgery, and at the second stage — excision of the lipoma. In the absence of progression of clinical manifestations of hydrocephalus and syringomyelia in relation to these anomalies the surgeries were not performed.

The strategy of spina bifida complicate surgery were regarded with the position of reconstruction of a vertebro-medullar anomalies which included the following key points: 1) adequate access, allowing to provide a surgical technique and direct visualization at all stages of the intervention; 2) mobilization and allocation of hernial ring; 3) the possibility of radical resection of lipoma; 4) meningo-radikulomyelolysis; 5) plastic of the brain dura from the position of reconstruction of subdural space; 6) external drainage of the formed subdural cavity; 7) musculo-fascial plastic bone defect.

To achieve this aim the following methods of a surgical techniques were used: In 12 children were undertaken the additional resection of the non imperforated arches, laminectomy of the 1–2 vertebrae were performed in 9 children, radical resection of an adipomas were done in 2 patients, subtotal resection of lipomas is produced in 23, meningoradikulomyelolisis were performed in 11 of patients. When there were considerable defects of the dura and stitching the edges of which led to a narrowing of the subdural space the plastic of the dura was done with artificial material, which was performed in 5 patients. Full deficsation of the spinal cord was achieved in 1 patient, partial — at 24. Muscle — fascial hernia gate plastic were performed in 7 patients.

Results and discussion. After the osteo-dural decompression of the 12 patients only 7 of them observed various changes. After the first stage of surgical correction of the combined defect the following changes were found: 1) improvement of the sensitivity of the limbs and anogenital region that was observed in 1 patient; 2) 3 children appeared urge to urine and feces; 3) 2 observations recorded a decrease in feelings of heaviness in the legs; 4) In 2 cases the pain in the leg was gone. In addition, the consistency of the hernia sac became orthostatic dependent in two patients (horizontal protrusion was supple and soft, and vertically — acquired puffy shape). In two cases it was the observed transient dizziness and rare vomiting.

After reconstruction of the vertebro-medullary anomalies of 18 patients, 7 of them observed positive results and 2 patients suffered from worsening of the neurological status. Positive results were considered as: 1) sensitivity improvement observed in 2 cases; 2) increase in range of motion — in 3; 3) Improving the monitoring function of the pelvic organs — in 3; 4) normalized the spastic tonus of the toe finger flexors — 1; 5) improvement of the ream trophic — in 2; 6) cessation of a headache — in 1 patient. Postoperative negative effects were as follows, increase of motor deficit — in 3, in one case there was a wound liquor rhea and transient pseudomeningocele were observed in 2 cases.

Thus, the relatively small clinical material confirms the position that the diagnosis and treatment of the spina bifida complicate is quite complicate, multi-step and mixed process. Only adherence to the principles of meticulous specification and pedantic surgical strategy, supplemented by physiological permissibility and technically possibility, can ensure an acceptable result.

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Study of the state of some cytokines in patients with urogenital ureaplasmosis and chlamydiosis

Abstract: The state of some cytokines was studied in patients with urogenital ureaplasmosis and chlamydiosis in this scientific work. The analysis of the obtained data demonstrates that at urogenital ureaplasmosis, chlamydiosis and their association the disease proceeds against violation of development of cytokin in an organism.

Keywords: ureaplasma, chlamydia, the immune system, cytokines.

The incidence of mixed infection (ureaplasma and chlamydia) increase the genitourinary system and causes serious complications in last years, both women and men [1; 4; 5; 11; 19]. Among human infectious diseases at a fraction of mixed infections account for up to 50 % of cases [13].

The peculiarity of the modern trend of urogenital infections is their frequent association with each other, with diseases caused by other microorganisms, multifocal lesions, few symptoms, severity of complications and the difficulty of therapy [1; 10].

The ubiquity of chlamydia, urea- and mycoplasma infection is due to the frequent persistence of agent reservoir with asymptomatic course of the disease [14]. However, despite the mostly torpid and subjectively asymptomatic course, urogenital chlamydiosis ureaplasmosis and can cause serious complications in patients on the part of the pelvic organs [2; 17].

In men, the incidence rate most of these diseases is higher than in women as in men clinically they proceed intensively, as a consequence, men are more likely to seek health care [8; 16].

In recent years, an increasing number of patients with sexually transmitted infections, with varying degrees of severity immmunodefitsitnye of different genesis as asymptomatic, and with a variety of clinical manifested [9; 12].

This not only prevents the elimination of the pathogen and the complete rehabilitation of the body, but also creates conditions for the development of different immunopathological reactions. Against develop immunodeficiency current infectious process most of varying etiology can wear chronic, prolonged or frequently recurrent nature [6; 7; 18].

Among the most important factors of natural and adaptive immune system include interferon and other cytokines. STI different nature are accompanied by a series of production of proinflammatory and anti-inflammatory cytokines, which are monitored to judge the severity of these diseases, their course and outcome, as well as on the effectiveness of the therapy.

The largest informational value STI are cytokines such as IFN-α, IFN-γ, IL-1β, IL-2, IL-4, IL-6, IL-8, IL-10, IL-18 and TNF-α. For example, IFN-γ, IL-1β, TNF-α plays a decisive role in combating chlamydial infection, with the development of persistent chlamydial infection depends on the changes in the concentration of IFN-γ [15].

The foregoing indicates that urogenital chlamydia and ureaplasmosis develops on the background certain immunological changes that the correction allows for adequate and effective treatment.

In this regard, the study status of cytokines in patients with urogenital chlamydiosis ureaplasmosis and dermatology is an urgent problem.

The aim of the study was to examine the state of some of the pro- and anti-inflammatory cytokines in patients with urogenital ureaplasmosis, chlamydia and their associations.

Material and methods

The study was performed in 67 patients of both sexes aged 19 to 35 years. Among the patients examined at 27 was diagnosed with urogenital ureaplasmosis, in 21 — chlamydia and 19 — Association of urogenital chlamydia and ureaplasma. The control group consisted of data 17 healthy individuals.

Serum cytokines were measured by enzyme-linked immunosorbent assay (ELISA) [3]. To determine the cytokine used test systems developed in Institute of Pure Biochemicals (St. Petersburg).

The study results are statistically processed by standard methods of variation statistics using Student's t-test for application «Excel-Office-2010" on Pentium IV computer.

Results and discussion

Today it is known that cytokines are a group of polypeptide mediators involved in the formation and regulation of the body's responses. They are mediators of intercellular cell cooperative interactions in the immune response. It was found that the decisive role in the regulation of neuro-immune-endocrine interactions belongs to the cytokines.

Of great importance in the regulation of resistance to the occurrence of a pathological process belongs to the pro-inflammatory and anti-inflammatory cytokines — mediators that influence the function of neutrophils and macrophages. This special role have interleukin-1 (IL-1), interleukin-4 (IL-4) and tumor necrosis factor (TNF-α).

We have the content of the above cytokines in the serum of patients with urogenital ureaplasmosis, chlamydia has been studied and their association, depending on the etiology and the nature of the discharge from the urinary tract.

When you examine the levels of cytokines in patients with diseases of the urogenital organs, depending on the etiological factor found (Table 1) that in the serum of patients with urogenital ureaplasmosis before treatment was a significant decrease in the level of IL-4 ($p < 0.001$) and anti-inflammatory cytokine elevation of pro-inflammatory cytokines IL-1 and TNF-α ($p < 0.001$) in comparison with the control group.

Table 1. – Indicators of some cytokines in patients with urogenital ureaplasmosis, chlamydia and their association (M ± m)

Cytokines	Control group n = 17	Patients ureaplasmosis n = 27	Patients with chlamydia n = 21	Patients with the association ureaplasmosis and chlamydia n = 19
IL-1, pg/ml	1.73 ± 0.08	5.24 ± 0.25*	5.14 ± 0.25*	7.40 ± 0.32*
IL-4 pg/ml	2.03 ± 0.15	1.18 ± 0.08*	1.09 ± 0.09*	0.76 ± 0.08*
TNF-α, pg/ml	14.40 ± 0.75	20.93 ± 0.73*	21.02 ± 0.96*	25.06 ± 1.04*

*Note: p — The reliability of the data in relation to the control; * — p < 0.001.*

The study of cytokine levels in patients with urogenital chlamydiosis found (Table 1) that patients in this group also observed a significant increase in the concentration of IL-1 ($p < 0.001$) and TNF-α ($p < 0.001$) in relation to that of healthy individuals, and IL-4 content was statistically significantly reduced ($p < 0.001$).

In patients with an association of ureaplasma and chlamydia identified the most pronounced changes in these indicators, that is, there is an even more pronounced reduction in the concentration of IL-4 ($p < 0.001$) and elevated levels of IL-1 ($p < 0.001$) and TNF-α ($p < 0 001$) than in patients monoinfected (Table 1).

The foregoing shows that in the study of the pathology of the urogenital tract in serum detected a violation of cytokine production. It should be noted that IL-1 and TNF-α are produced by macrophages mainly after antigen stimulation that are the acute phase of inflammation inducer. The trend of increasing levels of IL-1 and TNF-alpha describes the development of a general or local manifestations of the inflammatory process. Reducing the level of IL-4 in blood reflects the development of insolvency of the body's defense system.

Next, we investigated the performance of cytokines in patients with urogenital ureaplasmosis, chlamydia and their association, depending on the nature of the discharge from the urinary tract.

The results showed (table 2) that patients in all groups surveyed for admission in the serum concentration of the cytokine IL-4 ($p < 0.001$) decreased, and the content of IL-1 ($p < 0.001$) and TNF-α ($p < 0.001$) was significantly increased compared with those of the control group. However, the identified changes were dependent on the nature of discharge, ie, the smallest violation of cytokine status found in patients with scanty, and the greatest change in patients with copious of the urinary tract.

Thus, the analysis of the data shows that in the urogenital ureaplasmosis, chlamydia and their associations the disease occurs on the background of violations of the production of cytokines in the body that express increased levels of pro-inflammatory cytokines IL-1 and TNF-alpha and a reduction in the content of the anti-inflammatory cytokine IL-4 dependent on the etiological factors and the nature of discharge from the urinary tract.

Table 2. – Indicators of some cytokines in patients with urogenital ureaplasmosis, chlamydia and their association, depending on the nature of the discharge from the urinary tract (M ± m)

Character selection	Amount examinees	IL-1, pg/ml	IL-4 pg/ml	TNF-α, pg/ml
Control group	17	1.73 ± 0.08	2.03 ± 0.15	14.40 ± 0.75
Scarce	32	4.64 ± 0.19*	1.30 ± 0.08*	18.89 ± 0.61*
Moderate	24	6.40 ± 0.17*	0.88 ± 0.04*	23.82 ± 0.55*
Abundant	11	8.01 ± 0.35*	0.58 ± 0.08*	27.90 ± 0.70*

*Note: p — The reliability of the data in relation to the control; * — p < 0.001.*

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State and ways of improvement of combustiologic aid in the system of emergency medicine of Uzbekistan

Abstract: The authors studied the structure and rate of hospitalized patients with thermal injury in the period since 2002 till 2012 in the system of emergency medicine in the Republic of Uzbekistan, and showed the state and ways of improvement of combustiologic aid. The established combustiologic service allowed providing an adequate specialized assistance to victims with thermal damages.

Keywords: burn trauma, burn disease, specialized aid at burns.

Background

Burns continue to be one of the most common types of traumatic damages [1; 4; 7; 9]. Increased consumption of various energy resources in industry and everyday life determines growth rate of burn injuries. Despite these successes, among severe burned patients mortality remains high even in specialized clinics. This is contributed by an increase of both burn injuries and the proportion of large and deep burns, associated and combined damages, and the lack of unified concept of the treatment of severe burned patients [2; 5].

At the same time, disability of patients after thermal injuries remained to be poor [8; 11].

In this regard, in the system of emergency medical aid of the Republic of Uzbekistan high emphasis is placed on combustiologic service. The patients with thermal injury are became medical care at the stages of the evacuation by structural subdivisions of Emergency Medical Services (EMS), which governed by the Republican Research center of emergency medicine (RRCEM). 13 regional branches of RRCEM are organized in the Republic of Karakalpakstan, in

all regional centers of the Republic, as well as in Chirchik city of Tashkent Region. Total number of beds of combustiologic service of EMS is 189. In the 172 district centers of the Republic the sub-branches of RRCEM are functioning — emergency departments of medical aid (EDMA) at district medical unions (DMU) and city medical unions (CMU). Ambulance service and sanitary aircraft also subordinated to structure of EMS of the Republic.

Material and methods

Designed for offices of EMS diagnostic and treatment standards are focused on the mandatory evacuations of severe burned patients into specialized combustiology departments of RRCEM and its branch offices, where all of resource and human facilitates for providing quality and timely assistance to this category of victims are presented. This protocol applies primarily to large cities, where

these centers are located. Regarding the victims from rural and remote cities, diagnostic and treatment standards give wide indication for transportation of severe burned patients in specialized offices after the stabilization of their condition in EDMA or specialized care is organized in the spot with the assistance of opportunities of sanitary aircraft.

Analysis of the results of combustiology service in SEM showed that the total number of hospitalized patients with thermal injury over the period 2002 to 2012 was 85 538. Noteworthy is a steady increase of the number of patients with burn injuries. So, if in 2002 there were 6 398 patients hospitalized, with rising every year, by 2012 the figure was 8 976, representing an increase of hospitalized with thermal injury over a given period of time relative to the population of Uzbekistan by 15.9 % (Fig. 1).
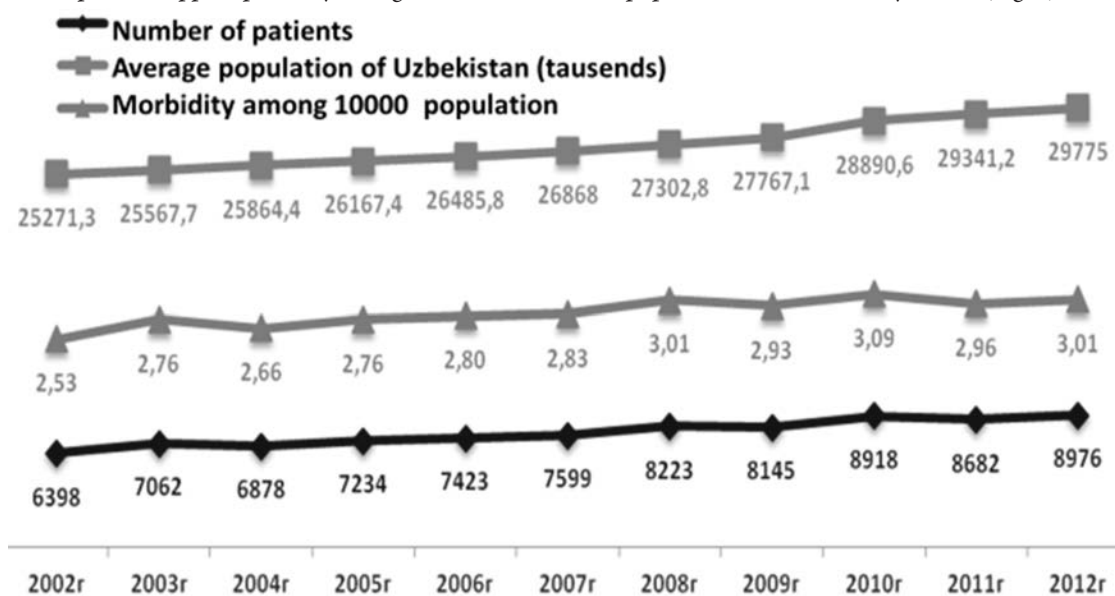
Fig. 1. Trends in hospitalized patients with thermal injury in EMS

Results and discussion

Over the past period among hospitalized patients with thermal injuries the proportion of children was 61.0 % (52 178), of adults — 39.0 % (33 360), i. e., nearly two-thirds of hospitalized patients were burnt children that representatives the features of socio-psychological and behavioral status, significantly different from adults. Children, especially young children, because of their vulnerability, the inability to identify and assess the risk of hot items and agents, as well as their excessive curiosity, are more prone to thermal injury.

In the age structure dominated burnt children affected up to 3 years and was 34 728 (66.6 %) cases. Children from 3 to 7 years was 12 318 (23.6 %), and children from 7 to 15 years and from 15 to

18 years — respectively 4 020 (7.7 %) and 1 112 (2.1 %). Among adults, the number of the patients capable of working (18–60 years) accounted for 31 820 (95.4 %). The rest of 1 540 (4.6 %) patients were elderly. Thus, the bulk of the victims are young children, patients of working age, which have increased vulnerability to thermal injury due to behavioral characteristics of their psyche (children up to three years) and social activities (people of working age). This fact points to the specific goals that need to be taken into account in the development of appropriate programs to reduce thermal injuries.

As with all other forms of trauma, to thermal trauma increasingly exposed men (69.7 %). The majority (60.7 %) of patients were with burns of up to 10 % of the body surface, and in only 3.2 % cases the area of damage exceeded 60 % (Fig. 2).
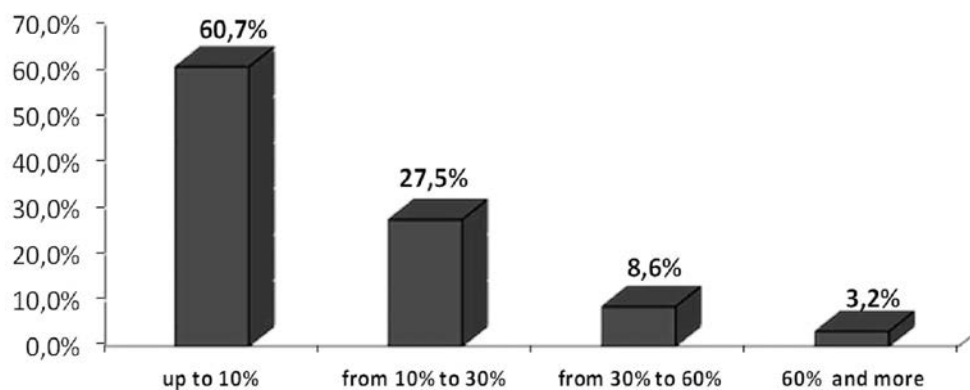
Fig. 2. Distribution of patients with burns due to the total affected area

At 21.6 % (18 476) patients were deep burns, deep burns up to 5 % of the body surface were in 71.3 % patients, 5–10 % in 16.8 % ones, 10–20 % in 6.4 % ones. The prevalence of deep burns in 3.9 % patients was 20–40 % and in 1.6 % patients was higher than the 40 %.

The result of the treatment of burn injuries depends on the time interval between injury and admission to hospital, along with the age of the victim, the area and depth of the burn wound, comorbidity. Often this term determines the prognosis and treatment tactics. The reasons for the late arrival of patients are subjective underestimation of the severity of the injury, decreased pain sensitivity in the area of deep burns, unwillingness to be hospitalized, the inability of independent access to medical care and so on. Later arrival of victims to specialized medical offices are responsible for a complicated course of burn disease and wound healing process, an unfavorable outcome [3; 10].

Of the total of patients, 73.5 % (62 871) were hospitalized during the first 6 hours after thermal injury (Fig. 3). In the period from 7 hours to 3 days hospitalized 18.1 % (15 482) of the victims. At later period specialized care was provided to 8.4 % (7 185) patients. The fact that more than a quarter of the victims (26.5 %) goes to the hospital later than 6 hours after thermal injury points to the need for increased awareness among workers of primary health care and the public about the importance of early specialized aid for burns. The diagnostic and treatment actions for burn victims at the pre-hospital tge should be with early antishock therapy. The sequence of clinical diagnostic tactics may include:

1. To stop the action of thermal agent. To do this: remove the victim from the source, giving the horizontal position, put out the fire (can be covered with a blanket — to make sure that his head was open, otherwise the victim may be poisoned with combustion products, and burns of the respiratory tract). As soon as possible to cool the burnt surface with a stream of cold water.

2. Narcotic analgesics and oxygen supply at high burn surface are always indicated. Intravenous administration of 1.0 ml. morphine or 2.0 ml. fentanyl decreases pain and negative emotions, and the inhalation of oxygen decreases hypoxia and poisoning by combustion products.

3. Strategically correct is early infusion therapy, in any of the affected area with the damage area of 20 % and above (or deep burns of 10 % and above). Delay infusion therapy even for one hour worsens the condition and prognosis. Vascular access and early fluid therapy with crystalloid solutions in the area of destruction of 10 % of the surface of the body, regardless of the severity of the condition. Infusion of plasma leads to loss of electrolytes from burn surface, which requires their replacement. To patients with deep burns over 15 % (10 % children) of body surface area, it is necessary to begin infusion therapy with Ringer's lactate solution of no less than 1000 ml/h for adults and 400–500 ml/h. for children, before the severity of the burn and need of indemnifying liquid will be assessed. Available oral hydration is available with alkaline using 3 g. of salt and 1.5 g. of baking soda to 1 liter of water.

4. Adheres to the burn wound pieces of clothing are needs to separate. With extensive burns, better primary dressing is dry contour aseptic bandage (tissue dressing with laces whose shape corresponds to the contour of the trunk or limb. It is used for fixing the dressing on extensive burn surface). Extensive open burned surface is closed with sterile sheets, clean cloth and linen. Warming with covering with blankets keeps heat.

5. In case of deterioration and progressive burn shock: nitrous oxide and oxygen in a ratio of 1:1, HES (hydroxyethylstarch) 6 % 250 ml. into a vein.

6. During transportation the constant control of the external breathing is necessary. Inhalation of oxygen. If laryngeal edema and suffocation — tracheal intubation and mechanical ventilation.

Fig. 3. Timing of patients' admission in specialized units after trauma

For determining the severity of the burn injury considerable importance has the nature of the thermal agent. In our study, the proportion of thermal burns from hot liquids accounted for 64.5 % (55 172) of the cases. Thermal burns due to flames appeared in 24.8 % (21 213) cases, elektroburns — 4.6 % (3 935), contact burns — 3.7 % (3 165), chemicals burns — 1.6 % (1 369) and frostbite — 0.8 % (684).

Analysis of the distribution of traumatic agents by age showed that in children the main mechanism was a thermal burn with hot liquids (84.1 %). In adults, thermal trauma approximately equally due to influence of hot liquid (36.7 %) and a flame (42.8 %) (Fig. 4). Socio-psychological and behavioral status of children, especially young children, their inability to recognize and assess the danger of hot liquids, which constantly used in everyday life, make them vulnerable to this injury factor. In adults burns with flame and hot liquid have, as a rule, technogen character — working in the kitchen, boiler room, the explosion of gas cylinders and others. When the flame burns, even for

a short period of his exposure, severe lesions of the skin, especially in the case of ignition of clothing were observed. Often there are electrical burns — adults in 11.8 %, and 5.4 % of children in the cases.

If children generally suffered from thermal injury at home, in adults circumstances of burns are more diverse: domestic origin were 80.5 % (68 858) of the cases, industrial burns — 15.3 % (13 087), suicide attempts — 2.8 % (2 395) and criminal burns — 1.2 % (1027), as well as in emergency situations burns received 0.2 % (171) patients. The most severe burns arise as a result of exposure to flame and electricity.

The main cause of death in burn disease are its complications, the incidence of which directly dependents on the time of existence of the burn wounds. Therefore, despite the wide arsenal of complex therapy, which allows to prevent the expressed violations of the vital organs and systems, in the primary treatment of patients with deep extensive burns main aim is to restore the lost skin in the earliest term surgically [5; 6; 10].
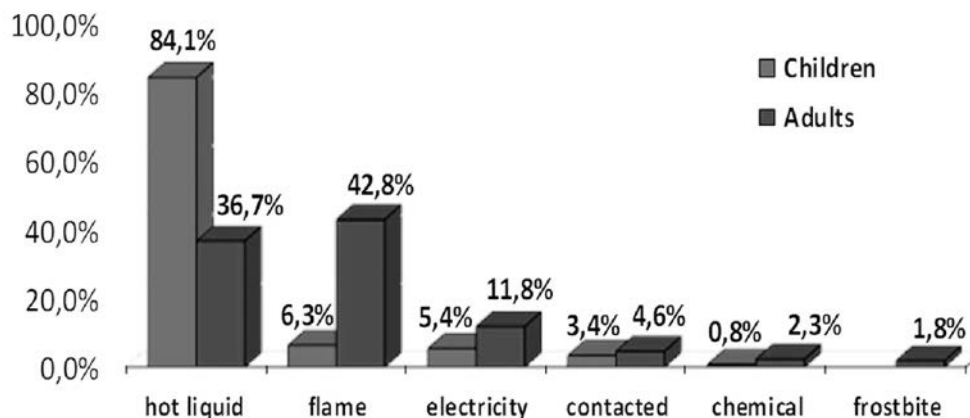
Fig. 4. Structure of patients due to damaging agents concerning age

Surgical treatment was performed in 20.3 % (17 364) of the patients, including early surgical necrectomy — at 12.4 %, early delayed necrectomy — at 16.7 %, landmark necrectomy — at 19.4 %, the imposition of temporary wound coverings — at 15.8 %, autodermoplasty — at 56.3 %. In 3.2 % of patients had to make disarticulation and amputation.

Creating EMS with sufficient material and technical base changed the overall concept of the treatment of burn disease. Through this clinical combustiology introduced general methods of complex treatment using modern technology and methods of early surgical treatment of burn wounds using various types of temporary wound coverings cultured allogeneic fibroblasts, which contributed to the reduction of mortality among burnt patients. So, if in 2002, the overall mortality rate was 4.3 %, in 2012 this figure fell to 2.8 %.

Nowadays, in all specialized departments of combustiology the principles of staged treatment of burnt were developed and implemented. When emergencies with mass arrival of burnt these principles shown to be highly effective. In all units in the regional branches of RRCEM there are conditions for the providing of qualified and specialized medical care to burnt. The focus of the work of the combustiology offices paid to the application of methods of active surgical tactics of treatment, the use of synthetic temporary wound coverings and various kinds of combined plastic closure of deep burns. In order to improve the quality of specialized care combustiologic course organized at the department of emergency medicine of the Tashkent Institute of Advancing of physicians, where annually raise their qualification combustiologs, masters and clinical residents.

Despite advances in the treatment of burn patients, there are still many unexplored issues. The most actual trends for further study are to develop optimal approaches to complex treatment of burnt with combined and multiply lesions. Needs to be resolved the issue of implementation in daily clinical practice of combustiologic offices in regional branches of RRCEM the using of cultured allofibroblasts in severe burnt with extensive deep burns and skin donor resources deficit. It is necessary to create a system of clinical examination of patients with sequelae of burns with development of programs of conservative and operative rehabilitation, and social reintegration.

Conclusion

Thus, the established service of combustiology allows adequate specialized aid to patients with thermal lesions. Trend to increasing of burn injury dictates the need of further improvement of the organizational and methodological work on the problem of burns in Uzbekistan, which will improve the quality of specialized medical aid to the patients with burns.

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Diagnosis features of the damaged intestine in abdomen injuries and prevention of the postoperative complications

Abstract: Small and large intestine injuries are still the actual issues of abdominal surgery. They are considered as one of the most negative prognostic factor. So, the insufficiency of the sutures of intestinal anastomosis remains to be the typical complication of the resection of the large intestine. The methods of treating intestine traumas have been noticeably changed for he last 20 years: the primary closure without colostomy has been popular here in Uzbekistan and abroad though the discussion about the necessity of stoming are still lasted in the surgical editions.

Keywords: intestine injuries, abdominal surgery, anastomosis, postoperative complications, colostomy, suture failure.

Introduction

The trauma remains to be one of the leading causes of the mortality and disability of the population. The heavy multiple and associated injuries due to increase in cases of road accidents and industrial traumatism have become of dominating significance over the last years.

The treatment of the colon injuries appeared to be the most difficult. The colon injuries occupy the special place because of frequent complications in the postoperative period and high lethality that is connected with severity degree of the injury of the colon, as well as with multiple and associated damages in which prognostic factor of the colon is considered to be the most unfavourable.

At the isolated injuries of the large intestine the frequency of the lethal outcomes varied from 2 to 14 % [1; 4], at the injuries of the large intestine on the basis of the associated trauma from 39.5 to 51.8 % [3; 7; 8], and on the background of the multiple injuries accounts for 25.3–41.2 % [16].

The complicated development of the small and large intestines has been registered in 20.0–65.0 % cases [1]. The failure of the sutures of intestinal anastomoses remains to be typical complication of the large intestine and is found in 4–20 % of surgeries [5; 6; 9; 10]. The main cause of death in the postoperative period is intraperitoneal complications which may occur in a half of patients.

At present time there is no universal tactics in the choice of the method of treatment of the injuries of the small and large intestines, particularly on the background of the polytrauma, in relation to character and severity of the injury of the intestinal wall and its mesentery, time from the moment of injury, degree of contamination of the abdominal cavity, blood lost at the multiple injuries of the parenchymatous organs, severity of traumatic shock. In the literature there are occurred various, frequently contradictory data in relation to rationality of radical or palliative operation at this pathology. Prestigious technique and new modifications of the intestinal anastomosis sutures have not been the critical keys for successful surgeries on the intestine though they reduce the number of complications [1; 4; 5].

The knotty problem for positive solution is raised in spite of the multiple proposed clinical criteria, laboratory tests and instrumental methods for the evaluation of the intestine viability; the question about the state of reparative regeneration of the damaged area at the various time from the moment of trauma has not been still resolved [2; 11; 17].

Materials and methods

During the period from 2003 to 2014 in the Republican Research Center of Emergency Medical Aid there were treated 1 740 patients with abdomen injuries that accounted for 4.1 % from the total number of the operated patients. From them we analyzed treatment efficacy in 187 victims of traumas of the small and large intestines. Among the patients males were 106 (56.7 %) and females — 61 (43.3 %). More than 60 % of patients at the admission were at the state of alcohol effect. According to the character of the trauma the patients were divided by the following way: penetrating stab-incised traumas — 120 (63.98 %) closed abdominal trauma — 65 (35 %) and gunshot wounds in 2 (1.02 %) patients. With single injury of the hollow organs of the abdominal cavity there were 99 (52.9 %) suffering, with multiple — 14 (8.3 %) and with associated — 74 (39.6 %) patients. The injury of the hollow organs of the abdominal cavity associated with injuries of the thorax, fractures of the upper or lower extremities, fractures of the pelvic bones, brain trauma. Among all the admitted patients the thoracic-abdominal wounds with intestinal injuries were found in 78 (41.7 %). Among all patients admitted with this pathology at the state of shock accounted for 78 %.

Clinical-diagnostic measures were performed in parallel with antishock therapy. The numbers of diagnostic measures included: examinations of the other specialists, such as urologist, traumatologist neurosurgeon, and such methods as roentgenography, contrast roentgenologic investigations, ultrasound scanning, esophagogastroduodenoscopy, computed tomography, diagnostic laparoscopy with study of exudate from the abdominal cavity for enzymatic contents. Performance of the type of examination was depended on the severity of the patient's state.

Results and discussion

In our clinic there has been developed clear tactics for management of the patients with traumas of small and large intestine of different severity for the last decade. This tactics is individual and depends on the character of injuries, degree of blood supplying disturbances of the damaged site of the intestine, health state of the patients. At the open injuries there was performed revision and primary surgical debridement of the wounds. The penetrating character of the wound without organ eventration or active blood hemorrhage was the indication firstly for the diagnostic laparoscopy, then if necessary, for conversion. We have performed

diagnostic laparoscopy in 125 patients with intestinal injuries, of them in 113 (90 %) cases there was conversion. Contraindications for laparoscopic treatment of the wounds of the abdominal cavity, in our opinion, are gunshot wounds of the abdominal cavity; multiple wounds; unstable hemodynamics, hemorrhagic shock; eventration of the intestinal loops. For this category of patients there was immediately performed laparotomy. The suffering patients under the state of shock at presence of active bleeding were carried out minimum of examinations and they were quickly transferred into the operation room. All suffering patients admitted without clinical picture of peritonitis and shock as well as with stable hemodynamics were performed diagnostic laparoscopy as the first step. At the late referral of the patient with symptoms of peritonitis, first of all, there was carried out short preoperative preparation. At the thoracic-abdominal wounds before operation in the obligatory order the pleural cavity was drained, as well as if it was required thoracoscopy was made.

The risk factors at intestinal injury included heavy shock, massive blood lost, associated trauma, fecal contamination of the abdominal cavity and peritonitis.

Table 1. – The character of injuries
of the small and large intestine

Type of small and large intestine injures	n	%
Duodenum penetrating wounds	8	4.3
Duodenum rupture	2	1
Penetrating injuries of the small intestine	110	58.8
Multiple ruptures of the small intestine	5	2.7
Penetrating injuries of the large intestine	56	29.9
Injuries of the small and large intestine	26	13.9
Totally	**187**	**100**

Peritonitis was diagnosed in 95 (51 %) suffering patients. The stomach, liver, pancreatic gland, spleen were damaged associated more often with intestine injury. It is known that the most difficult group in relation to diagnosis appeared to be the patients with closed trauma of the abdomen. During diagnostic laparoscopy it does not always manage to perform complete revision of all the loops of large and small intestine, and frequently this procedure may require long time in severe associated injury. From 2008 in all the patients at diagnostic laparoscopy the exudate was removal from the abdominal cavity (even in the little quantity the presenting exudate in the abdominal cavity) and in the obligatory order underwent to express analysis (apparatus "Vitros 200") for determination of the amylase, ammonia and alkaline phosphatase. The parameters of the presence of amylase and ammonia may show damage of hollow organs, and, consequently, resolve the question about conversion and more careful revision. Ammonia concentration in the exudates from the abdomen in the patients without signs of perforation of the hollow organ does not prevail 100 micromol of NH_3/l, and amylase is practically absent. At injury of the small and large intestine the content of ammonia increases, as well as in the exudates there was found amylase more than 40 mg/ml/hour.

During choice of operative intervention such factors as sizes of the wound defects of intestine, signs of peritonitis, type of injury, severity of the state of suffering patient, haemodynamic stability were taken into attention. The injuries of the large intestine in relation to clinical course are more severe than the injuries of the small intestine. The more size of the large intestine defect then the more expressed: shock intensity, volume of blood lost, peritonitis expression. Besides, the size of the wound defects rendered significant effect on the outcomes of the treatment. As the clinical studies showed during increase in wound sizes, consequently, the number of complications increased, including frequency of intra-abdominal infections and the level of lethality increased too. Development of peritonitis to the moment of primary operative intervention had significant effect on the trauma outcome and was accompanied by higher frequency of complications. Taking this into account all patients in the intraoperative and early postoperative period were performed antibacterial therapy with preparations of the wide spectrum of effect, as minimum in two groups. Then antibacterial therapy was performed in dependence to sensitivity after bacteriological investigation. The significant moment during operation was assessment of adequacy of the vascularization of the damaged segment of the large intestine and other its parts. It was of particular importance in wounds and ruptures of the intestine mesenterial margin, mesenterial hematomas, gunshot wounds, because the main cause of the suture failure of the large intestine is missed evaluation during operation of the blood supplying adequacy of the sutured site. We consider that the technique of the anastomosis is of great importance. All anastomoses are applied by the manual method with double — row sutures. The interintestinal anastomoses were created by our developed technique with use of frame from metallic ring (Patent No FAP of 2007 useful model "Device for anastomosis application in the gastrointestinal tract") in 22 cases. This method allows to preserve mechanic strength and hermeticy of the intestinal anastomosis, because the area of anastomosis is under the state of stabilization, as well as increase in intestinal pressure does not result in tension and dehiscence in anastomosis line on the background of "compromise" abdominal cavity.

Table 2. – The types of performed operative
interventions on the small and large intestine

Types of operative interventions	n
Suture of wound in the small intestine	56
Laparoscopic suture of wound in the small intestine	7
Suture of wound in the large intestine	24
Suture of wound in the small and large intestine	16
Resection of the small intestine with application of EEA	11
Resection of the large intestine with application of ICA	4
Resection of the small intestine with application of ileostomy	4
Resection of the large intestine with application of colostomy	3
Suture of wound in the duodenum	7
Wedge resection of the small intestine	15
Wedge resection of the large intestine	6
Suture of wound in combination with suture of the gastric wound	5
Totally	**187**

All the stab–incised wounds of the small and colon intestine were sutured by double-row sutures. The proximal colostomy was applied in rare cases. It would be especially interested to stop at the tactics in the damage only of the posterior wall of the ascending and descending colon. This occurred more frequently in the stab-incised wounds of the lumbar area. We observed 5 similar cases. To reveal such injury is very difficult. As a rule, during performance of the primary surgical debridement the direction of the wound to the end cannot be determined. At laparoscopy it may be seen only retroperitoneal hematoma of any severity degree at the area of lateral canal. To suggest injury may be only in rare cases of excretion of gases and feces. The vulnerography may be only one method of diagnosis, but only at the wide wound hole in the intestinal wall, as well as if the hole is not covered by fecal stones. The contrast substance is introduced into the wound and roentgenography is performed. At injury of the intestinal wall we see contrast in the

lumen of the intestine. However, the diagnostic error occurs most of frequently. During development of the clinical picture of the lumbar phlegmon the drainage of all suppurative leaks is performed, the wound is treated by open way and the formed fecal fistula is gradually closed by conservative method. The proximal colostomy with complete exclusion of the damaged site from passage was applied on the elderly weak patients with diabetes mellitus. In table 2 there are presented types of the performed operative interventions on the small and large intestine in isolated and associated injuries.

In the early postoperative period all patients were performed diagnostic monitoring to reveal intraperitoneal complications: USI-monitoring of the peritoneal cavity, exudates investigation from the peritoneal cavity for contents of ammonia, amylase on the 3–5 day for purpose of early diagnosis of the development of intestinal sutures failed. During increase in these characteristics we can suggest about occurrence of insufficiency, and accordingly choose the following management of the patients. The postoperative complications were fixed in 66 (35 %) patients. The failed intestinal sutures were observed in 12 patients, of them in 9 — insufficiency of the suture on the intestinal wall and in 3 — failure of intestinal anastomosis. Of them in 26 patients (including additionally patients with failure of the intestinal sutures, because they all had suppuration) there was found suppuration of the postoperative wound, in 7 patients — early commissural ileus (resolved by conservative method), in 6 cases — abscess of the peritoneal cavity, in 36 cases the postoperative pneumonia developed. The suture failure was the most critical group of complications: the intestinal suture failure — in 4 patients, anastomosis suture failure — in 3 patients. In the patients with suggestion of the intraperitoneal complication the diagnostic fibrolaparoscopy was performed through left laparoport. Taking into account mini-invasive methods of investigations (fibrolaparoscopy, clinical and

biochemical parameters of blood and exudates and others) the patients with early commissural ileus, abdominal cavity abscess as well as failure of sutures at early time were performed relaparotomy, sanitation and drainage of the peritoneal cavity. At the failure of intestinal anastomosis the resection of the part of intestine was performed with application of the repeated anastomosis or enterostomy. The general lethality accounted for 26.8 %. Of them the most part of patients dead on the first day due to severe associated injury, traumatic shock. The complications of the injuries of small and large intestine served as a cause of the lethal outcome in 6 (3.2 %) patients. The death induced by continuing peritonitis and polyorgan insufficiency. The analysis of the results of complications and lethal outcomes in the control group showed two types of tactic mistakes. In the majority of cases the volume of operative appliance was "risen", and this resulted in significant worsening of the severe health state of the patients. In the other cases the volume of operation was "lowered", that resulted, first of all, in increase in the number of suture insufficiency in the sutures of defects and development of peritonitis.

Thus, the primary suture or anastomosing may be performed practically at any wounds of the small and large intestine according to special rules and providing of the adequate blood supplying. The adequate sanitation of the abdominal cavity, intraoperative antibacterial therapy by preparations of the wide spectrum of effect and intestinal decompression should be obligatory component of the operative appliance at the intestinal injuries.

During intraoperative and early postoperative periods these patients have to be performed investigations of the exudates of the peritoneal cavity with purpose of possibility of early diagnosis of the suture failure or continuing inflammatory process in the peritoneal cavity. Besides, in the patients of risk group it is necessary to perform diagnostic fibrolaparoscopy on the 4–5 day after operation.

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Differential-diagnostic criteria auditory neuropathy in children

Abstract: The article presents the results of objective techniques of hearing study in 36 children with auditory neuropathy. Based on these data, a comparative analysis of auditory neuropathy, and sensorineural hearing loss. The differences in the mechanisms underlying disorders.

Keywords: auditory neuropathy, sensorineural hearing loss, otoacoustic emission.

The use of auditory evoked potential techniques such as the auditory brain stem response (ABR) and otoacoustic emission (OAE) for the assessment of hearing in young and difficult-totest children is now well established. Auditory neuropathy (AN) — is a new type of hearing loss, which was made possible thanks to an objective method to diagnose hearing research. Unlike sensorineural hearing loss (SNL), where the damaged outer and inner hair cells of the cochlea, while AN preserved outer hair cells.

Evidence for the existence of AN in the infant population recently has begun to appear in the literature. Deltenre et al. [2, 17–22] described the findings for three infants who had suffered major neonatal illness and who showed electrophysiologic results fitting the AN profile within the first year of life. Stein, Tremblay, Pasternak, Banerjee, Lindermann, and Kraus [5, 197–213] identified four children through a special care nursery screening program with normal GAEs and absent or abnormal ABRs in the neonatal period.

The complexity of detection AN and a variety of clinical symptoms of the disorder hinder the development of adequate rehabilitation measures. Do not clear the causes and mechanisms of this disorder. A number of publications has been suggested that the probable causes of auditory neuropathy may be a high level of bilirubin, hypoxia, low birth weight, demyelinating disease [1, 933–938; 3, 184–186; 7, 1026–1030; 4, 741–753]. There is information about the presence of genetic factors associated with the development of AN [8, 45–50; 9, 770–778].

A particular problem is the choice of tactics rehabilitation of patients with AN, as observations show that traditional in patients with sensorineural hearing loss techniques are not always effective in these patients [6, 1–5; 10, 325–333]. As a rule, all of these studies were conducted in small groups of patients, characterized by a certain inconsistency of the results obtained by different authors.

Objective: To conduct a comprehensive study of auditory function and identify the characteristics of auditory neuropathy.

Material and Methods

During the period from 2012 to 2014 yy. were surveyed 180 hearing impaired. Of these, 36 children were selected with auditory neuropathy. This was 5 % of all patients. Among the surveyed, 20 were boys (56 %), 16 — the girls (44 %).

The majority of patients (29 men) diagnosed with AN has been established under the age of 5 years. In 5 patients AN was identified at the age of 1–3 years. One patient AN was identified as a teenager.

As the objective methods of hearing assessment on patients using registration techniques evoked otoacoustic emission (TEOAE) and brainstem auditory evoked potentials (ABR), the acoustic impedance (AI). Some patients also recorded otoacoustic emission distortion product (PIOAE) and stationary auditory potentials in the modulated tones (ASSR).

The study was conducted using the "Neuro-Audio" company "Neuro-Soft" (Russia). For registration UAE used the probe, which houses two phones and a microphone. After one phone single tone is continuously fed through another continuously thereto a second tone. The microphone provides a registration and monitoring OAE levels of test tones. To highlight the OAE is also necessary to minimize the level of input noise. Therefore, a survey was carried out in a quiet room, and the probe is installed tightly into the ear canal.

Incentives were broadband acoustic clicks to be met with a repetition rate of 20–50/sec. retractable microphone response signal amplified in the passband from 500 to 5000 Hz. and sent to a computer via an analog-digital converter.

The source of the sound stimuli for ABR registration were in-the-phone with a pre-chosen size ear bud. To register brain responses using pan silver chloride electrodes. The electrodes were fixed at the border area on the scalp (the reference electrode) and mastoid region right and left (active electrodes). In studies of the inter-electrode resistance does not exceed 5 ohms, which was achieved by pretreating the skin of a patient and using special conductive gels. When carrying out various types of stimulus ABR were used — acoustic click 100 ms, frequency tones 1000, 4000, 2000 and 500 Hz.

The acoustic impedance (AI) was performed on impedancemetry AZ-28, Interacoustics (Denmark). In the measurement of middle ear pressure was applied to the probe tone frequency of 226 Hz. intensity of 85 dB. SPL. The results were evaluated according to the classification of tympanometric curves, proposed by James Jerger.

Results of the study

A characteristic feature of patients with AN was the fact that all patients in the initial evaluation TEOAE on the right and left ear was registered. An exception was one patient who was registered TEOAE only one ear. This is different in patients with AN of patients with sensorineural hearing loss, in which TEOAE not recorded during stimulation of both ears.

The acoustic reflex is not recorded in the most part (55 %) of patients with AN. In 29 % of patients with AN acoustic reflex was registered at frequencies of 500–1000 Hz. Threshold reflex registration in these cases was 120 dB.

When ABR registration is revealed stability of the studied parameters. Most children are not ABR recorded in primary and re-examination. In 2 (5 %) of children were registered in the ABR acoustic stimuli level 95–103 dB. HL.

Discussion

It is expected that the sensorineural hearing loss and auditory neuropathy related to violations of sound perception and vary in topic destruction of structures of the inner ear and the auditory nerve. When SHL damage the inner and outer hair cells, whereas with AN preserved outer hair cells, thus recorded TEOAE and OAEPI. The presence of TEOAE in the absence of registration of ABR or ABR registers only on maximum levels of stimulus is a recognized symptom specific for AN.

However, our findings suggest that some patients with AN TEOAE can fade with time. According to our data, it was observed in 22 % of patients. This is not the case for children with CHT who have over the entire observation period TEOAE not recorded (Table 1).

Table 1. – Comparative analysis of TEOAE in patients with auditory neuropathy and sensorineural hearing loss

	Patients with AN (N = 36)	Patients with SHL (N = 180)
Number of patients (%) during the initial examination of TEOAE recorded:		
with 2 sides	92 %	0 %
one side	5 %	0 %
Number of patients (%), in which the re-testing TEOAE recorded:		
with 2 sides	76 %	0 %
one side	0 %	0 %
Number of patients (%) who have disappeared during the second TEOAE examination	22 %	0 %

The disappearance of TEOAE difficult differential diagnosis AN with SNT. In this case, the child with AN based on the results of ABR registration (not registered) and TEOAE (lack of) will be diagnosed as a child with a 4 degree SHL. Thus, the possibility of the disappearance of TEOAE in AN should be considered in its diagnosis.

Significant differences between patients with AN and sensorineural hearing loss were found when comparing the results of ABR registration. In 95 % of patients with auditory neuropathy ABR not recorded during stimulation, both right and left ear. Only 2 of the 36 patients of ABR were recorded in the sound stimulus level 95–103 dB. HL.

In contrast, in patients with SHL ABR threshold of detection ranged from 40 dB. with a small hearing loss to lack of ABR with severe hearing loss.

Of particular interest is the comparison of the data registration ABR in patients with SHL and AN during follow-up. It was found that patients with hearing loss in 15 % of cases detected change detection thresholds ABR in repeated surveys. At the same time in 22 patients with hearing loss was an increase in ABR thresholds of visualization, in 16 patients — lowering thresholds. Unlike patients with SHL in patients with AN not detected any changes in the ABR.

These impedance, apparently, are of limited value for the differential diagnosis of AN and SHL. Of course, conducting tympanometry is necessary because only the tympanogram when characterizing normal middle ear sound-conducting system, the absence of TEOAE can be interpreted as a sign of the defeat of the outer hair cells, which is characteristic of the SHL. Registration threshold reflex was thus proportional to the degree of hearing loss.

Dynamic observation was conducted to analyze the variability registration ABR and TEOAE in children with AN and SHL. The data show that patients with SHL has positive dynamics visualization ABR thresholds. The results of this analysis are presented in Table 2.

Table 2. – Changes in enrollment ratios ABR and TEOAE in repeated surveys

	Number of children	Incidence (%)					
		Raising thresholds		Lowering thresholds		Stability thresholds	
		ABR	OAE	ABR	OAE	ABR	OAE
SHL	180	12	7	9	11	79	82
AN	36	–	–	–	–	100	100

Obtained data shows that a single study in children auditory function is insufficient and requires follow-up.

Based on the foregoing, electrophysiological diagnostic criteria for hearing loss is sufficiently definite and do not allow different interpretations. At the same time, the results of instrumental studies of patients with AN is not always unambiguous, and require in-depth understanding of the whole complexity of the audio perception mechanisms.

Timely detection of features of character pathology in sound reproduction system has important clinical implications in connection with the difference between the tactics of treatment and rehabilitation of such patients. This in turn makes it possible to carry out a full rehabilitation of such patients.

Conclusions:

1. Features of the auditory function in patients with AN and SHL indicate differences in the mechanisms underlying auditory function disorders in these groups of patients. This gives grounds for their separation into separate disease entities.

2. The results showed that in children with AN, on the one hand, there are disturbances in the transmission of acoustic signals central auditory system, on the other — disturbances maturation pathways and auditory centers.

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Changes cytokine spectrum in children with bronchopulmonary diseases with bronchial obstruction

Abstract: In bronchopulmonary diseases with bronchial obstruction immune response develops mainly on Th-type, which suggests that in the occurrence of symptoms of bronchial obstruction, the leading role is played by the formation of the hearth of an infectious inflammation of the lung tissue. When analyzing the changes in the level of IL-4 in patients with ROB it has been found that the immune response feature is its Th-2 direction, which leads to overproduction of IgE and IgG. These processes ultimately determine the course and prognosis of the disease.

Keywords: Bronchopulmonary diseases with bronchial obstruction, cytokines, immune system.

The development of the disease with immune pathogenetic basis should be considered from the point of view of the effector parts of the immune system, which is involved in pathological processes is largely due to a cascade of cytokines. It is believed that when BO which the considered as a systemic inflammatory reaction cascade triggered by weight of pro-inflammatory and anti-inflammatory cytokines.

It is known that antigen entry into the body activates macrophages and causes secretion of a number of mediators, including IL-1β stimulating T cell proliferation and which is the main mediator of local inflammatory reaction, in any type of inflammation [1; 2; 3]. In addition, it is proved that the physiological conditions, IL-1 is able to increase the activity of Th1 cells by stimulating the secretion of IFN-γ. Normally, the dominant form of secretion in humans is IL-1β [2].

IL-4 limits the incidence and intensity of inflammation, inhibits the production of pro-inflammatory IL-1β, activates B lymphocytes, increases the synthesis of immunoglobulin's primarily immunoglobulin G, E, contributing to the production of antibodies protective properties which neutralize the action of pathogenic agents. The development of the disease with immune pathogenetic basis should be considered from the point of view of the effectors parts of the immune system, which is involved in pathological processes is largely due to a cascade of cytokines. It is believed that when BO which considered as a systemic inflammatory reaction cascade triggered by weight of pro-inflammatory and anti-inflammatory cytokines.

In order to characterize the functional state of the T1 and T2 have surveyed our children with bronchopulmonary pathology (BLP) with bronchial obstruction (BO) studied the features of production IL-1β and IL-4 in serum Peripheral blood.

Material and methods

We observed 371 children aged from 3 months up to 7 years: 110 of them to OB, 50 children with obstruktiv recurrent bronchitis flow (OBRT), BLP 211 patients with symptoms of OB and 20 healthy children.

When the diagnosis into account medical history, the results of clinical, radiographic, functional, biochemical, immunological and psychological research methods. Verification of the diagnosis based on the classification adopted in Moscow at the Symposium (on improving the classification of non-specific lung diseases in children, 1995).

Children have been subjected to clinical examination with the standard description of the personal data, including during pregnancy, nutrition of pregnant and breastfeeding, childbirth, the neonatal period, the application timing to the chest, child nutrition in infancy transferred somatic diseases background state.

Results and its discussion

Our studies have shown that in healthy children IL-1β products ranged from 14–69 pg/ml and the average stood at 52.4–3.5 pg/ml. Children with BLP, hypercytokinemia marked both by pro- and anti-inflammatory cytokine with a maximum concentration of IL-1β in patients with intense inflammation and adequately reflect the severity of their course.

A comparative analysis of the level of pro-inflammatory cytokine IL-1β, depending on the presence or absence of BO showed that when ON 1.3 times at OB 1.9 times and 2 times in the BPBO was increased in patients with BO. Study of anti-inflammatory indicators cytokine IL-4 showed an increase in their standard of 1.6 times, 2 times and 1.4 times at the BW in children with OB, OP, and RB, respectively.

We have found that in children with AOB production IL-1β was significantly (P < 0.01) increased to 125.8 ± 5.7 pg/mL compared with healthy children. In patients with BPBO indicator IL-1β production was significantly (P < 0.01) increased to 286.2 ± 10.7 pg/ml, which was 5.4 times higher than the norm. Patients with OBRT index products IL-1β succeed to 198.5 ± 21.2 pg/ml. These data suggest the presence of IL-1β depending on the level of production on the nature of the infectious process, as evidenced by the upconsciously high level of secretion in patients with OBRT. There regulation increase in pro-inflammatory interleukin IL-1β in all the surveyed groups, but it is more pronounced in case of acute pneumonia with obstructive syndrome, exceeding the norm by 5.4 times. We fixed that when AOB and OBRT their level increased by 2.4 and 2.3 times, respectively, that is, the severity of the changes of this indicator was practical the same in case of bronchitis.

The study showed that the increase in IL-4 takes place in all groups with the AOB, but it is most pronounced in patients with BPBO. If patients with acute process OBRT – IL-4 levels in serum increased by 3.2 and 3.3 times, respectively, the BPBO at 4.5 times. Intensive synthesis of IL-1β and IL-4 at OBRT displays cytokine imbalance in the system. At the same time the immune response in patients with OP BO develops pre and property by Th-1-type,

which suggests that in the occurrence of symptoms of bronchial obstruction, the leading role is played by the formation of the hearth in-infectious inflammation of the lung tissue.

A more significant increase in anti-inflammatory cytokine IL-4 compared to the pro-inflammatory IL-1β in the BPBO, and especially when OBRT indicates menen of immune re-sponse with a predominance of Th-2 responsible for the humoral immune response.

Interesting data were obtained by analyzing the individual is – following results: the highest values of IL-4 are registered in children with severe pneumonia with AOB and BPBO.

The most important, in our view is the study of the relationship between the pro- and anti-inflammatory cytokines when OBRT. The level of IL-1β and IL-4 for cases in repeat bronchial obstruction presented in the table.

Table 1. – Interleukins level in patients with BLP re-BO (pg/ml)

Indicators	Healthy kids	AOB n = 110	BPBO n = 211	OBRT n = 50
IL-1β	52.4 ± 3.5	125.8 ± 5.7***	286 ± 10.7***^^^	118.5 ± 21.2**
		78.6 ± 5.4***^^^	172.9 ± 9.3***	89.1 ± 7.6***
IL-4	35.1 ±	114.5 ± 3.1***	117.3 ± 5.2***^^^	157.3 ± 3.8***
		172.0 ± 8.7***^^^	157.9 ± 6.5***	273.8 ± 14.7***^^^

*Note: numerator — in the primary obstruction in the denominator — in time in the repeat obstruction; * — the differences with respect to healthy children meaningful data (** — $P < 0.01$; *** — $P < 0.001$), ^ — the difference between the permary and reobstruction significant (^^^ — $P < 0.001$).*

It should be noted that the production of both pro- and anti-inflammatory cytokine was greatest (significantly higher) with OBRT than without.

As the table shows, the level of proinflammatory cytokine IL-1β during repeat-term obstruction tended to decrease in all groups of patients, but remained above you — normative values of 1.5 times at AOB, 3.3 times in BPBO, 1.7 times at the OBRT. Analyzing the level of anti-inflammatory cytokines — IL-4, we found the opposite trend, namely a significant increase in this indicator compared to the previous obstruction. Consequently, the level of IL-4 continued to differ significantly from that of the norm of 4.9 times at AOB, 4.5 times in OBRT and 7.8 times at the ROB. From here, we can say that in the pathogenesis of BO is set to an imbalance in the cytokine system, in repeated cases, AOB plays a major role anti-inflammatory cytokines — IL-4.

The data show an increase in the blood serum of children with BLP proinflammatory cytokines — balance changes imunoregulyation mediators. Immunodeficiency's associated with disorders of immune regulation, lead to a weakening of the immune response controls, may lead to the development of autoimmune diseases against loss of immunological tolerance to self antigens and often the trigger element in the pathogenesis of diseases. Failures cytokine network and immune disorders in AOB, in all probability, cgjcj, exacerbate immune deficiency and the development or exacerbation of clinical symptoms.

Increasing the content of cytokines, cytokine activation system should be disregarded as an indicator of activity, disease progression, involvement in the pathological process of the immune system, its deregulation. Hyperproduction pro- and anti-inflammatory cytokines is evidence of serious irregularities in the work of all parts of the immune system, the oppression of non-specific and specific immune protection that affect the course of the underlying disease, requiring appropriate correction. The data show an increase in the blood serum of children with AOB proinflammatory cytokines — balance changes imunoregulyator mediators. immunodeficiency associated with disorders of immune regulation, lead to a weakening of the immune response controls, may lead to the development of autoimmune diseases against loss of immunological tolerance to self antigens and often the trigger element in the pathogenesis of diseases. Failures cytokine network and immune disorders in BPBO, in all probability, capacity exacerbate immune deficiency and the development or exacerbation of clinical symptoms.

In the airway, there are two subpopulations of helper — Th-1 and Th-2. Development of the immune response in children is largely determined by the direction of differentiation of Th0-tion — lymphocyte subpopulation Th-1 and Th-2. Th-1 subtype secretes cytokines play an important role in the defense against bacterial and viral infections Institute. Under the Th-2 type facilitates the proliferation of mast cells, IgE production, differentiation, and survival of eosinophils entiation.

Determining the level of IL-4 in the serum of patients with OBRT is an actcial, since this cytokine plays a central role in the synthesis of immunoglobulin E. Therefore, we would also be interesting to study IgE levels, depending on the IL-4 production in patients with AOB and without the AOB.

The correlation analysis showed the presence of high direct correlation between blood levels of IgE and IL-4 in patients with OBRT ($r = 0.57$ at AOB, $r = 0.62$ in OBRT, and $r = 0.69$ at BPBO). The period of re-obstruction characterized polarized higher content of IL-4 in the serum, which is correlated with the frequency of the obstruction. At the same time the level of IL-1β in the serum did not correlate with repeated cases of bronchial obstruction. The correlation analysis revealed a significant imbalance between the individual links of the immune system and chi-Tokin that defines a variety of clinical manifestations of bronchial obstructive at AOB in children. Due to the fact that the development of bronchial obstruction depends on the combined effects of many factors, the ratio of which individually specific case, the average figures do not always accurately reflect the average picture of the disease.

Thus, among the pathogenetically relevant factors largely determined development and frequency of bronchial obstruction include increases in the serum anti-inflammatory cytokine IL-4 and IgE.

Identified immune system dysfunction, manifested in oppression cellular immunity, stimulation of some indicators of humoral immunity, rise IL-1.beta and IL-4, which promotes the overproduction of IgE, is pathogenetic basis for the development of bronchial obstruction in children with BLP. It is interesting data analysis of the immune response of patients, depending on the nosology of BLP with BO.

Conclusion

Thus, the results of the study once again urge the advisability of studying the immune status of patients to identify the characteristics of the formation of bronchial obstruction, followed by sound correction.

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The improvement of pectus excavatum repair results using differentiated tactics in children

Abstract: This report presents the results of the operative correction of the PE in 54 children aged from 5 to 15 years. In relation to the SCC elasticity degree and age of the patient there was performed the PE repair by D. Nuss procedure and in modification with application of a metal plate of the own construction. The obtained results show that thoracoplasty by D. Nuss due to PE is required when the sternocostal complex is still elastic. PE with worsening SCC elasticity required the thoracoplasty in modification.

Keywords: children, chest, pectus excavatum elasticity, D. Nuss procedure.

Background

The deformation of the chest has various forms, the overwhelming majority of them is the pectus excavatum (PE) (90 %) [1; 2]. The treatment of children with PE remains to be significant and not to be resolved completely problem of the children orthopedics. This is confirmed by the high percent of unsatisfactory results of operative correction of PE, which are found in more than 30 % [1; 3]. While having diversity of various methods for operative correction of PE the cosmetic effect seems not to be resolved problem completely.

Though the majority of the authors use the method of thoracoplasty by D. Nuss with the purpose of elimination of the PE, the orthopedic features of treatment remain without appropriate attention. It is quite logical, that the performance of the same method of thoracoplasty at different types and severity of the PE in the patients of various age groups leads to the predispositions for occurrence of various postoperative complications which quite often result in unsatisfactory results of treatment at the long-term period [4].

The purpose of work was to improve results of operative correction of PE in children.

Materials and methods. In the Clinic of Scientific Research Institute of Traumatology and orthopedics of the Ministry of Health 54 patients with PE at the age from 5 to 15 y. were operated during the period from 2009 to 2013. All patients were known about their cosmetic impairment and so, they had moral degradation. Because, patients and their parents were given their consent to perform the operative intervention, notably, they completed out the act about occurrence of any complaints during the operation.

These children were divided into three groups in relation to the degree of sternocostal complex elasticity (SCC). All patient was performed treatment with use of the SCC elasticity criteria (patent № DGU 02466) including the following parameters: the test of autocorrection, difference of chest excursion at a deep inspiration and expiration, "torsion" of the breast bone and the angle of steepness of the deformed ribs. On the basis of SCC elasticity degree there were formed groups of the patients, according to which the choice of a method of operative correction was made. For operative correction of the SCC we used our developed (2010) and made by firm ChM (Poland) metal plate (patent № FAP 00825).

The results of the study are devoted to research of all parameters data of SCC elasticity degree, which are shown in table 1.

Table 1. – Distribution of the children with PE
by the SCC criteria elasticity degree (n = 54)

Criteria №	Elasticity degree			Totally
	Light degree of elasticity of the chest n = 27	Moderate degree of elasticity n = 15	Severe degree of hypoelastic chest n = 12	
(TA) Test of autocorrection	27 (50.0 %)	17 (31.5 %)	10 (18.5 %)	54 (100 %)
(CE) Excursion of the chest	28 (51.8 %)	15 (27.8 %)	11 (20.4 %)	54 (100 %)
(BBT) Breast bone torsion	27 (50.0 %)	15 (27.8 %)	12 (22.2 %)	54 (100 %)
Angle of the steepness of the deformed ribs	24 (44.4 %)	20 (37.0 %)	10 (18.6 %)	54 (100 %)

The table 1 shows, that summarizing all parameters of criteria of deformation of the sternocostal complex in 27 (50.0 %) children we establish elastic thorax, in 15 (27.8 %) moderate elasticity was determined, and in 12 (22.2 %) the hypoelastic thorax is established.

Depending on a degree of SCC elasticity the method of operative correction was choosen. In 27 (50.0 %) patients with normal elasticity of sternocomplex (as a rule they are children in the age under 10 years), there was carried out the D. Nuss procedure with application of a metal plate. At the moderate degree of elasticity in 15 (27.8 %) children PE repair was performed by chondrotomy of the deformed ribs with stabilization with plate. In the third group of the patients the PE was corrected by «T»-shaped or transversal sternotomy and cartlages resection and stabilization with plate too. The duration of immobilization period was 3.2 ± 0.9 y. in relation to character and rate of growth of the patient.

The long-term results of the operated patients were investigated in 37 (68.5 %) out of common number of operated children during the period of follow-up from 2 till 4 years. In the other 17 (31.5 %) patients there were studied nearest postoperative results.

The results of operative correction we have estimated as good, satisfactory and unsatisfactory:

– The good result is considered when the patient does not show the complaints and the good cosmetic effect, complete restoration of the functions of pulmonary-cardiovascular system;

– The satisfactory result is considered when there is a periodic pain sensation in the field of operative intervention, intercostals pain, and light inflammatory reaction in the area postoperative wound on the basis of good cosmetic result.

– The unsatisfactory result is when there is noted the deeping of SCC looking-like PE 1 degree, that is, the relapse of deformation is of mild degree.

In 27 (50.0 %) children with sufficient SCC elasticity there was performed D. Nuss procedure. The good result was obtained in 26 (96.3 %) children, thus PE was eliminated with a good relief without a relapse and complaints of the patient. In one (3.7 %) patient the satisfactory result was achived.

In 15 (27.8 %) patients with moderate degree of elasticity with the purpose of reduction of resistans of the SCC the D. Nuss operation was performed with modification. The good result was obtained in 13 (86.7 %) children, they have good relief in the are of SCC, recurrences were absent. In 2 (13.3 %) cases there were received satisfactory results, that associated with periodic pain sensations in the area of surgery and the forming of rough celoid scars. The unsatisfactory results were not found.

The hypoelastic chest was established in 12 (22.2 %) patients, them were performed thoracoplasty in modification with "T"-shaped or transversal sternotomy and cartlages resection, then the plate of D. Nuss was inserted under sternum. The good result was obtained in 9 (75 %) children.The satisfactory result was noted in 1 (8.3 %) case. The unsatisfactory results were received in 2 (16.7 %) cases with occurring of the mild relapse of deformation. These patients underwent repeated operative intervention.

Intra- and postoperative results of the operative correction of the patients with pectus excavatum are presented in table 2.

Table 2. – Results of the operative correction in the patients with pectus excavatum deformity in the comparative groups (n = 54)

Criteria	Group 1 Normal elasticity n = 27	Group 2 Moderate degree of elasticity n = 15	Group 3 Hypoelastic n = 12	Totally
Good	26 (96.3 %)	13 (86.7 %)	9 (75 %)	48 (88.9)
Satisfactory	1 (3.7 %)	2 (13.3 %)	1 (8.3 %)	4 (7.4 %)
Unsatisfactory	0 (0 %)	0 (0 %)	2 (16.7 %)	2 (3.7 %)
Totally	27 (50 %)	15 (27.8 %)	12 (22.2 %)	54 (100 %)

The table 2 shows the results of operative intervention depend on SCC elasticity degree. The rate of restoration and improvement of the patient state was directly proportional to volume of operative intervention. The duration of D. Nuss procedure (group 1 of the patients) was 25 ± 2.5 minutes, at modified method of D. Nuss, (groups 2–3) was more than an hour — 72 ± 9.4 minutes (p < 0.001).

Because of strong pain syndrome in the postoperative period in the patients from groups 2–3 the ventilation function of the lungs was limited and worsened, the need of the body in oxygen was not supplied, this was expressed by slowing of physical activization of the patient, as a result the patiets received treatment in the department of resuscitation and intensive therapy for a longer period, 3.4 ± 0.8 days.

At an easy degree of elasticity the pectus excavatum deformity is easily corrected without negative effect on the internal organs of the thorax. And at the moderate and hypoelastic thorax the elimination of deformation is carried out with the certain difficulties and with additional interventions. In these cases the possibility of the occurrence of intraoperative complications is increased. We believe that presence of breast bone torsion and marked steepness of the deformed ribs are the contributing factors to occurrence of the secondary deformations.

Conclusion

As our results shoun, that with the growth of patients their SCC is became as a rigid. So, in such moment the correction of the PE deformity without sternotomy or cartlages resection is impossible.

The results of the performed operative interventions and their comparative analysis show that thoracoplasty by D. Nuss due to PE is required when the sternocostal complex is still elastic. The worse elasticity of the sternocostal complex there are more and more often complications and relapses of the deformation after the thoracoplasty.

The results obtained of the comparative characteristic in three groups of the patients indicate that "with age" the SCC elasticity in PE loses, that is difficult for correction and with some complications.

Thus, the operative intervention at PE should be performed with taking into account SCC elasticity that contributes to the easy performance of the correction and provides good cosmetic and functional results.

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Assessment of emotional psychological status and quality of life at women with premenstrual syndrome under therapy with drospirenone

Abstract: The analysis of the conducted researches has shown that after 6 months of therapy with drospirenone more than at a half of women symptoms of PMS have completely disappeared, essential decrease in cases of subclinical anxiety and depression and improvement of quality of life were noted.

Keywords: premenstrual syndrome, emotional psychological status, quality of life.

Premenstrual syndrome (PMS) is characterized by the repeating, affective, physical and behavioural symptoms that develop during luteal phase of menstrual cycle and vanish within several days after the beginning of menstruation. The symptoms arising in luteal phase of cycle can significantly influence social relationship, quality of life and working capacity, changing and worsening a habitual way of life of the woman and her relation with people around [3; 14; 15; 17].

Though the exact etiology of PMS is unknown, there is a wide range of tested medications, for treatment of premenstrual symptoms (for example, change of the way of life, pharmacological interventions, and non-pharmacological methods of treatment) [11].

Pathogenically a reasonable method of treatment of PMS is suppression of cyclic activity of ovaries. For the purpose of suppression of ovulation a number of medications is used: combined oral contraceptives (COC), danazol, agonists of gonadoliberin. Interest in use the COCs as a method of treatment of PMS has revived with the advent of a new gestagenic component — drospirenone (DRSP) similar in its effects to a spironolactone [1; 2; 16].

Drospirenone is the only gestagen that is synthesized on the basis of a molecule of a spironolactone. The unique mechanism of action of drospirenone besides influence on receptors of progesterone is also caused by its powerful anti-aldosterone and anti-androgenic potential. At the same time drospirenone is void of estrogenic and glucocorticoid activity, it is as high-selective as gestagen due to activation of only progesterone receptors [4; 7; 9].

Objective: to estimate influence of drospirenone on the level of anxiety, depression and quality of life of women with PMS.

Materials and methods of research

Researchers examined 89 women of fertile age (from 18 to 40 years) with PMS (average age of 31.0 ± 6.59 years) who have addressed to advisory policlinic of Republican Specialized Scientific and Practical Medical Center of Endocrinology. The control group included 33 women (average age of $30.0 \pm 5,30$ years) with no PMS symptoms.

For confirmation of PMS the assessment of symptoms was carried out by filling out of a "calendar of premenstrual supervision" during 6 cycles including 12 most widespread psycho-emotional and 10 somatic symptoms of PMS [5; 8; 10]. Each patient estimates the severity of each symptom daily on a 4-mark scale, proceeding from extent of violation of a habitual way of life due to this symptom.

Existence and intensity of anxiodepressive distress were estimated by means of the Hospital scale of anxiety and depression [19]. At interpretation a total indicator on each subscale was considered, allocating three areas of its values: 0–7 — norm (no significant expressed symptoms of anxiety and depression); 8–10 — subclinically expressed anxiety/depression; 11 and more — clinically expressed anxiety/depression.

For the purpose of determination of QOL parameters of patients the standard version of questionnaire SF-36 was used [18], allowing to estimate the QOL within past 4 weeks. Prior to the beginning of pharmacotherapy it was recommended to all women to change lifestyle (observance of diet, change of work-rest schedule, sports).

The combined medication drospirenone/ethinylestradiol was assigned to all patients from the first day of menstrual cycle — 1 pill for 21 days. After a 7-day break the next course was assigned. Duration of therapy made 6 months. All patients have signed the informed consent to participation in research.

The obtained data was processed by means of the computer programs: Microsoft Excel, STATISTICA 6 and Biostat. The relation of chances (RC) and 95 % of confidence interval (95 % of CI) were counted with application of logistic regression. Reliability of differences of indicators was estimated by means of nonparametric criterion χ^2 (Pearson's criterion). Quantitative indicators are presented in form $M \pm m$, median (Me) and 25 and 75 percentiles (IQR). Distinctions between groups were considered statistically significant at $P < 0.05$.

Results and discussion

At the first stage of work the careful analysis of two menstrual calendars of patients carried out that allowed to reveal dependence

of symptoms of PMS on the second phase of cycles and to estimate severity of their symptoms.

The carried-out analysis has shown that most often patients complained about soreness (33.7 %), low mood (32.6 %), headaches (27.7 %), decrease in working capacity (26.2 %).

At assessment of the family anamnesis inherited predisposition to PMS was established at 42 (47.2 %; 95 % CI 36.5–58.1 %) patients, i. e. almost at a half of surveyed women the presence of symptoms of PMS at relatives of the first generation was recorded. Twelve (13.5 %; 95 % CI 7.2–22.4 %) women have never been pregnant. Of all pregnancies 71.4 % (95 % CI 60.0 —81.2 %) ended in childbirth (n = 77), 28.6 % (95 % CI 18.8–40.0 %) in artificial and spontaneous abortion. After the restoration of menstrual cycle 36.4 % (95 % CI 23.8–50.4 %) of women, having a history of childbirth, noted that the state of the disease became more serious (n = 55). In past medical history of the patients there were: operative delivery (7.9 %; 95 % CI 3.2–15.5 %), surgeries concerning ectopic pregnancy (9.0 %; 95 % CI 4.0–16.9 %), surgeries concerning ovarian cysts (5.6 %; 95 % CI 1.8–12.6 %). The reproductive anamnesis and the analysis of surgeries hasn't shown specific violations that could be an immediate cause of PMS. At 59.6 % (95 %CI 48.6–69.8 %) of women with PMS the high infectious index was determined (5 and more infectious diseases a year).

All patients treated with drospirenone were observed until the end of research. The analysis of results of therapy with drospirenone after 3 months has shown disappearance of symptoms of PMS at 27 (30.3 %; 95 % CI 21.0–41.0 %) patients, severity of symptoms of PMS has decreased from average to easy degree at 37 (41.6 %; 95 % CI 31.2–52.5 %) women. After 6 months the symptoms of PMS have completely disappeared at 51 (57.3 %; 95 % CI 46.4–67.7 %) women, at 38 (42.7 %; 95 %DI 32.3–53.6 %) women respectively expressiveness of symptoms had easy degree.

Mean scores on anxiety (6.98 ± 1.48) and depression (6.51 ± 2.13) scales were within normal values, however anxiodepressive distress has been found more than at half of women. Subclinically the large degree of anxiety/depression has been diagnosed in 58.4 % (95 % CI 47.5–68.8 %) of cases, the clinical norm was observed in 41.6 % (95 % CI 31.2–52.5 %) of cases. Clinically large degree of anxiety/depression wasn't noted. The obtained data confirm high prevalence of anxiodepressive symptomatology among patients with PMS.

At the end of the course of treatment reliable decrease was established: in cases of subclinical anxiety to 31 % (OR 0.38; 95 % CI 0.21–0.70; P = 0.003) and in cases of depression to 27 % (OR 0.31; 95 % CI 0.17–0.57; P = 0.0003).

At an assessment of the psychological status of women with PMS under therapy with drospirenone-containing oral contraceptive, conducted by Lekareva T. M. [1; 2] (2007), it was found that by the end of the first cycle of therapy the clinical norm was observed at 91.4 %, subclinically 8.6 % of women had anxiety/depression of large degree. Positive influence of drospirenone on psychological state of patients is also determined by anti-edematous action of the medication [12; 13].

According to research results, at our supervision of patients with PMS the quality of life at all scales SF-36 was credibly lower than the quality of life of healthy women.

Indicators of QOL ranged from 24 to 89 points. The lowest values that aren't exceeding 50 points were noted on scales: role-physical functioning (at 67.4 % of women), amount of pain (at 41.6 %), physical activity (at 40.4 %) and general state of health (at 39.3 % of patients). Existence of clinical symptoms of PMS influenced the psychological component of health, the indicators that aren't exceeding 50 points were noted on scales: emotional functioning (at 38.2 % of women), vitality (32.6 %), mental health (25.8 %) and social activity (13.5 %).

The comparative analysis of scale indicators in dynamics (after 6 months) has revealed high rates (more than 70 points) on the following scales: vitality (at 71.9 % of patients), physical activity (at 59.6 % of patients), amount of pain (at 56.2 %), social activity (at 55.1 %), emotional functioning (at 52.8 % of women) and mental health (at 52.8 % of women). It testifies to high social activity and good emotional state of respondents after therapy with drospirenone.

After the course of treatment reliable increase in indicators of all studied questionnaire components was noted. The most essential increase was noted on the following scales: role functioning (by 42.7 %), physical (by 31.7 %) and vital activity (by 29.2 %).

Conclusions:
1. On the background of administration of drospirenone (after 6 months) symptoms of PMS have completely disappeared more than at half (57.3 %) of women, at 42.7 % of patients respectively severity of symptoms was of low degree.
2. At the final stage of treatment essential decrease in cases of subclinical anxiety (to 31 %; P = 0.003) and depressions (to 27 %; P = 0.0003) was noted.

Dynamic supervision over QOL indicators after therapy with drospirenone has revealed improvement on such scale components as role-physical functioning (by 42.7 %), physical (by 31.7 %) and vitality (by 29.2 %).

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Influence of neutron capture therapy to biological subjects

Abstract: Developed for treatment of radio resistant malignant tumors the Gadolinium neutron capture therapy (GdNCT) is based on the nuclear capture and reactions that occur when [155]Gd and [157]Gd, which are non-radioactive constituents of natural elemental gadolinium, are irradiated by thermal neutrons with low energy 0.025 eV. In this article, results of scientific researches on development GdNCT in Uzbekistan are presented. The beam of epithermal neutrons with characteristics satisfying the all requirements of IAEA was received. Neutron kerma for biological tissues $K^{bt}_n = 1.35 \cdot 10^{-4}$ Gr/s and for 1 μg. natural gadolinium in 1 g. of biological tissues $K^{Gd}_n = 3.1 \cdot 10^{-7}$ Gr/s for this beam was calculated. As gadolinium delivery agent the well-known pharmacological preparation Magnevist was chosen. For absorbed dose calculation, the Magnevist pharmacokinetics was studied after intratumoral injection in mice and intramuscular injection in rats. Results of researches of influence epithermal neutrons beam on binding ability of transport proteins of human blood, on tumor cells C-180 at mice are presented. Planned scientific researches with application of this beam in Uzbekistan are summarized.

Keywords: neutron capture therapy, sarcoma, gadolinium.

1. Introduction

There are a number of radio resistant malignant tumors, incurable traditional methods of radiation therapy. One of a perspective method of treatment of such tumors is GdNCT. Gadolinium neutron capture therapy (GdNCT) is based on the nuclear capture and reactions that occur when [155]Gd and [157]Gd, which is a non-radioactive constituent of natural elemental gadolinium, is irradiated with low energy (0.025 eV) thermal neutrons. This results in the production of high energy γ-rays, internal conversion electrons, X-rays and Auger electrons, as shown below.

The employment GdNCT for cancer treatment is receiving more and more interest owing to the efficient killing effect of the Auger electrons, which have demonstrated higher cell lethality than alpha particles [1]. Natural Gd consists of 7 stable isotopes including [152]Gd (0.205 %), [154]Gd (2.23 %), [155]Gd (15.10 %), [156]Gd (20.60 %), [157]Gd (15.70 %), [158]Gd (24.50 %), [160]Gd (21.60 %). Among them, [155]Gd and [157]Gd have the most excellent neutron capture properties with thermal neutron capture cross-section of 60,800 and 255,000 barns, consequently, which is approximately 16 and 66 times that of [10]B. Nuclear reaction cross sections for other isotopes are small, which can be neglected at dose calculations. Therefore, we are considered these isotopes doing the basic contribution to the summary dose (20 % – [155]Gd and 80 % – [157]Gd) [2]. Initially, Locher have mentioned about suitability of gadolinium as element for NCT in 1936 [3]. Then it has not been used long time for NCT. All researches on NCT was realized by using of the best element for NCT [10]B [4–17]. But for treatment of some radio resistant forms of cancer are require element having properties with the big gradient

to collect in a tumor. By similar property preparation Gd-DTPA was proposed as contrast substance for a nuclear magnetic resonance diagnostics in 1984 [18]. Since this moment has renewed interest to gadolinium as to usable isotope for NCT. In the first works on application of Gd was considered only dose distribution from the gamma radiation resulting of Gd (n, γ) reactions [19–23]. However Martin et al. [24; 25] and Laster et al. [26] have shown, that in experiments with cells effect from Gd (n, γ) reactions higher, than received only from gamma radiation. In works [24; 25] it has been explained by Auger electrons. In work [26] this effect was explained by interaction internal conversion and Auger electrons of gadolinium. Precisely explaining this phenomenon is not possible today. For this purpose is required estimation and definition of doses from all radiations appearing from nuclear reactions in gadolinium. Available works are essentially differs from each other [27–34].

In spite of it this effect is already applied for treatment of some radio resistant forms of cancer. In this paper we will briefly summarize current developments in the design neutron sources, gadolinium delivery agent, experiments on biological objects and with chemical dosimeters in Uzbekistan.

2. Studies on biological objects

For last some years the medical-biological studies on NCT were carried out in Institute of Nuclear Physics of Academy of Sciences Republic of Uzbekistan on the channel of medical destination of reactor of WWR-SM. Series of following studies on various biological objects were performed.

3. Studies of pharmacokinetics of gadolinium-containing chelate preparation Magnevist at intratumoral and intramuscular introduction in mice and rats

Gd-NCT dosimetry requires exact analysis of the gadolinium amount in the irradiated target. For this purpose fast and convenient method for radiographic visualization of gadolinium-containing preparation (Magnevist) was developed. By using this metod the Magnevist pharmacokinetics was carried out after intratumoral injection in mice and intramuscular injection in rats. For experiment white male mice were used. S180 sarcoma strain was inoculated to mice's hip of right rear leg. To study pharmacokinetics of Magnevist at intramuscular injection normal healthy white rats with weight of approximately 250 g. were used. X-Ray study of rats and mice was produced on Sirescop "Siemens" x-ray equipment. Roentgenograms of mice were skiagraphed before injection (control) and in 1, 2.5, 5 min. after injection and further every 5 min. until 65 min. inclusive after inection. Roentgenograms were processed by means of Image J2x2.1.4.7ud2 software (Wayne Rasband, National Institute of Health, USA). The x-ray contrasting properties of gadolinium-containing preparations (Information leaflet of Optimark preparation of Malinkrodt Inc. company, USA) were used for definition of Magnevist pharmacokinetics.

Based on received data the dependence of Magnevist's concentration decrease in a tumour from the injected dose is ploted Magnevist injection the optimal concentration of the preparation (80 %) remains for 15–25 minutes depending on the injected dose. Then Magnevist eliminates out of tumour sufficiently fast. In roentgenograms, one can clearly see that on 25th min. a darkening of the kidneys appears. This can indicate that the significant amount of gadolinium accumulates in kidneys. It is necessary take into account the beginning of intensive Magnevist accumulation in kidneys on 25th min. at planning of irradiation sessions. Dynamics of Magnevist at intramuscular inection on rats, which can be used for preparation delivery to bone tumours. In the roentgenogram in 1 minute after injection the darkening caused by Magnevist is well represented. Fast enough

reduction of darkening is observed, that indicate active Magnevist elimination from an injection region, and thus on 40th min. darkening is not observed any more. Thus, at intramuscular injection of Magnevist, optimal concentration of the preparation (to 80 %) preserved within 10 min. Obtained data allowed the semiquantitative estimation of gadolinium amount in injection site. The values of gadolinium amount in irradiated region depending on time is used for correct definition of absorbed dose.
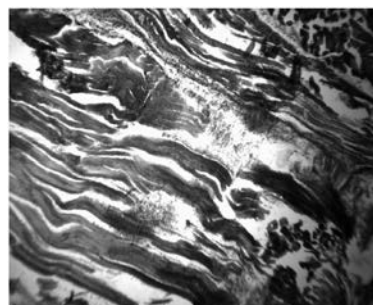
Fig. 1. View of tumour bed – cross-striped muscular tissue with the moderate intermuscular edema and inflammatory infiltrate. Staining by hematoxilin-eosin
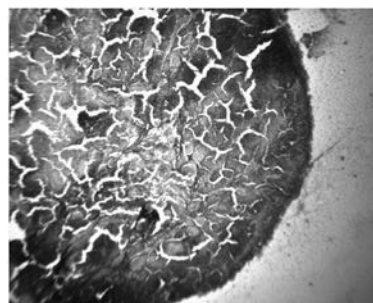
Fig. 2. Tumour with necrosis in the center. Tumoral cells form blocks without complex disposition, basal membrane is absent. Contours of glands are visible. Magnification 10×4. Staining by hematoxilin-eosin
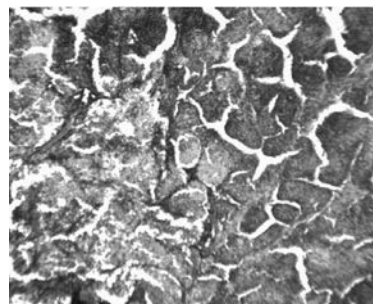
Fig. 3. The same preparation at greater magnification 10×10. Staining by hematoxilin-eosin

4. Study of influence of gadolinium-capture reaction on sarcoma C-180 in experiments in vivo on tumour-bearing mice

For experiment were used white mice, in the age of 4 month, weighing 17–25 g. Cells of sarcoma strain C-180 were inoculated on the right back legs of mice. The irradiation was carried out on mature tumours with size 0.3 × 0.3 cm up to 2.0 × 1.5 cm. Preparation Magnevist was injected directly into the center of a tumor immediately before irradiation. The irradiation was carried out by epithermal neutrons beam with the various absorbed dozes — 3, 4 and 5 Gy. Procedure of Magnevist injection and irradiation did not influence on activity of animals. On 24 hours after irradiation animals were sacrificed and samples of tissues for the further histological analysis have been taken. In whole in tumour beds it has been found out lymphoid-hystocyte infiltration.

At some mice the moderate edema of muscles and fibrosis was observed (fig. 1). In group of mice received absorbed doze 3Gy it were found necrosis sites in tumours — islands of pathomosphosis. Also it was found lymphocytic infiltration around tumour. In tumours with absorbed dozes 4 and 5 Gy the II and III degrees of pathomosphosis were found (fig. 2, fig. 3). At present time studies on animals in vivo for definition of optimum modes of tumours irradiation are continued.

5. Conclusion

The complex with epithermal neutrons beam was developed and created for last years at Institute of Nuclear Physics AS RUz. The medical and biologic researches realized and carried out now have shown accordance with characteristics of a beam to the international standards and suitability of a epithermal neutrons beam for the medical and biological researches concerned with neutron capture therapy. Thus, now the Institute of Nuclear Physics possesses all possibilities (scientific and technical) for carrying out of different medical and biologic researches on neutron capture therapies. Created technical facility and realized preclinical tests allow us to carry out in future following researches:

- Medical and biological studies on animals in vivo, in vitro, in situ.
- Preclinical studies of new preparations.
- Use of epithermal neutron beam for various medical and biological experiments.
- Dosimetry researches of neutron irradiation conditions of patients.
- Carrying out of fundamental medical and biological studies of neutron irradiation influence on biological objects.
- Development and investigation of new preparations for NCT on the basis of B and Gd.

Acknowledgment

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Surgical treatment of pseudoarthrosis of lateral humeral condyle of humerus with cubitus valgus in children

Abstract: Object of the research work was 59 patients with lateral humeral condyle pseudoarthrosis with or without cubitus valgus, whom three types of surgical correction are spent depending on weight of deformation, prescription of the got trauma and age of the patients. Pseudoarthrosis liquidation or necrosis field resection are made in 21 patients, for 8 patients are admitted the extraarticular supracondylar osteotomy of humerus with ulnar nerve transposition and stabilization by Ilizarov's apparatus and other 30 patients was corrected by the developing own clinic technique — «Lateral humeral condyle pseudoarthrosis resection of the humerus, supracondylar osteotomy of humerus and osteosynthesis by Ilizarov's apparatus». These differential techniques help to shape the distal part of humerus, thus, restoring the function of the elbow joint.

Keywords: lateral humeral condyle, pseudoarthrosis, children, osteotomy.

Introduction

Damages of bone structures of an elbow joint in children, according to various researchers [1; 2; 3; 4; 5], averaged from 16 to 40 % among several kinds of bone fractures and 50–80 % from all intraarticulate damages of upper extremity. The lateral condyle of humerus is one of basic elements of the distal end of humerus, which is made role as a lateral supporting point and participates in correct distribution of attaching loading on elbow joint and participates in rotation of forearm bones [4; 5; 8]. Nonunion of the lateral humeral condyle in time leads to aseptic necrosis of lateral part of distal end of humerus with loosening of its articulate structures. Frequently the part of the block of humerus is resolved. The absence of lateral supporting point leads to aggravation of cubitus valgus with following of consequences [6; 7; 8; 9; 10]. Today this pathology becomes a social and economic problem so children with pathology become persistent invalids.

Purpose was to develop the differentiated approaches for lateral condyle of humerus pseudoarthrosis surgery with cubitus valgus in children.

Materials and methods

For observation underwent 59 children, which are treated since 1998 to 2013 yy in Children's Traumatology Department of Research Institute of Traumatology and Orthopedics of Ministry of Health of Republic of Uzbekistan with lateral condyle pseudoarthrosis of humerus with cubitus valgus. For all patients clinic-laboratory analyses, radiological measurement, a tomography investigation and electromyography of damaged segment are carried out in dynamics in comparison by healthy extremity.

Due to clinic-radiological changes the electronic software product was developed, that allows observing the severity of elbow joint valgus deformity in patients with lateral condyle pseudoarthrosis of humerus, which data are presented in table 1. This developed software product is registered and patented № DGU 01354 in Patent Office Republic of Uzbekistan.

Results and discussions

Distribution of patients who have admitted on treatment with lateral condyle pseudoarthrosis of humerus (after trauma — more than 4 months) due to on age and gender was made, that presented in table 2. The age of patients fluctuated from 2 till 18.

As follows from presented data in table 1, all patients have been distributed on 5 age groups: 3–7 years — 13 patients (9 boys and 4 girls); 7–11 y. — 17 (10 — boys and 7 girls); 11–15 y. — 25 (18 boys, 7 girls) and adolescent group from 15 till 18 y. — 4 patients.

As has shown the retrospective analysis data, causes of nonunion occurrence were untimely diagnostics or wrong interpretation of data, omissions during choice of treatment tactics and to decrease of responsibility, infringement of an orthopedic regimen, especially by boys.

Table 1. – Distribution of patients by lateral condyle pseudoarthrosis of humerus due to an age, sex, severity level of deformation and operation types (n = 59)

Age	Gender	Lateral condyle pseudoarthrosis of humerus with elbow joint valgusal deformity									Total
		I operation type (n = 21)			II operation type (n = 9)			III operation type (n = 29)			
		Degree of deformity			Degree of deformity			Degree of deformity			
		I	II	III	I	II	III	I	II	III	
3–7	b	3	2	–	–	–	–	–	3	1	9
	g	4	–	–	–	–	–	–	–	–	4
7–11	b	3	1	–	–	2	1	–	2	1	10
	g	–	1	–	–	–	–	–	2	4	7
11–15	b	1	2	3	–	1	2	1	5	3	18
	g	–	1	–	–	–	2	–	1	3	7
15–18	b	–	–	–	–	–	1	–	1	2	4
	g	–	–	–	–	–	–	–	–	–	–
Total		11	7	3	–	3	6	1	14	14	59

Inall patients the correction methods were chosen on three types of operation techniques due to severity level of deformation of elbow joint, prescription of the got trauma and age of the patients.

The first operation type is spent in 21 (35.6%) patients with lateral condyle pseudoarthrosis of humerus without cubitus valgus deformation (15 boys, 6 girls) who complicated with elbow joint contracture various severity. From them in 12 cases 1st severity level of deformation, in 5 children — 2nd severity level and other 3 patients with 3rd severity level of deformation were marked. In all these patients it is spent elbow joint arthrolysis with elimination of capitellum pseudoarthrosis and stably functional osteosynthesis with Ilizarov's device consisting of 2 semicircles. The operation feature was that the adjacent bone fragments surfaces covered with a fibrous tissue "were freshened" to a healthy bone tissue. In a maternal bed was created a surface corresponding to fragment of capitellum and made its adaptation. Its mobilization was made for the best adaptation of capitellum from the adhesive secondary healing (scar) tissues then bone fragment adapted and was made reduction for a maternal bed. A following stage was conducting three bulb-tipped pins in diameter of 1.5 mm. through capitellum: the first — in a diagonal direction on the outside to inside and from below-upwards, the second — it is perpendicular to a humeral bone axis on the outside to inside. The third pin spent through the lower third of humeral bone axis, thus the bulb-tipped pinlocated opposite concerning the previous pins for creation of an opposite directioncompression. Then Ilizarov's apparatus installation carried out from 2 semicircleswith creation of stability bone fragments by pins tension and postoperative wound took in hermetically.

The second operation type is spent in 9 (15.3%) patients (7 boys, 2 girls). On deformation severity level was marked the 2nd severity level in two cases and in 6 cases the 3rd severity level. In these patients it is spent the extraarticular varusal correction osteotomy of humerus with an elbow nerve transposition and Ilizarov's apparatus imposing. It is necessary to notice, that the currentoperation type was made in children of an average and the senior school age. This results from the fact that often patient addressed for the help very much late in connection with development peripheral neurotrophic infringements and hypotrophy development corresponding hand and forearm muscles up to their atrophy, because of cubitus valgus progressing. With the times occurs almost full distal end resorption of humerus with adapted lateral condyle pseudoarthrosis formation. In such cases in patients the full volume of elbow joint movement was marked and we in this group of patients spent only correction of cubitus valgus with an elbow nerve transposition and an osteosynthesis with Ilizarov's device.

Carrying out for children of the senior age groups intra-and extraarticular reconstructive operations significantly raises the risk of development of stable elbow joint contracture, which are very difficultly giving in working out demanding long time (3–3.5 years), a regularity of performance of physio-functional procedures and exercises and patience as parents, and patients.

Last year we were limited to carrying out of extraarticular corrections with an elbow nerve transposition without intraarticulate intervention as some parents negatively concern for postoperative contracture, demanding long time for working out of available deficiency of joint movement volume.

The third operation type is made in 29 (49.1%) children (19 boys, 10 girls) mainly with 2nd and 3rd severity level of cubitus valgus deformations. In 3 cases children had 1st severity deformation level, in 14–2nd severity level and in 13 cases 3rd severity deformation level. These patients had rough anatomic elements defect of distal parts of humerus because of aseptic necrosis of the lateral condyle and parts of internalblock with the subsequent of neurotrophic disorders.

We in such difficult cases had been developed a new technique repair of lateral condyle pseudoarthrosis of humerus with cubitus valgus, consisting in a pseudoarthrosis resection of with the supracondylar extraaticular corrected osteotomy of humerus, n. ulnaris nerve transposition and cross fixing of bone fragments and stable-functional osteosynthesis by Ilizarov's apparatus, consisting of 2 semicircles on which was received the certificate of receipt from 23.02.05. №IAP0060 Patent Office of Republic of Uzbekistan. The essence of method consists in the maximum preservation of the soft tissue cover of lateral lateral condyle elements and capitellum of humerus as blood supply source, n. ulnaris transposition, correcting osteotomy distal part of humerus, and fixation of bone fragments and "T" shape transposition all of elements, to cross fixing withwires, the installation of Ilizarov's apparatus consisting of 2 semicircles. Fixation duration of the apparatus at this technique depended on degree of bone elements consolidation which corresponded to 5–8 weeks.

It is necessary to notice, that after carrying out of this difficult intra-and extraarticular elbow joint reconstructive operation, first of all the upper extremity axis was corrected, but after device removal it is necessary the period of 2–2.5 years for full restoration of elbow joint functions depending on age of the child and aseptic necrosis processes of the distal end of humerus, as the patient is more younger more full and earlier is restored and formed of joint congruity of distal end of humerus and faster there is a full elbow

joint movements volume restoration. The first received results after such reconstructive operation have shown gradual formation of distal end elements of humerus within 2–3 years. This type of operation is recommended to carrying out for patients are aged till 12 years. The example from our experience is shown.

Clinical example

Patient M., 10 years (disease history № 5422). From his anamnesis: the patient was injured 2 years ago before arrival to RITO clinicin 2010, first time was treated domiciliary by a plaster bandage. During examination a cubitus valgus deformation and upper extremity weakness were defined. During inspection locality cubitus valgus with deformation angle is 32°, flexion — 45°, extension — 180° were defined, the volume of elbow joint movement is made 135°. Marx's line and Gunter triangle have been considerably changed. Fingers movement and sensitivity are kept. The peripheral neurotrophic changes aren't revealed. On the basis of clinical and instrumentation investigations the diagnosis has been established: Posttraumatic left sided cubitus valgus, the capitellum pseudo-arthrosis of left humerus (Fig. 1. a, b, c). In November 2010 the operation № 237–238 «The liquidation of the capitellum pseudoarthrosis of humerus, supracondylar extraarticular correcting osteotomy of humerus with an elbow joint transposition, cross fixing Ilizarov's wires and a stable-functional osthesynthesis using Ilizarov's apparatus from 2 semicircles» (Fig. 1 d, e) are made. The postoperative period proceeded smoothly. Patient has received the corresponding medication, physiotherapeutic therapy. The postoperative wound has begun to live a primary tension. The patient is discharged from the hospital in 9 days in a satisfactory condition. In analysis of the nearest and remote postoperative results the full capitellum consolidation of humerus with distal end anatomical formation humerus are revealed (Fig. 1. f, g, i, h, j, k). In 3 years restoration of full volume of elbow joint movements (Fig. 1. l, m, n, o) was defined.
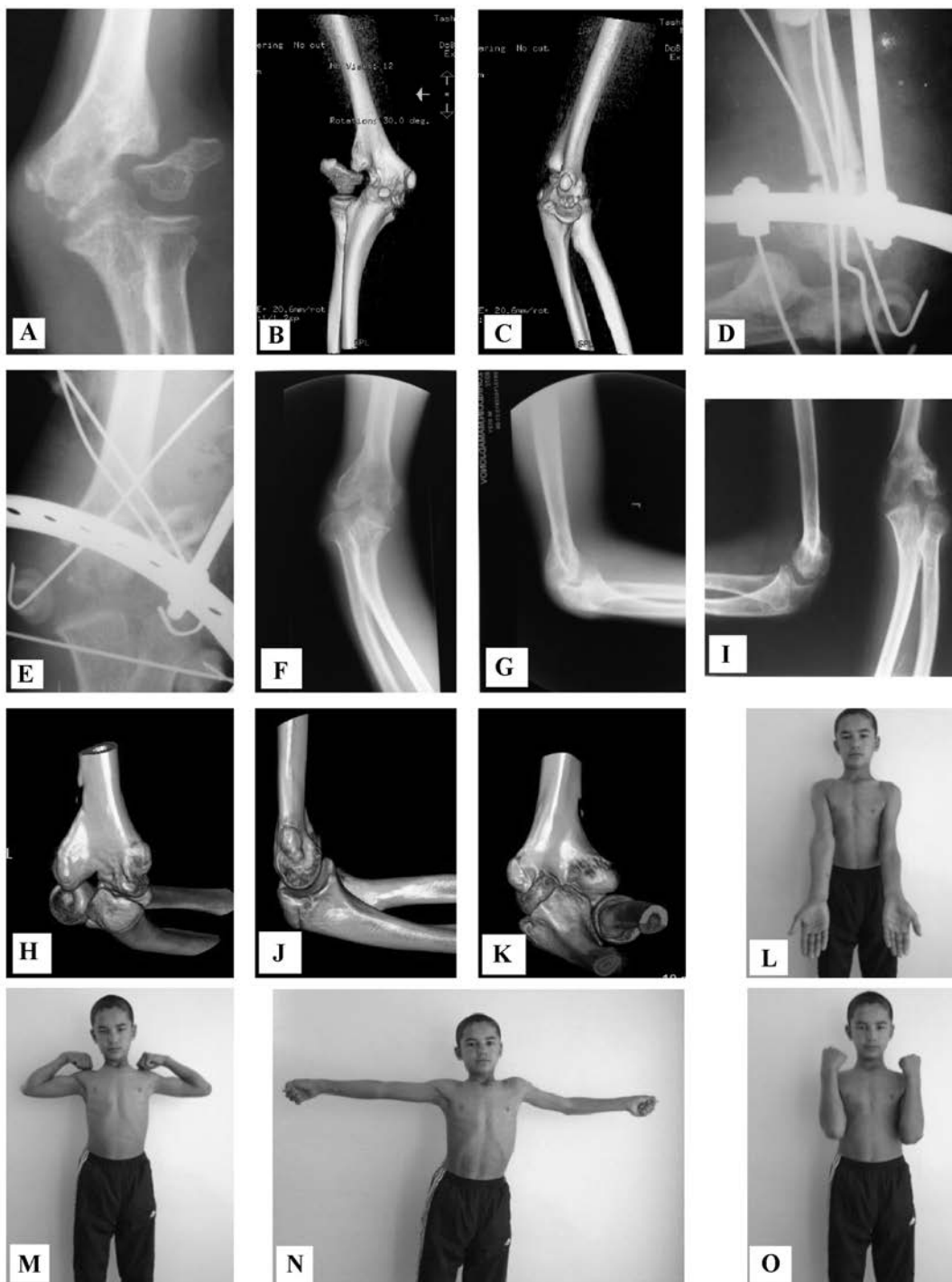
Fig. 1.

We study the remote postoperative results in terms till 10 years (table 2). For objective estimation of operative results and standardization of studying of the clinic-radiological founding, which defining the pathology necessary for comparison of treatment outcomes between literature data was applied the developed Yu. P. Soldatov and V. D. Makushin (1997) table with indicators of anatomic-functional signs of disease and an estimation of each sign in points: 14–21 — good result, 8–13 — satisfactory, 0–7 — unsatisfactory.

According to the table data in 59 patients the outcome results in 48 (81.3 %) cases were marked as good, in 9 (15.3 %) — satisfied, in 2 (3.4 %) — the unsatisfiedresult, so, preoperatively in this 18-year-old young man with a primary trauma of 12-year-old prescription the hypertrophy of a radius head was marked, postoperatively elbow joint flexion-extension contracture has developedbecause of an orthopedic mode infringement and default of the appointed physio-functional purposes.

Table 2. – Outcome results of treatment of patients

Age	Sex	Lateral condyle pseudoarthrosis of humerus with cubitus valgus									Total
		I type (n = 21)			II type (n = 9)			III type (n = 29)			
		good	Satisf	unsatisfied	good	Satisf	unsatisfied	good	Satisf	unsatisfied	
0–3	b	–	–	–	–	–	–	–	–	–	–
	g	–	–	–	–	–	–	–	–	–	–
3–7	b	4	1	–	–	–	–	2	1	1	9
	g	4	–	–	–	–	–	–	–	–	4
7–11	b	4	–	–	2	1	–	2	1	–	10
	g	1	–	–	–	–	–	5	1	–	7
11–15	b	6	–	–	2	1	–	7	1	1	18
	g	1	–	–	1	1	–	3	1	–	7
15–18	b	–	–	–	1	–	–	3	–	–	4
	g	–	–	–	–	–	–	–	–	–	–
Total		20	1	0	6	3	0	22	5	2	59

As shown by data 2nd table, that, good resultsconsiderably have been received in patients, whom were performed 1 and 3 type operative techniques. Because1 type operation was made in patients with little anatomical and functinal disfiguring of elbow joint and and without joint incompetence and with other side applied method for these patients was sufficient for joint malfunctionrecovery. Third type operation technique was traumatically, but due to the extend joint disfiguring and considerably distal joint elements dislocation that, it was necessary to apply such technique for repair as "T" shape reconstruction of distal part of humerus and fixation by Ilizarov's apparatus, that was reasonable method for correcting.

As has shown the retrospective analysis data, causes of nonunion occurrence were untimely diagnostics or wrong interpretation of data, omissions duringchoice of treatment tactics and to decrease of responsibility, infringement of an orthopedic regimen, especially inboys.

Inall patients the correction methods were chosen on three types of operation techniques due to severity level of deformation of elbow joint, prescription of the got trauma and age of the patients.

Thus, the lateral condyle pseudoarthrosis of humerus with the expressed aseptic necrosis of distal end anatomic structures of humerus only by operative treatment can prevent the heavy and great complications development in children (progressing cubitus valgus, late period an elbow nerve neuritis and others). Operative intervention should be to as much as possible sparing and differentiated approaches. For capitellum fragment allocation from adhesion it is necessary to aspire to keep communication of a fragment with tendomuscular supplied. Bone fragment fixing should be carried out by external fixing devices with preservation of an elbow joint function, the external immobilization is necessary for occurrence of full consolidation (6 weeks).

Conclusions

1. The lateral condyle pseudoarthrosis of humerus is an elbow joint composite pathology, which is met rather often and lead to early physical disability of children.

2. The differentiated tactical approach for a choice of operation type, considering deformation severity level, prescription of injury and age of the child allow improving the treatment results.

3. Developed and approved in our clinic the new surgical treatment technique allows to reach in one stage restoration of anatomy and promotes distal end of humerus formation and by that restores function of an elbow joint in children.

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Differentiated surgical tactics of the posttraumatic "complicated" cubitus varus in children

Abstract: Since 1998 to 2013 we have treated 222 children and teenagers at the Department of Children's Traumatology of Scientific Research Institute of Traumatology and Orthopedics under the Ministry of Health of the Republic of Uzbekistan with "complicated" varus deformations of elbow joint by application of the different types of osteotomy. For all children we observed a good function of the elbow joint with full range of motions. Our fixation method with the use of the Kirschner's wire and Ilizarov's apparatus with 2 rings was modified in order to increase stability and functionality of osteosynthesis. It gives the opportunity of anatomic functional recovery under correction of the varus deformation of the elbow joint of the children.

Keywords: cubitus varus, complication, children, osteotomy.

Introduction

Posttraumatic elbow joint deformation is the most widespread complication appearing after the transcondylar and supracondylar fractures of the children's humerus [1; 2].

The analysis of existing literature demonstrates the poor awareness on the high relevance of complicated varus deformations of the elbow joint accompanied with the elbow joint contracture, "supracondylar" syndrome and peripheral neurovascular modifications. Their treatment result is often unsatisfactory since correction is either insufficient or absolutely lost. Up to now there is no common view on the terms and size of correcting osteotomy in case of varus deformation posttraumatic with "supracondylar" syndrome of the children's and teenagers' elbow joint requiring surgical correction [2; 3].

Deformation is often limiting the elbow joint motions, but parents and children are frequently complaining only about cosmetic defect. Several types of surgical techniques, including wedge, rhomboid, trapezoid, dome-shaped and the other types of osteotomy have been described. A number of bone-holding units, including wires, bows, bolts, sheets, strands and allochtronic units of various designs have been applied [3; 4; 5].

Improvement of the results of posttraumatic varus deformations of the children's and teenagers' elbow joint through application of the cutting-edge research methods and development of differential approach to the surgical treatment is the **purpose** of our study.

Materials and methods

Since 1998 по 2011 we have treated 222 children with the varus deformation of elbow joint with application of the various types of osteotomy.

All visiting children with posttraumatic varus deformation of the elbow joint passed through the clinical, X-ray, densitometric, ultrasound (US), computer tomography (CT), MRT and functional methods of examination.

We used measuring the physiologic valgus axis on unaffected limb and the varus deformation of the elbow joint on deformed upper limb. Physiologic valgus on unaffected limb was considered as

the "positive" (+) and pathological varus deformation of the elbow joint — as the "negative" (–) one. Required extent of correction was calculated through summation of valgus angulation of unaffected side with the varus angulation of deformed side. We called this angle as the "angle difference" between unaffected and deformed upper limb. The angle difference is very important in correction of deformed limb, in particular, in evaluation of the late fate and comparison with unaffected limb.

Moreover, we suggested the term "supracondylar syndrome". In case of the varus deformation of the elbow joint the "supracondylar syndrome" means the following. In case of high-grade (over 30°) and complicated children's varus deformations of the elbow joint, the highly emerging and deformed lateral epicondylus of humerus and local osteoporosis in external epicondylus of humerus are identified and clinically it is evident as abnormality caused by the tension of lateral collateral ligament of the elbow joint. We called this combination of symptoms as the very "supracondylar syndrome". We have not found this symptom in domestic and foreign literature. Along with that, it is very important in surgical correction of this abnormality.

Besides, the varus deformation with flexion or extensive elbow joint contractures were found in the course of our study due to the anticurve or recurve deformation of the humerus distal edge. In such cases, specifically in case of recurve deformation of the humerus distal edge, first of all, the joint hyperextension appears, and later on — its instability. We had called the combination of these symptoms as "complicated" elbow joint varus deformation and our studies were also devoted to this abnormality.

The number of results of the X-ray examination of this cohort of patients was analyzed for identification of the reason of this syndrome.

We have developed and suggested evaluation criteria for the severity of the posttraumatic elbow joint varus deformation depending on deformation angle and clinical signs of the elbow joint deformation (The patent of RUz: DGU 01287 from 2007).

We used the new type of supracondylar correction osteotomy for correction of "supracondylar syndrome" in elbow joint varus

deformation with bone-holding with the decussated wires along with osteosynthesis with G. Ilizarov's apparatus.

Anatomic and functional correction of the elbow joint was the goal of operation. The full-scale X-ray filming of both upper limbs in position of full extension in the elbow joint and maximal forearm supination was completed before the planning of osteotomy type. Both upper limbs of all patients were measured for comparison of physiological valgus on unaffected side and varus deformation of affected limb.

Varus angulation correction. The skiagraph was reflecting the osteotomy scheme; humero-ulnar angle in deformed and unaffected elbow joints was calculated. The deformed side difference was put on paper from the X-ray film.

Based on the X-ray data, we have identified this syndrome appears in case of transcondylar humerus fractures with high-grade remaining dislocation with rotational component.

We split the patients by 3 (I–II–III deformation degree) depending on deformation angle, clinic and X-ray signs. First two groups (I–II deformation degree) of children had the "common" varus deformation. The third group of children had the elbow joint varus deformation with "supracondylar syndrome" and anti-curve and recurve multiplanar deformations of the humerus distal edge. They are determined as the groups of "complicated" elbow joint varus deformation.

87 children arrived from the district hospitals after the numerous attempts of the closed reduction during first two weeks after the trauma or after the poor manipulations of tabibs were included in the major group (III deformation degree). X-ray data analysis demonstrated this syndrome had appeared in case of transcondylar humerus fractures with high-grade remaining dislocation with rotational component.

Given the above classification, we launched the search of the optimal treatment options and differential approach to the surgical treatment of this cohort of patients for correction of the various types of the elbow joint varus deformation.

The supracondylar correction osteotomy with consistently functioning osteosynthesis in Ilizarov's apparatus was developed and introduced in our clinic. Developed method is as follows: the humerus distal metaphysic is opened subperiosteally with posterolateral cut in the lower third of the arm with the length of 5–7 cm., layer-by-layer without separation but with moving away of the triceps muscle of arm. Then, the correction angle is identified via the awl and the holes are made with the burr. After that, the holes are connected with the help of chisel and correction osteotomy is accomplished in the frontal plane in form of triangular — cone osteotomy.

Osteotomy in order to correct the antero-posterior and lateral deformations and creation of physiological anticurve of the humerus distal edge is carried out as the second stage. For this purpose, the osteotomy in sagital plane is made through the marginal osteotomy of anterior walls of the humerus distal edge cortical layer.

After correction of all types of deformation in two planes and bone fragment reposition they are fixed with two crossed Kirschner's wires with stop surface. The stitches are put layer-by-layer on the wound. In order to put the Ilizarov's apparatus, the third wire is put through the olecranon bed of ulnar bone and the last, forth wire — through the mid-upper third of ulnar bone in the frontal plane. The Ilizarov's apparatus is assembled from 2 semi-rings, and two supporting arms with the wire holders are fixed on the ring. After this apparatus assembling, compression through the tension of upper ends of both wires is carried out and counter-collateral compression is created.

Results and their discussion

The results were evaluated both in clinical and X-ray terms with the use of developed by us criteria. The clinic criteria included extent of motions after the operation and availability of complications. The X-ray criteria included the volume of the varus deformation correction (post-operational humero-ulnar angle) and lateral eminence availability.

Clinic example

Patient S. 13 years old, Med. Rec. #250. Was admitted with complaints about deformation and restriction of the left elbow joint flexion. From anamnesis: the patient was injured 4 years ago and treated with the plaster bandage with diagnosis: closed transcondylar fracture of the left humerus with the bone fragment deflection.

After the plaster bandage removal some deformation was identified along with extension and flexion contracture in the elbow joint. Locally: the high-grade varus deformation of the elbow joint is identified on examination (–48°), physiological valgus on unaffected limb (+4), "Angle Difference" is equal to 52 degrees. The flexion of elbow is equal to 50° (fig. 1 в), the elbow extension — 165° (fig. 1 d), extent of motion — 115. The operation was done — Supracondylar Correction Osteotomy of the left humerus according to the clinic method along with osteosynthesis with Ilizarov's apparatus from 2 semi-rings. During postoperative period, the humero-ulnar angle approached the unaffected limb indicators (–4 degrees). The angle difference was equal to 0 degree. Diaphysial — glanular angle in sagital plane was equal to 42 degrees (on unaffected side — 42).

On the final examination in the mid terms 16 months (from 12 to 36 months) after operation, the results with 187 children from 222 (84.2 %) were considered as excellent, and with 35 (15.8 %) — as good ones. All osteotomies grew back together within 3–4 weeks after operation. The mean value of postoperative humero-ulnar angle of deformed elbow joint accounted for –4.5° (from +2 to –11). The mean humero-ulnar angle on unaffected side accounted for -9^0 (from –2 to –16°) of physiological valgus.

In our studies we compared our methodology with the other types of osteotomy in cosmetic terms. Several types of supracondylar osteotomy were applied in the clinic for correction of this type of deformation. The cone osteotomy in line with Bairov's method + osteosynthesis with Ilizarov's apparatus was applied for 19 (8.6 %) children and teenagers, rhomboid osteotomy — for 21 (9.5 %), trapezoidal osteotomy — for 29 (13 %), supracondylar osteotomy in line with Gulyamov's method — for 66 (29.8 %) and proposed correction supracondylar osteotomy — for 87 (39.1 %) children and teenagers.

We believe proposed methodology has the number of advantages against the other types of osteotomy:

– Osteotomy is carried out in supracondylar area and does not cause restriction of the motions in the elbow joint;
– this correction osteotomy enables single-step elimination of all types of deformation of the humerus distal edge;
– proposed methodology ensures good cosmetic and functional treatment results;
– This type of supracondylar osteotomy can be applied for "complicated" varus deformation with "supracondylar" syndrome and recurve, anticurve multiplanar deformations of the humerus distal edge and the elbow joint contractures;
– application of Ilizarov's apparatus ensures better fragment fixation and stability and provides opportunity of early joint development.
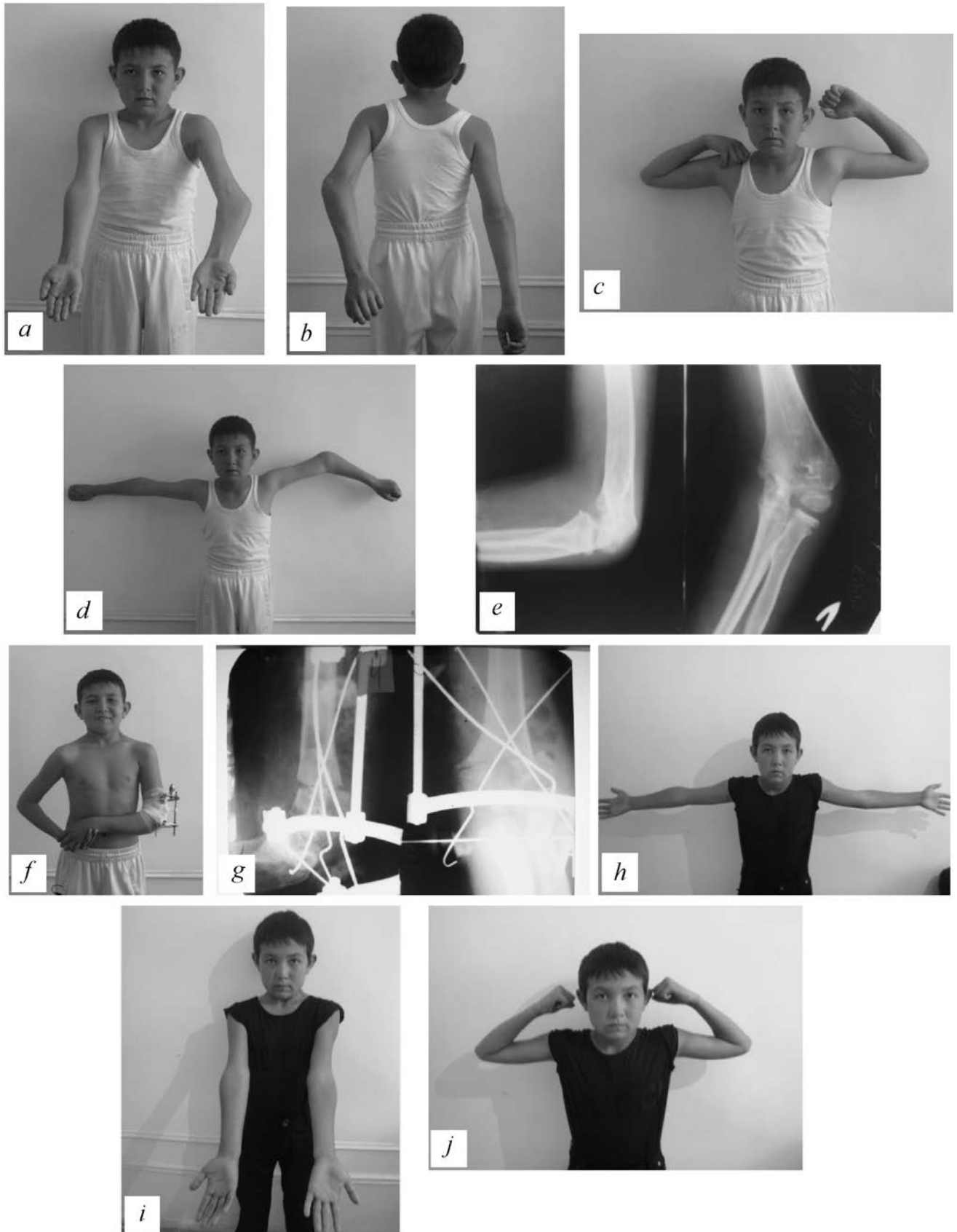
Fig. 1.

In the course of the treatment result analysis, the humero-ulnar angle, in average, was equal to −19° (from −46 to −8) before operation, in the postoperative period it accounted for −3.5° (from +2 to −9). After correction no one child had external epicondylus eminence exceeding 5 mm. and not one patient had restriction of motions in the elbow joint. Benchmarking assessment of immediate results and the late fate of the surgical treatment of 222 patients — children and teenagers has demonstrated that proposed methodology is the most efficient one in case of "complicated" varus deformation of the children's elbow joint, both in anatomic functional and cosmetic terms. Examination of 194 (87.4 %) in 3–6 months enabled clinical detection of the lack of the elbow joint deformation, and during 2–5 years the

axis of the upper limb remained correct and the elbow joint function remained to the full extent. The excellent results were obtained with 187 (84.2 %) and good ones — with 35 (15.8 %) children.

Therefore, the objective assessment of the results of the treatment of children with the posttraumatic varus deformation of the elbow joint makes it possible to conclude that differential approach to selection of operative treatment method of various types of the elbow joint varus deformation should consider all components of deflection causing deformation.

Conclusions

1. Application of differential surgical techniques of the treatment of the children's elbow joint varus deformation depending on deformation severity can enable obtaining excellent and good results.
2. Developed methodology of the surgical treatment of the children's elbow joint varus deformation is the optimal one and provides good anatomic functional and cosmetic results.

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Features of hearing impairment in children with perinatal pathology of the central nervous system

Abstract: The analysis of hearing loss in 58 children with perinatal CNS. The correlation of peripheral sensorineural disorders and degree of hemodynamic disorders in vertebrate arteries. The results showed a significant increase in the severity of peripheral hearing loss with increasing severity of the ground state from light to heavy.

Keywords: sensorineural hearing loss, perinatal CNS damage, audiologic examination.

Sensorineural hearing loss — a form of hearing loss, which affects any of the sections of the auditory analyzer sound-card, from the sensory cells of the inner ear, and ending with the cortical representation in the temporal lobe of the cerebral cortex. It is known that one of the risk factors for cerebral hemodynamic disorders of the inner ear and is hypoxia. Most often it develops in the background of preeclampsia and chronic placental insufficiency, which, in turn, are the result of gynecological, extragenital pathology and intrauterine infection [1, 575 –578; 9, 82–85; 10, 48–50; 11, 79–80].

Most often preeclampsia develops on the background of pyelonephritis (74 %), hypertension (44 %), obesity and endocrinopathies (85 %). Preeclampsia is marked on the background of anemia in 2–3 times more often than in women with normal level of hemoglobin [8, 59]. All these factors lead to the development antenatal acute intrapartum hypoxia and asphyxia [2, 1605 –1615; 3, 571–576; 4, 84–87]. Severe toxic and hypoxic conditions, in turn, influence the circulation of the inner ear. The nature and degree of damage to the auditory system are directly depending on the severity and characteristics of lesions of the central nervous system [5, 12–16; 6, 54–57; 7, 53–55].

When cerebral disorders, not all neurons are not all areas are undergoing the same pathological disorders. Extremely vulnerable region parietal-temporal-occipital joint, which is the area of the adjacent circulation karotid and vertebro-basilar pools. The deterioration of blood supply leads to tissue ischemia of the brain, and in severe cases may develop necrosis and gliosis (brain destruction). The main damaging factor in the newborn, leading to brain damage, a perinatal hypoxia and intrapartum asphyxia.

Purpose of the study

Provide clinical and functional characteristics of the auditory sensory disorders and to develop an diagnostic algorithm in children with perinatal pathology of the central nervous system.

Material and methods

The work was carried out on the basis of the ENT clinic 2nd clinic TMA from 2011 to 2014. 58 children were examined to achieve this goal we were born with signs of hypoxia. The children were divided into groups according to the degree of hypoxia severity (mild, moderate and severe) — 14, 16, 28 people, respectively. For comparison, a control group was recruited children — 20 people. The age of patients ranged from 1year to 4 years of life. Therefore,

for clarity, the severity of hearing loss was conducted a comparative assessment of the development of children born in the hypoxic conditions of varying severity and children in the control group.

The study of auditory function was examined on the device "Neuro-Audio" Company Neurosoft (Russia) TEOAE two classes: transient evoked otoacoustic emission (TEOAE) and emission at the frequency distortion product (DPOAE).

As a technique, objectified state of cerebral blood flow, using ultrasound imaging of the arteries of the brain base, basal veins, vertebral and basilar arteries, the extracranial segments of the common and internal carotid arteries. Transcranial Doppler lerografiyu performed using apparatus Acusón/28 XP-4 (US) line sensor L7 with the frequency of the radiation of 10.0 and 7.0 MHz. We evaluated the following parameters: systolic, diastolic and mean blood flow velocity; resistance index (RI), which is determined by the tone pialno- capillary vasculature, blood viscosity and the value of intracranial pressure.

Results of the study

Common to both groups were complaints about sleep disturbances and behavioral-cal disorders. They were observed in 52 % and 24 %, respectively, and the main control groups. In addition to these complaints, the parents of children of the main group complained of speech disorders, hearing loss and neurodevelopmental disability.

Active complaints of speech disorders in children after a year of instituting the parents, only 6 % of patients, however, when viewed from the formation of pre-speech development disorders has revealed 69 % of people, which was manifested as a delay of speech formation and phonemic disorders. These abnormalities were observed in all patients with severe manifestations of hypoxia — 100 %, somewhat less — the children born in a state of moderate severity, — 75 % ($p < 0.05$) and 2 times less often — in patients that determined signs of mild hypoxia 42 % ($p < 0.01$).

The structure of complaints of hearing loss or lack of volatility of auditory responses was observed in 44 % and 17 %, and 13 % noted a reaction hyperacusis. The lag in motor development was observed in 80 % of children that was to the delay of the timing self-holding head, sitting, standing, walking. In 45 % of the children were observed structurally unstable moderate lag pace of physical development. 40 % identified a pronounced lag in motor development, of which 32 % — with signs of severe hypoxia: the children on their own are not sitting, the article-supporting functions were missing. 13 % of children born in the moderate and severe conditions, had complaints of choking when feeding, and seizures.

Neurological status of each child was evaluated only once, when referring to the reception. Hypertension-hydrocephalic syndrome was significantly more common in the patients who had moderate to severe hypoxia, 80 % and 100 % compared with patients who had mild hypoxic condition of 46 % ($p < 0.05$, $p < 0.01$), indicating that high-level and depth of defeat of cortical-subcortical structures and their relations.

All patients who were born in hypoxic conditions occurred irritation syndrome of the peripheral auditory analyzer, manifested startle reaction in 23 %, a decrease of (lack of) these reactions at 62 % in the determination of hearing function in free field conditions, including volatility of auditory responses revealed 17 %, no — 49 %.

In all 3 subgroups of the main group had about the same number of patients, determine the response gipakuzii 65 %, 70 % and 60 %, respectively severity posthypoxic states ($p > 0.05$), increasing the proportion of patients seen against this background that revealed deep hearing impairment (anacusia) with increasing severity of the ground state. These disorders are 2 times more often detected in subgroups of children with moderate and severe condition of 81 %

and 82 %, compared with patients who had lung manifestation post-hypoxic 44 %. In the course of the electrophysiological examination of the children in the control group showed no abnormalities.

According to Doppler ultrasound haemodynamic-violation in the vertebrobasilar basin in the extracranial level within physiological limits showed 35 %, of which 12 %, 9 % and 16 %, respectively 3rd degrees of hypoxic conditions. The asymmetry in excess of the physiological determined in 36 child (62 %).

Audiology methods of research have shown that children in the control group were observed deviations in the survey of hearing function. In all patients had normal type tympanograms (A); 29 children identified the absence of acoustic reflexes stirrup muscles with 1 or 2 sides, indicating the deep peripheral sensorineural disorders.

Of the 58 patients who were born in hypoxic conditions, in 39 children (67 %) revealed peripheral neurosensory disorders of varying severity, which was accompanied by an increase in the sensitivity of the auditory thresholds. Only in 2 (3 %) patients showed unilateral hearing loss, in 37 (64 %) were determined by bilateral sensorineural disorders, including patients who were born respectively 3rd degrees of hypoxic conditions were 9 (16 %), 12 (21 %) and 13 (22 %) patients. These hemodynamic changes were combined in 13 patients (22 %) from 2-sided vasoconstriction of the vertebral arteries, deepening under compression samples. Hemodynamic disturbances in the basin of the vertebral arteries and intracranial remained level for all children, which revealed the asymmetry of more than physiological.

In 5 (9 %) and 3 (5 %) patients who were born in hypoxia light and medium severe, defined body toning middle cerebral artery; 6 (11 %) patients who were born in mild hypoxia and 13 people (22 %) with signs of moderate to severe hypoxia determined reduction of blood flow in the middle cerebral artery (right localization was 4 people, a left — 9 people).

Sensorineural disorders of I degree detected in 2 (3 %) people, these children were born in hypoxia mild to moderate degrees; I–II level — 8 (14 %) patients; Grade-II–III in 23 (40 %) patients; hearing loss Grade III–IV were detected in 13 (23 %) patients. Mostly right-sided localization process was observed in 22 people (37 %), left-handed — in 13 patients (23 %), even snizhenie hearing with 2 sides was noted in 3 (5 %).

Thus, it drew the attention of not only the prevalence of profound sensorineural disorders (63 %) of the structurally unstable (17 %), but also the growth of the severity of peripheral sensorineural disorders with increasing degree of the ground state of severity (deep hearing loss detected in 23 (39 %) children born in the moderate and severe conditions and in 5 (8 %) patients, is easy to identify posthypoxic condition at birth). The distribution of peripheral sensorineural disorders in 3 subgroups of patients undergoing hypoxic conditions varying degrees, is shown in Fig. 1.
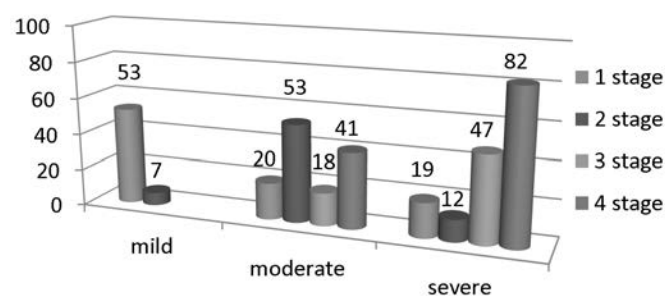
Fig. 1. Distribution of peripheral sensorineural disorders in 3 subgroups of patients undergoing hypoxic conditions varying degrees

It was marked by significant increase of the peripheral extent of hearing loss severity with increasing severity of the ground state from light to heavy. At the same time in the comparison of subgroups with moderate and severe hypoxia progresirovanii significant differences in the degree of peripheral sensorineural disorders with increasing severity.

Conclusions:

1. Identified archaeological violation confirm the role of cerebro-vascular factor and indicate chronic vertebra-basilar vascular insufficiency in patients undergoing hypoxic conditions varying degrees. The state of cerebral hemodynamics of compensation depends on the degree of hearing impairment.

2. The severity of peripheral sensorineural disorders is proportional to the degree of hemodynamic disorders in the system make it possible-night arteries.

3. The algorithm of diagnostics sensorineural disorders in children with perinatal pathology should be built based on you-revealed neurological and auditory abnormalities at early stages of development.

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Abdominoplastics of postoperative ventral hernia in patients with obesity of III–IV degree

Abstract: From 2008 till 2015 years in surgical departments 1st and 2nd clinic of Samarkand Medical Institute were operated 208 patients with postoperative ventral hernia of abdominoanterior walls. Important factors identifying surgical tactic is localization of hernia, size defect and presence of relapsing in amnesia. Abdominoplastic is not only cosmetic operation in patients suffering from obesity on excessive fat of deposit of abdominal wall, but also presence of postoperative ventral hernia–technical surgery using, allowing to improve results of hernioplastics. The treatment of patients with obesity must be complex and individual as estimation initial condition of patient such on choice treatment method, so far as in problem such operation enters not only weight loss of mass body but also normalization of metabolic process.

Keywords: Hernioalloplastics, dermotolipidectomy, Abdominoplastics.

Introduction

Postoperative Hernioplastics of ventral hernia (PHVH) with abdominoplastics remains one of the spreading operatic interference of surgery in patients with expressive obesity of skin-fatty lining [4]. The main cause influencing on the process of formation hernia serves in patients accompanying pathology on the form of disturbances of exchange fat. In now a days abdominoplastics as independent operation is enough spreading in plastic surgery and has esthetic and cosmetic meanings [5]. Wide mobilization skin-fatty patches allows to estimate the condition of tissue around defect of aponeurosis, identify additional hernia gate and weak area [1; 4]. Using abdominoplastic in patients with postoperative of ventral hernia and obesity improving current postoperative period, decrease the number of complication and gives better near and further results [3]. Removing significant number of obesity tissue in the area of abdomen is prophylaxis recurrence of postoperative hernia. In measure restoring of integrity aponeurosis, recovery outline figure creates relational comfort without reversal main cause of obesity [5]. The main advantages abdominoplastic is [2]: capability of removing large fatty mass with excessive saggy skin patch, expanded, tough postoperative scar; possibility performing abdominoplastic in epigastric area with creating muscle-aponeurosis corset on significant decreasing circumference of waist in ten centimeter (on other types of abdominoplastic occurs significant excessive of skin in epigastric area which keeps even on imposition of additional deep raphe.

Materials and methods

From 2008 till 2015 years in surgical departments 1st and 2nd clinic of Samarkand Medical Institute were operated 208 patients with postoperative ventral hernia of abdominoanterior walls. Important factors identifying surgical tactic is localization of hernia, size defect and presence of relapsing in amnesia. According to classification of Chervel J. P. and Rath A. M. (1999) [5] in 67 (32.2 %) patients were large (W_3) and giant (W_4) hernia. In overwhelming majority patients (148 — 71.2 %) were under umbilical (M_1) and around umbilical (M_2) hernia. The least number of patients were ventral lateral hernia (L) and associated (M + L) location. From 208 patients in 172 (82.7 %) were initial (R_0) and in 36 (17.3 %) patients relapsing (R_n) hernia. In 152 patients accompanied obesity in several stages. 73 of them patients in the age from 27 to 68 years suffered of obesity III–IV stages and presence of manifestation dermato-fatty lining. From them 69 were women and 3 were men gender. All the patients were carried out anthropometry, including the measure of height, mass of body, computation index of body mass (IBM). Standard criteria for determine obesity — (IBM). IBM identifies in formula: weight divides in quadrate of height: 20–26 — healthy; 26–28 — increasing nutrition; 28–31 — obesity of I stage; 31–36 — obesity of II stage; 36–41 — obesity of III stage; More than 41 — obesity of IV stage. The patients were separated in two groups. The control group consisted of 29 patients with obesity III–IV stages, they were performed hernia section with plastic autogenous tissue and performed complex operative treatment, including hernia section with abdominoplastic. Carried out general clinic, biochemical examinations, measuring intraabdominal pressure before and after operation. Among 73 (35.1 %) patients with obesity III–IV in 61 (83.6 %) had extensions down of abdomen form, in 7 (9.6 %) — ovoid shape form and in 5 (6.8 %) — extension of upper abdomen form. Receiving presented allowed to choose optimal operative approach on hernioplastic and abdominoplastic. Electrocardiography and Ultrasound examinations of organs abdominal cavity performed to all 152 patients. Operative treatment of control group patients included of plastic hernia defect of autogenous tissue and prosthesis of material indication. On prosthesis plastic transplant fixed according to method of onlay, inlay and sublay. In necessities with aim of increasing capacity of abdominal cavity for prevention of development the syndrome of few abdomen and respiratory failure, the plastic of pre-abdominal walls performed in combination method — in supplementary mobilization of vaginal straight abdomen muscle. The stage of hernia section in patients of main and control group did not distinguished. Particularities of operative treatment in main group patients was included in combination abdominoplastic. The stage of prosthesis hernioplastic with combination of abdominoplastic included the following: After manipulation of operating field on the skin of pre-abdominal walls inserted the picture of type "Anchor" (cutting on Fleisch), enclosing hernia pulsion, old postoperative scar and dermo-fatty ruga. After cutting the skin and hypodermatic fatty layer till aponeurosis of excessive ruga on picture removed and discharged hernia sac. The edge of dermo-fatty patches widely steamed into and out. Prosthesis of hernia defect refers on indications. After completing hernioplatic with abdominoplastic in patients on aponeurosis retained drainage of perforated tube on Redone. The edge of skin wound combined on the way of reasonably traction down and middle line. Horizontal portion of cutting skin sewed in a single raphe, cutting on the middle of line –internal skin raphes. Combining connected three skin patches, triangular portion of skin on under bosom sewed internal skin, free ends of ligature lead out under the skin of lateral portion and ligatured without pulling. This reception allowed to avoid necrosis of triangular patches. Administrated an early rising, respiratory gymnastics, anticoagulants and physiotherapy. Removed of drainage tube on the period from 2 to 8 days on observing USD in dynamics. The results and discussing: Altogether, among the examinations (n = 208) spreading obesity in various degree consisted 73.1 % (n = 152). On this III–IV stages obesity (IBM from 36 till 60.9) had 35.1 % (n = 73). There were detected growing of the rate obesity in the ages. The part of the obesity made up 35.1 % in women younger than 45 years, 56.3 % in patients on the age from 45 to 55 years and in women older age 80.3 %. Estimation of effectiveness results treatment of patients in discussing group in the quality of main criteria used of indication rate in hernia recurrence of pulsion, character and gravity of occurring complications. In dynamic examination separate anthropometric indication: mass of body (MB, kg.), index of body mass (IBM, kg/m^2). Also investigated the dynamic of intraabdominal pressure (IAP, mm. rt. st.), laboratory results, current concomitant pathology and the level of life quality. From 73 treated patients one case (3.4 %) finished by fatality result in control group. The cause of death was acute cardiovascular failure. Postoperative period in patients of control groups observed on 9 complications (31.0 %) (infiltrate in 3, hematoma in 2, seroma in 2, lymphorrhea in 1 and purulence of wound in 1 patient). Bronchopulmonary complication observed in 7 patients, phenomena of heart failure in 5 patients, the last manifestation was in low indication of arterial pressure, acceleration of pulse, dyspnoea. The last complication obviated simultaneously with pulmonologist and cardioresuscitator. In main group complications were in 4 patients (9.1 %). (purulence of postoperative wound in 1 patients, infiltrate in the area of postoperative wound in 2, necrosis of edge skin patches in 1 patients. Bronchopulmonary complications observed in 2, heart failure in 1 patients of age 66 years suffering from postinfarction cardiosclerosis. Thus a majority number of complication observed in patients of control group. A few number of cardio-pulmonary and local complications of postoperative were marked in main group patients. On dynamic observations of control

group patients the indication of body mass and relative indication of IBM, important changes did not undergo. In patients of control group on dynamic observation, indication, characterized degree of abdomen obesity important changes did not undergo. According to the IBM of patients in main group the indication of abdominal obesity carried out in global changes. This positive said on the further vital perspectives, as far as exactly abdominal type of spreading fatty tissue, in most degree associated with a high risk of cardio-vascular disease and diabetes mellitus II-type, undergo essential changes. On research level of glycemia in control group patients important changes were not detected. After 1 year of postoperative diabetes mellitus II type was detected again in 3 patients and total number such patients consisted of 12 (16.4 %). In patients of main group on research level of glycemia were marked reliable decreasing indication after carrying out treatment. Exceeding level of glucose in blood was 6.1 mmol/l in patients main group did not detected. In both groups initially 54 persons (73.9 %) had arterial hypertension of different degree. On dynamical observed in further kept higher number AD, with tendency of transition in more severe degree of arterial hypertension. In patients of main group were detected decreasing higher number of AD, with tendency of transition in more mild degree of arterial hypertension. In both group patients on the stage of treatment, in dynamic measured the level of intraabdominal pressure. Proceeding from receiving results were detected well-formed changes of indication intrarabdominal pressure on the side of their increasing on stages of operation associated dipping hernia content and hernioplastics. Performing combination methods with mobilization straight muscle on Ramirez, using 12 patients of control group and 10 patients of main group, who get enlarge capacity of abdominal cavity, allowed to avoid increasing of intrabdominal pressure. The results of analysis research which estimated the indication of quality of life in patients of both group, with the help of inquirer did not stated appreciable differ between the condition before operation in main and control groups. In main group patients, postoperative after 3 months were detected improvement the quality of life on all component of research.

Conclusions

Abdominoplastic is not only cosmetic operation in patients suffering from obesity on excessive fat of deposit of abdominal wall, but also presence of postoperative ventral hernia – technical surgery using, allowing to improve results of hernioplastics. The treatment of patients with obesity must be complex and individual as estimation initial condition of patient such on choice treatment method, so far as in problem such operation enters not only weight loss of mass body but also normalization of metabolic process. Hernioplastics with abdominoplastics in patients postoperative ventral hernia anterior abdominal cavity suffering from obesity III–IV degree, performing after careful pre-operative preparation as rule improves the quality of life of patients and gives adequate cosmetic effect. Combination of herniological operation with abdominoplastic corrective form of body and removable esthetic inconvenience, brings in large deposit in psychological and social rehabilitation patients obesity and is good stimulus for elaborated motivation in decreasing body mass.

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Criteria's of choice method in surgical treatment of patients ventral hernia with concomitant obesity

Abstract: The work based on result analysis in 208 hernioplastics patients postoperative recurrence and primarily ventral hernia suffering from obesity. The patients were divided in two groups: control and main group. The patients of control group carried out classical hernoiplastics of local tissue and prosthesis materials according to indication. In main group patients

performed hernioplastics with using reticulate implants with additional DLE. In majority patients postoperative kept normal function of abdominal cavity organs, abdominal complication observed only in 13.3 % patients in control and 7.3 % patients in the main group.

Keywords: Hernia, hernioalloplastics, obesity, dermotolipidectomy.

Introduction

Despite on dynamic development of medical science the treatment problem of ventral hernia remains actual. The growth incidence of ventral hernia maintains in main due to postoperative ventral hernia, their number after performing laparotomy consists on various facts from 10 to 15 % [1; 4]. Combination of anterior abdominal wall hernia with disturbances correct proportion of anterior abdominal walls and trunk, occurring result over spraining muscle and enlarging the thickness of derma-fatty folds abdomen said negatively on the results of hernioplastics [6]. Hypernormal deposit of fatty tissue on anterior abdominal walls associated with derma-fatty lining except causing esthetic inconvenient is the cause occurring functional disturbance with a side of gastrointestinal tract, cardiovascular system, respiratory organs. Under flabby folds as rule appears stabile diaper rash. Creates also circumstances for developing congestive appearance in lower extremity and varicose of distension vein. All these changes lead to restriction labor ability of patients, that allows to consider of plastic anterior abdominal wall as operation directed on correction not only esthetic deformation but also functional disturbances [2; 4]. That's why actual and even necessary supplement of hernioplastics dermatolipectomy (DLE) directed on restoration morphological condition of abdominal walls, preceding that changes which occurred in the results of pregnancy undergo interference, long hernia carrier, obesity [5].

Materials and methods

From 2008 till 2015 years in surgical departments 1st and 2nd clinic of Samarkand Medical Institute were operated 208 patients with postoperative ventral hernia. The patients were divided in two groups: control group (98 — 47.1 %) and main group (110 — 52.9 %) patients. The patients of control group carried out classical hernioplastics of local tissue and prosthesis materials due to indication. In the main group patients performed hernioplastics in using reticulated implants with additional DLE. From 208 patients were men — 44 (21.1 %), women — 164 (78.9 %). Distribution on ages: before 45 age — 66 (31.7 %), 46–59 ages — 108 (51.9 %), 60–74 ages — 30 (14.4 %), 75–90 ages — 4 (1.9 %). All patients admitted in surgical inpatients in ordered plan were examined in outpatient condition. Criteria of prepared patients in operatic surgery were absence of concomitant pathology or resistant its compensation. Important factors identification of surgical tactics are localization of hernia, size defect and presence of recidivism in amnesia. According to classification of Chervel J. P. and Rath A. M. (1999) [3] in 67 (32.2 %) patients were a large (W_3) and giant (W_4) hernia. In depressive majority patients (148 — 71.2 %) were under umbilical (M_1) and around umbilical (M_2) hernia. A few number of patients were ventral hernia of lateral (L) and combined (M + L) location. From 208 patients 172 (82.7 %) were initial (R_0) and 36 (17.3 %) patients recidivism (R_n) hernia. All patients carried out general clinic, biochemical examinations. Measuring intraabdominal pressure before and after operation. Electrocardiography and ultrasound examination of abdominal cavity performed all 208 patients. Echocardiography carried out on indication suffering ischemic heart diseases. In patients of control group depended on localization and size of hernia defect carried out hernioplastics of local tissue and materials. On prosthesis plastics transplant fixed due to the method of "onlay". In necessity aimed enlarging volume of abdominal cavity for warning development of abdominal compartment syndrome, plastic of anterior abdominal walls performed unstrained methods imposition reticule on aponeurosis without its sewing, and also combination method — of additional mobilization vaginal straight abdominal muscle due to Ramirez (table 1).

Table 1. – The types of hernioplatics in control group

Type of operation	n	%
Stretching method of plastics		
Autoplastics	64	65.3 %
Implantation of prosthesis due to "onlay" in sewing defect	21	21.4
Unstretching methods		
Implantation of prosthesis due to "onlay" without sewing defect	6	6.1
Combination method		
Reconstruction of abdominal wall due to Ramirez in using meshes	7	7.1
Total	98	100

In main group cutting skin carried out on hernia pulsion. Then subcutaneously–fatty cellular widely cultivated before aponeurosis around hernia sac. After this carried out manipulation of hernia sac, plastic hernia defects, removal diastasis of straight abdominal muscle. All patients of control group used reticulated implant. Prophylactic syndrome of small abdomen and respiratory failure on indication performed unstrained hernioplastic without sewing aponeurosis or reconstruction of abdominal wall according to Ramirez (tab. 2). After completing plastic of anterior abdominal wall performed DLE due to line of previously carrying on anterior abdominal wall before operation which enclosed hernia pulsion, old postoperative scar and derma-fatty folds. All excessive derma-fatty patch consisted of 4 to 12 kg.

After completed of hernioplastics all patients of control and main groups on aponeurosis remained drainage perforation tube, free endings which lead to lower horizontal cutting and fixed in skin and drained according to Redone. The patients of the main group aimed preventing wound complication on prosthesis during operation wished for liquidation of spreading which possible accumulation of liquids. Recommended setting drainage not always effective and often accompaniment separating from wound during long period. And also drainage is foreign body that can be promote exudation on long supplies increasing the risk of infectious. Complication. For them on sewing wound used vertical P-form raphe with wide seizure subcutaneously fatty tissue and with obligated attachment in prosthesis and deep wound [6]. Postoperative period in patients of both group administrated banding anterior of abdominal wall, antibiotic prophylaxis, early awaking, respiratory gymnastics, anticoagulants, physiotherapy. Drainage tube removed in period from 2 and 8 days under observation USD in dynamics.

Table 2. – The type of hernioplastics in main group

Type of operation	n	%
Stretching method of plastics		
Implantation of prosthesis due to "onlay" in sewing defect + DLE	68	61.8
Unstretching methods		
Implantation of prosthesis due to "onlay" without sewing defect	27	24.6
Combination method		
Reconstruction of abdominal wall due to Ramirez in using meshes	15	13.6
Total	110	100

Results and their discussing

In both group patients on treatment stages the dynamic of measured level of intraabdominal pressure. Proceeding from d 7 receiving results were detected regular changes of indication of intraabdominal pressure on side of their increasing stages of operation associated with dipping hernia content and hernioplastics. Performing loose hernioplastics and combinations method with mobilization of straight muscle due to Ramirez, used in 7 patients of control groups and 15 patients of main group which reached enlarging capacity of abdominal cavity allowed to avoid increasing of intraabdominal pressure. In majority patients of postoperative kept normal the function of GIT, only in 7 patients in control and 4 patients in main group undergo hernioplast according to giant ventral hernia marked paresis of intestinal, relieving medicamentally. In 6 patients of control group and 4 patients of main group observed retention of urine. In control group of brochopulmonary complication observed in 8 patients, phenomena of heart failure in 6 patients, the last manifestation of low arterial pressure of indication, acceleration of pulse, dyspnoea, and two cases (0.96 %) of total number patients completed mortality. In the main group of extraabdominal complication observed in 4 patients, heart failure in 1 patients in the age 59 years suffering from postinfart of cardiosclerosis. Wound complication in postoperative period in control group observed in 10 patients. In main group complication were in 9 patients. Thus a majority number of early complication observed in patients of control group. A few number of cardio-pulmonary and local complication of postoperative marked in the main group. Long-term period of postoperative intervention from 98 patients of control groups observed in 67 (68.4 %), but from 110 patients of main group observed in 89 (80.9 %) in the period from 1 to 3 years. On this control group recidivism of hernia observed in 6 (8.9 %) cases, but in the main group recidivism were not observed. In dynamic observation of patients control group the indication mass of body the appreciable

changes were not undergo. In patients of main group the indication of abdominal obesity undergo global changes. This positive said that the further vital perspective of exactly in abdominal type of spreading fatty tissue, majority degree associated in higher risk of cardiovascular diseases and diabetes mellitus of 2nd type, undergo of appreciable changes. On research level of leukemia in patients of control group appreciable changes were not detected. In patients of main group on research level of leukemia marked reliable decreasing of indication after carrying out treatment. Increasing level of glucose in blood 6.1 mmol/l in patients of main group were not detected. In both groups initially 108 persons (51.9 %) had arterial hypertension of various degree. The analysis of research results which estimated of indication quality of life in patients of main group through 3 months postoperative marked improving of quality life in all components of research. Thus on performing hernioplastics the rate of postoperative complication significantly higher than using DLE. Giving matter had principle important as modern characteristics of patients in group using lipoabdominoplastics having appreciable benefit as due to objective such as subjective indication for patients.

Conclusions

The particularity of clinic current in patients with ventral and obesity are availability of concomitant pathology that requires separately preoperative preparation. In the results using dermatolipidectomy succeeded to decrease the number of complication in near and further postoperative period. Early complication decreased on 10.2 % to 8.2 % on the side organs of cardiovascular system — from 69.1 % till 60.1 %. Recidivism of disease and mortality result were not detected. Hernioplastics and dermolipidectomy allow to dispose of patients not only from physical suffering and inconvenience associated with them but also from condition of psychological discomfort returning them full-value life, contraction the period of socio-occupational rehabilitation.

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Plastic surgery of persistent and extensive defects of the anterior wall of the trachea and neck soft tissues after laryngo-tracheostomy

Abstract: Clinical experience in the treatment of neck defects after laringotraheostomy. Using of the autocartilage in plastic surgery of extensive neck defects.

Keywords: neck defects, microsurgery, delta-pectoral flap, cartilage-fascial flap.

Introduction

In order to restore airway patency during critical and decompensated stenosis of the larynx and trachea in some patients using tracheostomy with the introduction of the cannula into the lumen of the trachea below the level of the stenosis. In some cases, at surgical correction of stenosis we perform laryngo-tracheostomy with wide excision of tissue around the area of stenosis, followed by the introduction into the lumen of the tubular airway dilators for a specified duration. Subsequently, after the formation of persistent laryngotracheitis raises the question of closing the defect without violating patency and restenosis without trachea. Often posttraumatic stenosis complicated by festering wound in the neck, combined with tracheal wall defect [2; 6; 9]. Proposed large number of possible fabrics and materials, as well as variants of operations aimed at eliminating defects in this area [1; 3; 5; 7]. The main requirements to them clearly formed: they must be of sufficient size to provide a carcass function and the possibility of a secret evacuation, as well as being resistant to infection [4; 5; 8]. Despite this, the problem of the closure of large defects of laryngo-trachea is relevant and continues to be the subject of research and microsurgery discussions, otolaryngologists and thoracic surgeons [3; 10; 12].

Material and methods

In the Department of Surgery of the lungs and mediastinum RSCS named after academician V. Vahidov in the period from 2008 to 2015, was hospitalized 26 patients with defects of the anterior wall of the upper third of the trachea, subglottic larynx and soft tissue of the neck after laryngotracheostomy or tracheostomy. Among these 8 patients were referred from other medical institutions of the republic, 18 patients were admitted to the final stage of the combination of staged treatment of cicatricial post-tracheostomy and post-intubation tracheal stenosis. Previously it in our department has been carried out stages of endoscopic coagulation, bougienage tracheal stenosis, followed by plastics tracheal lumen with the formation on the T-shaped stent. After routine examination including endoscopy (bronchofiberscope, esophagogastroduodenoscopy), MSCT of the chest with the seizure of the neck area and clinical patient diagnostic methods carried out surgical treatment.

Thus in patients with persistent defects extensive anterior tracheal wall and soft tissues of the neck, with the defect size not exceeding 2 cm. in width and 4 cm. in height was performed three layer plastic skin and muscle with simultaneous elimination of local tissue defect.

6 patients had extensive defects in the anterior-lateral wall of the cervical trachea and subglottic larynx, and also had a deficit of soft tissues of the neck around the stoma. The dimensions of the defect in one case amounted to 3×5 cm., in the second case — 3.5×5.5 cm. see also the presence of large defects after laryngotracheostomy complicated breach the vertical axis of the lumen of the respiratory tract, and the posterior tracheal wall came forward in the defect area. The complexity of the plastic was the lack of soft tissues around the defect, large defects due to lack of cartilage and skin-muscular frame and bend the vertical tracheal axis in the anteroposterior direction, which required the creation of the graft on the hard frame of sufficient size, with the mucous lining of the inside with the possibility of creating a hermetic lumen.

Results and discussion

Patients (n = 22) with anterior tracheal wall posttracheostomy defects and soft tissue defects with sizes from 1.0 cm. to 2.0 cm. wide and 2.0 cm. to 4.0 cm. in height (Fig. 1) when the defect depth of 8 mm., i. e. anterior-posterior size of the tracheal lumen and the lumen formed persistent airway narrowing in the plastic zone without a tread (T-shaped stent or tracheostomy cannula) made the local three-layer or four-layer skin and muscle plastic defect.

The technique is to perform a defect section bordering scar-altered skin some distance from the edges of 0.6–0.8 cm. and a depth in average of 0.8–1.0 cm., depending on the size of the defect is eliminated. Thus, on the one hand the release of skin grafts, i. e. their mobilization must be sufficient so far as is necessary to prevent the tension generated first layer. On the other hand excessive mobilization of a cut flap can cause flotation of bound edges, which is fraught with a lack of framing the respiratory tract in the area after the plastics during respiration, phonation and cough.

Created the first layer, stitched atraumatic absorbable thread (Vicryl 3/0) turns into the epidermis. This point is mandatory holding submucosal sutures, which excludes further adhesion of

bronchial secretions to the filament due to the absence of the suture in the lumen of the trachea. The second layer sutured adjacent muscles (m. sternocleidomastoideus, m. Sternothyroideus, m. Sternohyoideus) by means of the capture in the seam and convergence on the first layer. The third layer — the skin, the nodal atraumatic thread tightening the skin and eliminate the defect formed by leaving a rubber graduates.

When applying each subsequent weld seam in the wall of the underlying captured to further strengthen the wall layers in the flotation exclude cough shock, as well as to prevent the formation of cavities between the layers.

After the defect plasty was performed intraoperative fibro-bronchoscopy through an endotracheal tube with a tightening in her throat infraglottic department for visual assessment sutured the defect area. Thus investigated leaks formed front wall in the form of cutaneous inserts, layer mapping, the presence or absence of deformation and/or constriction of the trachea in the plastic zone.

Control bronchoscopic examinations were performed in patients on the 5th day after the operation. Then, after 1 month, 3 months, 6 months and one year after the operation. Two patients had a point failure joints skin and muscle plasticity to form a skin-tracheal fistula size of 2–3 mm., which closed on their own without surgery by conservative treatment with the imposition of aseptic dressings ointment.

Six patients with extensive defects in the anterior-lateral walls of the trachea and the distal part of the larynx, produced complex reconstructive surgery using microsurgical techniques.

In one case, the patient was operated with the diagnosis: Extensive defect of soft tissues of the neck and the front-side walls of the cervical trachea and the distal part of the larynx. Posttracheostomy and postoperative cicatricial stenosis of the trachea. Condition after circular tracheal resection. Cicatricial-paralytic laryngeal stenosis. Full extended cicatricial obliteration of the distal larynx and cervical trachea. Condition after laser recanalization tracheal stenosis. Condition after laryngotracheoplasty at T-tube stent.

Fig. 1. Extensive defect anterior-lateral walls of the trachea and the soft tissues of the neck

Due to the extensive defect of the front wall of the trachea and soft tissue front of the neck is made of plastic microsurgical prefabricated delta-pectoral autorib flap with autodermaplasty. Defect size was 3 cm. in width and 5 cm. in height, the depth of the lumen was 1.2 cm. The axis of the respiratory tract has been broken, the distal larynx and trachea into the upper third of the defect projections have forward direction behind the axis in the sagittal direction, and the average third of the trachea in the retrosternal area had front to back direction of the axis in the sagittal direction.

Plastic extensive defects of the cervical trachea suggests the recovery is not only soft tissue defect, but also the restoration of the mucous lining of the trachea and framing functions. To restore tracheal defects requires an adequate supply of high-grade, skin devoid of hair in the area of reconstruction. The absence of such sites in the neighborhood (or sharp dystrophic scarring) requires the use of tissue from skin taken from other areas of the patient's body (Filatov stem formation, moving skin-fascial flap on a vascular pedicle, autotransplantation complex flaps on microvascular anastomosis).

We have perfected a method of forming prefabricated flap. As the supporting tissue used in this case implanted graft autorib cartilage. Depending on the tracheal defect parameters carried fence part in cartilage compounds VI and VII ribs, by the usual method in plastic surgery. Subsequently formed cartilaginous carcass implanted into the distal portion of the delta-pectoral graft under fascial.

Procedural steps:

Stage 1. Formation of prefabricated delta-pectoral flap implantation autorib cartilaginous carcass in the distal flap0 (Fig. 2).
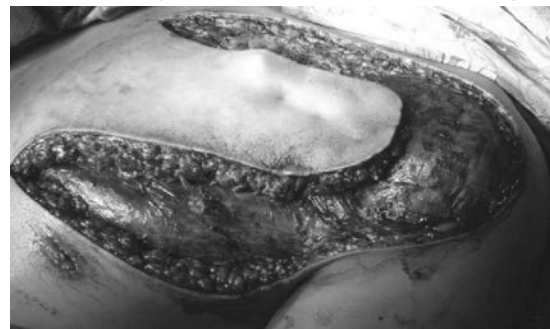
Fig. 2. Formation delta-pectoral flap with implantation of cartilaginous skeleton (delta-pectoral0skin and cartilage-fascial flap)

Stage 2. Raising prefabricated flap to form a round stem. Substitution tracheal defect with the restoration of the mucous lining (due to skin flaps) and cartilage carcass (due to the implanted autorib cartilage). Closing of the donor area and part of the fascial flap with split skin.

Stage 3. Trimming of the flap leg and final plastic tracheal defect (Figure 3).

Fig. 3. Long-term results of extensive plastic defect cervical trachea

As a result of the reconstruction achieved phonation recovery and patency of the trachea (Figure 4).

Fig. 4. The final result. MSCT of the neck organs. 10 months after the plastic
tracheal defect prefabricated delta-pectoral flap, cross-section

In 4 cases, the patients underwent extensive plastic defect prefabricated autorib cartilage.

The technique is a two-stage closure of the tracheal defect extensive anterolateral wall of the trachea. At the first stage the fence autorib cartilage without opening the pleural cavity. Then, from autocartilage were cut out two identical forms of implant sizes more than in length by 1.5 cm. length of the defect (Fig. 5). Then the two cuts made parallel to the vertical axis of the defect in the formed bed intermuscular laid cartilage implants. Harboring them absorbable stitching thread soft tissue over the implant. Sutured skin incisions leaving rubber graduates with the imposition of aseptic dressings.

Fig. 5. A — Patient T., 20 years old. A. Marking cartilage implantation zone;
B — cut to form cartilage ready for implantation into the soft tissue of the neck

The second phase was carried out in 40 days, with the aim of healing implants (autorib cartilage) to generate around the case. Assessment of the viability autorib cartilage was performed by palpation. In the dynamics after the surgery remained stiff and elasticity autocartilage implanted on the side walls of the stoma, which confirmed the absence of lysis of the latter and the suitability to carry out the final stage of plastic extensive tracheal defect.

Under general endotracheal anesthesia, an incision on the right and left parallel to the walls of the stoma, mobilized implanted early cartilage autocartilage retaining legs (the bottom wall formed by the case), to rotate the cartilage with the movement in the projection of the defect and fixed with implants absorbable atraumatic suture material (Vicryl 4.0 or Biosyn 4.0). Separated lateral flap of skin with subcutaneous fat sheltered surface rotate autocartilage leaving rubber graduates (Fig. 6).

Fig. 6. The final form of the hermetic closure of the defect

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Two patients after skin-grafting and muscle in 1 case after autorib plastics in the early postoperative period, there was a partial failure of seams from the air intake of the zone created by skin-muscular front wall without differences external seams. In both cases, conservative methods achieved the elimination of signs of insolvency seams with the termination of air intake and phonation when coughing with a hermetic closure of the defect. In all other cases obtained good immediate and long-term results. The control broncho spectroscopy determined defect plastics sheltered area of the skin insertion, without disturbing the terrain and without narrowing the lumen of the trachea.

Thus, the selection process plastics or tracheal reconstruction of the defect is determined in each case individually. Local skin-muscle flaps, as well as complicated skin and musculoskeletal grafts from adjacent the neck and different parts of the thorax may be used. The indication for this operation is the presence of a defect and persistent tracheal lumen formed at this level, with no signs of restenosis of the respiratory tract, the absence of inflammation and infection of the tissues around the stoma. When the size of the tracheal defect to 2×4 cm., sufficient depth corresponding to the lumen of the lumen of the trachea below and above the stoma, the single axis of the trachea and larynx without distal displacement and deformation of the lumen is a skin-muscle plastic defect replacement with local fabrics.

Conclusions

1. The large number of donor zones hinged flap near the neck defects allows to use them widely for plastics extensive and persistent tissue defects. Using an improved method of forming prefabricated flap, it allows to produce plastic large tracheal defects with the restoration of the cartilaginous skeleton.

2. Formation of rotational flaps, in particular autocartilage and delta-pectoral flap for reconstruction of extensive persistent tracheal defects and soft tissues of the neck is technically simple, requires no additional microsurgical benefits to create a framing the front wall without violating the patency of the respiratory tract, without constriction and deformation lumen.

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Prognosis of the individual risk of periodontal disease development in the pregnant women

Abstract: The pregnant women have one of the highest risks of the occurrence of stomatological diseases. We observed 847 pregnant women at the age of 18 to 36 years. The research showed, that development of the prognostic coefficients by the most important and characteristic for pregnant women risk factors, particularly where there is danger of the occurrence of the periodontal pathology, present the opportunity for physician-stomatologists and obstetrician-gynecologists.

Keywords: pregnancy, parodontitis, risk factors, reproductive health.

The state of the stomatological health in the population has significantly improved over the last 10 years, however, the group of people with high intensity of periodontium impairment have still remained. The authors in their researches determined the risk factors for development of periodontal diseases [1; 4].

The pregnant women have one of the highest risks of the occurrence of stomatological diseases [3; 6]. The change of the hormonal fond, redestruction of all types of metabolism, reduction of the body defensive forces, change of the function of salivary gland and others these are factors, accompanying any pregnancy and simultaneously seem to be risk factors of development of stomatological diseases. The main diseases of the oral cavity, with which women meet, appeared to be caries and parodontitis [1; 5; 6].

Evidently that additionally to mass hygienic and therapeutic-prophylactic measures for this contingent the individual approach to the therapeutic prophylactic care is required. The modern methods of prognosis allow selection of pregnant women, more sensitive to the periodontal diseases for the timely providing for them the therapeutic-prophylactic care [1; 2].

On the basis of factor analysis there are revealed real functional causes, pathogenically determining risk of parodontitis development in this specific contingent [1; 6].

This time there is need in complex assessment of the effect of genetic, social, somatic state of reproductive health and factors arising during pregnancy on the level of prevalence of parodontitis, determination of "burden" of the factors and intensity of their influence in the integrated risk of morbidity. The initial predisposition appeared to be presence of interconnection between development of disease and factors, functionally effecting on its development.

Material and methods. The specially developed individual card was used for interview and examination of 847 pregnant women at the age of 18 to 36 years, visiting therapeutic institution, as well as there was performed copying of data from primary medical documentation of the same consultation (F.025; F. III/Y; F.113/4).

While investigating risk factors for development of parodontium in pregnant women there were revealed different reasons determining pathogenic mechanisms of the development of periodontal diseases united into group: 1) local; 2) social 3) factors reflecting the state of reproductive health; 4) the state of somatic health and 50 obstetric and neonatal pathology.

During development of the diagnostic algorithms there were used expert assessment for determination of every informative evidences and symptoms including into this study both in group of pregnant women with present of periodontium diseases and presenting the randomized selection from the contingent of pregnant women without pathology of parodontium. The experts were selected from the skilled physicians and researcher-specialists whose opinions were taken into consideration. In order to make the diagnostic conclusion there were used 47 risk factors.

The proposed method was developed on the prognostic model based on the Bayes' formula for independent evidences, method of assay of Volts and assessment of informativity by informative measure of Kulboch with use of recommendations offered by Kubler G. P.

While estimating statistical parameters there were calculated the following scores: mean error $M \pm m$, parametric Student's criterion (t), index of Kolmogorov-Smirnov ($\lambda^{2)}$), Pirson's goodness measure ($\chi^{2)}$). The differences were considered as reliable at the value $P \leq 0.05$.

Results and discussion. The mathematic analysis of the risk factors of disease development allows not only identification of the most significant from them with high degree of reliability, but provided

prognosis, on the basis of the algorithm proposed, of possible development of parodontitis in the pregnant women from the risk group.

There are presented prognostic coefficients (PC) and informativity (I) of the parameters. The positive sign "plus" indicated in favour of development of GP, and sign "minus" denies its exacerbation.

All the studied factors have high prognostic informativity. And the summarized prognostic informativity (I) of the obstetric and perinatal pathology accounted for 121.01; the summarized coefficient of informativity of the local (hygienic) factors was 97.66.

The rather high prognostic significance of the factors of reproductive health ($I = 76.66$) and somatic factors ($I = 65.25$) and the least prognostic significance were established in the social factors ($I = 46.93$).

Among the hygienic factors the very high prognostic informativity was found in the factor not referrals to stomatologist ($I + 26.73$); besides the high prognostic significance ($I + 2.0$) in descending order was established in relation to not use of therapeutic-diagnostic care for oral cavity ($I = 19.21$); absence of the appointment card from gynecologist to stomatologist ($I = 11.30$) and not usage of vitamin-mineral complexes prescribed by stomatologist ($I = 11.15$).

In relation to factors occurring during pregnancy the high prognostic informativity has the anemia of pregnant women ($I = 15.08$); marked early gestosis ($I = 12.39$); colpitis ($I = 13.75$); hemorrhage in the first trimester ($I = 11.12$); acute infection of the urinary tract ($I + 11.03$) and acute infection of pregnant women ($I = 10.60$). It is necessary to note high prognostic significance of the placental insufficiency ($I = 9.21$); cytomegalovirus infection ($I = 6.37$); edemas of pregnant women ($I = 5.63$); intrauterine fetal infection ($I = 5.23$); diabetes mellitus of pregnant women ($I = 3.38$); oligohydramnios ($I = 3.37$); hemorrhage in the II trimester ($I = 2.79$); herpes virus infection ($I = 2.55$); fetal hypotrophy ($I+2.36$) and threat of pregnancy interruption ($I = 2.34$); other factors have less prognostic significance ($I < 2.0$).

From the factors of reproductive health the most prognostic significance has aggravated obstetric anamnesis ($I = 20.43$); high prognostic significance was found in such factors as interval between pregnancies not less than 1 years ($I = 11.96$); uterine and adnexa uteri inflammation ($1 = 10.52$); premature delivery in the anamnesis ($I = 9.16$); high informativity has the factor of the third pregnancy ($I = 7.78$) and then in descending order the following factors distributed: interval between pregnancies >1 year ($I = 6.06$); more that 3 abortions in the anamnesis ($I = 4.58$); such factors as the first pregnancy and 0–1 abortion in the anamnesis have low informativity ($I < 2.0$).

Among the somatic factors the very high prognostic informativity the diseases of the gastrointestinal tract have ($I = 15.53$); practically the identical prognostic informativity was established in diseases of the thyroid gland, urinary tract and chronic specific infections and arterial hypertension informativity accounted for, respectively 11.13; 11.92; 11.47 and 9.61; the least prognostic significance is found in hypotensive syndrome ($I = 2.90$) and varicous disease ($I = 1.45$).

The difficulties of the social interrelationship, living-conditions, level of incomes, education, family history and other factors, which are considered as insignificant separately, together they have negative effect on the occurrence and severity of the parodontium pathology.

Thus, the study of the parameters in relation to risk of occurrence of parodontitis the high prognostic significance the social factors have: level of education ($I = 9.80$); marital status — single ($I = 6.7$); low level of incomes ($I = 6.84$). In this situation such obvious unfavourable risk factors as smoking, drinking of the alcohol had informativity lower, respectively $1 + 4.28$ and $I = 5,76$. The high informativity was characteristic for index of non-planned pregnancy ($I = 4.01$); for middle

special education (I = 4.28); besides the factors indicated the pathogenic significance in the development of parodontitis was revealed in the age of pregnant woman not less than 18 years (I = 1.94) and more than of 36 years old (I = 1.17).

The data presented confirm that the leading factors in the development of generalized parodontitis in the pregnant women are simultaneously with general (hygiene of oral cavity, social state, somatic pathology and reproductive health) the factors occurring during pregnancy, among which the more significant pathogenic role belongs to anemia of pregnant women, gestosis, hemorrhage in the first trimester, colpitis, acute infection of pregnant women, placental insufficiency.

Prognosis for development of generalized parodontitis of pregnant women with use of developed algorithm is determined with use of mathematic summary of the prognostic coefficients (PC) to achievement of the prognostic threshold.

According to the theory of relativity the prognosis is not considered as regulations, and should be taken as hypothesis of the most probable development of the pathology (particularly, exacerbation of the progressing of the inflammatory-destructive periodontal lesion) in the further.

With taking into account of desired errors for establishment of diagnosis, prognosis of the pathological process the threshold values of prognostic coefficients are determined. The exceed of one of prognostic hypotheses which corresponds to the required exceed of the frequency of the correct prognoses over the frequency of errors is considered as threshold meaning. At 5 % level of error probability the threshold values of the prognostic coefficients (PC) account for: PC + thresh. = +13.0; PC – thresh. = –13.0.

The threshold values of PC divide all diapason of the prognosis into 3 intervals:

- Sum of PC < –13.0 — favourable;
- Sum of PC from –13.0 to 0 — indefinite favourable;
- Sum of PC from 0 to 13.0 — indefinite unfavourable;
- Sum of PC > 13.0 — unfavourable.

For individual prognosis and determination of the required volume of therapeutic-diagnostic measures in the pregnant women with risk of periodontal disease development there have been developed criteria of the efficacy of the therapeutic-diagnostic measures in the pregnant women with various risk for development of generalized parodontitis.

The data on integral evaluation of the factors determining occurrence of parodontitis of the pregnant women may be used for performance of concrete therapeutic-prophylactic measures.

Knowing the character and degree of the effect of some factors it is principally possible to define probability of the occurrence of the parodontitis of the pregnant women.

The solution of the questions of such kind by the technique proposed includes the following stages:

1. Identification of the factors influencing on the occurrence of the parodontitis.
2. Evaluation of the degree of the effect of risk factors on the risk index.
3. Determination of the probability of the occurrence of the periodontal pathology taking into account the prognostic coefficients of the various factors.

Conclusions

Thus, development of the prognostic coefficients by the most important and characteristic for pregnant women risk factors, particularly where there is danger of the occurrence of the periodontal pathology, present the opportunity for physician-stomatologists and obstetrician-gynecologists:

1. To determine probability of the occurrence of the periodontal pathology, to select the groups, factors, contributing most of all to development of parodontitis, to reveal the most prognostically significant factors.
2. To explain necessity of the measures taking for treatment and prevention.
3. To more rationally effect on the main unfavourable factors, determining occurrence of the periodontal pathology.
4. To develop individual program of the therapeutic-preventive measures, providing reduction and stopping occurrence of the periodontal pathology of the pregnant women.

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Modern aspects of prevention of dental caries in children

Abstract: The status of healthy primary teeth for child health and dental health later in life has long been undervalued. This insolence has since changed considerably. Protective programs that have lead to an improvement in the dental health of

children and youths have been in existence for years in many nations. Early childhood caries, however, is still the most common continuing disease in young children in global. Caries is, as is mostly known, an infectious disease affected by bacteria, mainly Streptococcus mutans and Streptococcus sobrinus, in the oral cavity. The running of specific probiotic bacteria in order to stop the root of caries is a new method to avoidance of early childhood caries disease.

Keywords: caries, prevention dentistry, child dentistry, microbiology.

In modern dentistry, the problem of dental caries and periodontal diseases in children remains relevant, due to considerable intensity, high prevalence, a large number of complications of these diseases and increasing needs in dental care [1; 4; 19]. Great importance is attached to the search for effective ways of targeted prevention, and its implementation at all levels [3; 6; 12].

In a number of industrialized countries over the past 15–20 years there was a trend to a decrease in the intensity of dental caries, through the development and implement of prevention programs [2; 9; 11; 16].

The leading factor of tooth caries is cariogenic microflora of the mouth, though, when considering the broader, short-circuit, as a chronic infectious disease that is the result of an imbalance of multiple risk and protective factors. The main factors that play a role in the development of short-circuit in early childhood, is the structure of the temporary occlusion of teeth and saliva, cariogenic bacteria, the presence of carbohydrates and easily fermentable time factor [4; 8; 14; 19].

A characteristic feature of milk occlusion are biologically immature tooth enamel, making teeth more vulnerable to the action of acid. The maturation of the enamel after the eruption of teeth is due to the presence of saliva remineralization activity. It provides not only saliva remineralization, and purification of carbohydrates, as well as due to a bactericidal and protective immune factors to maintain the health of the oral cavity [5; 6; 10; 21].

Formation of oral microflora occurs in stages. The fruit of the womb is almost sterile oral cavity. After the birth of contact with the environment starts the process of settlement of the microbiota. The process of teething is conducive to more intensive colonization of oral bacteria as a result of the formation of the grooves and niches. Saliva constantly washing all surfaces of the oral mucosa, is not only a source of nutrients for the growth of bacteria, but also the protection factor. However, oral bacteria colonization baby is easier than in adults, due to immaturity of immune mechanisms functional secretory immunity. Thus, lower levels of antibodies in saliva and the presence of a particular form sIgA1, enzymes that can degrade a number of pathogens contaminating the mouth increases the risk of infection [7; 13; 17; 25].

The initial colonization of oral streptococci (mostly, Str mitis, Str salivaris.) And further — actinomycetes defines further the diversity of the microbial landscape. In general, the formation of a healthy oral microflora ends to 4 years [1; 8; 15; 24].

A number of bacteria, "living" in the oral cavity, are responsible for the development of short-circuit and periodontal disease, and is a completely different group of microorganisms. Initiating launch caries process is associated most often with streptococcus — Str. mutans and Str. sobrinus. They are produced from glucose sticky mass on the surface of the tooth, which is a habitat for other bacteria, contributing to the further development of caries infection [9; 17; 23].

A distinctive feature of cariogenic micro flora is its absence in the oral cavity of newborns. The presence of cariogenic microorganisms in the newborn child is associated with primary infection; the main source is the mother of the child or those persons who care for them. The main route of transmission — contact: through saliva by using common utensils, hygiene principles of non-compliance.

Previously it was thought that the colonization of cariogenic microflora in the oral cavity could not be toothless infants. However, recent clinical studies that the cariogenic microorganisms capable of forming colonies in tongue grooves. There is also evidence that the earlier the infection occurred, the higher risk and intensity of the caries process [1; 5; 8; 18].

There is a strong correlation between the level of decay-causing microorganisms in the saliva of the mother and the child's risk of infection. Therefore, even before the birth of the child to all family members need to sanitize your teeth carefully and take care of the oral cavity [4; 17; 21].

The first diagnostic sign of future fault is the large number of dental plaque is difficult to shoot with a yellowish tint (this feature should pay attention when inspection of the dispensary-year-olds). Then early carious lesions are detected in the form of chalky spots, usually on the front surface of the incisors of the upper jaw in the cervical area. These hubs very quickly (2–3 months) acquire a light yellow color, and in this place, carious defects occur in the future. The caries process is characterized by the speed of the flow, spread wide (planar cavities), multiple lesions of teeth in the order of their eruption, and often leads to prematur tooth loss [6; 16; 20; 23].

Providing dental care for children of early school age — not an easy task due to the high emotional instability and fatigue of children. A small volume of the cavity of the mouth, increased salivation, and increased gag reflex often make the process of treatment of carious teeth is technically difficult. In addition, usually the parents start dental care very late, when the majority of teeth affected by caries.

However, one should not underestimate the importance of temporary teeth. They are necessary for the formation of correct articulation and the formation of the facial skeleton. Teeth caries in early childhood may cause generalized oral infections and even lead to the defeat of the rudiments of permanent teeth enamel mineralization process that continues throughout early childhood period. The loss of a milk tooth — this is definitely a psychological trauma for the child, so the prevention and treatment of faults early childhood should be given serious consideration. In our country so far widely used method of silvering milk teeth, comprising the application three times the silver salt solutions (nitrate or diaminftorida). This method is based on the antibacterial effect of silver atomic forming insoluble salts on the surface of the enamel. It helps to slow down the process of the growth of bacteria and reduce the formation of plaque on the affected tooth. It is also believed that due to the silvering is provided obturation of dentinal tubules in the lesion. Timely use of silvering method allows achieving stabilization of the caries process [4; 7; 9; 11; 16; 25].

However, before resorting to the silvering of the teeth, the dentist has to make sure that the surface is not infected. In the case of an extensive distribution and/or rapidly evolving disease, process in the tooth depth of the application of the method of silvering ineffective and tooth decay will progress to the subsequent development of complications.

One of the significant drawbacks silvering method is the appearance of black spots on the teeth, which is usually retained until a change occlusion. This can be a source of psychological problems for the child, resulting in the future may become excessive timidity, indecisiveness and even the "inferiority complex" [6; 12; 14].

It should be stressed that today there is a real alternative to the silvering method. The Department of Pediatric Therapeutic Dentistry applied method of treatment of temporary teeth in children during the first years of life, based on minimally invasive surgery concept. The advantages of this concept are early diagnosis and minimize the occurrence of short-circuit risk factors, the conduct of all therapeutic measures against the background of the preventive effects of treatment with the inevitable — the use of minimally invasive techniques dissection preserving the maximum amount of hard tissue. The algorithm providing conservative dental care for children with teeth caries includes normalization of oral hygiene, removal of the carbohydrate factor, the widespread use of local remineralization therapy [1; 9; 15; 24].

The advantages of this tactic of patients are technically simple in execution of all phases, no need for expensive equipment, the possibility of all the manipulations without anesthesia, sparing attitude to the child's psyche. The main criteria for the success of the activities are the interest and discipline the parents of patients. In the presence of extensive caries and associated complications is conducted dental health under general anesthesia, followed by a mandatory appointment of conservative treatment and preventive measures for the prevention of relapse.

In the short-circuit prevention should distinguish two main aspects: minimizing risks and strengthening the body's defenses. As already described above, are major risk factors for the presence of cariogenic bacteria (Str. Mutans) and the presence of easily digestible carbohydrates.

The following steps are recommended to reduce the risk factors:

• Dental monitor the condition of the oral mother's mouth, if necessary — rehabilitation during and after pregnancy;

• Eliminating the possibility of cross infection through the saliva of the mouth cavity of the child (not to lick the nipple, spoon, baby cup, etc.);

• Advising parents on issues contributing to the prevention of short-circuit, including a thorough oral hygiene of the child, the formation of healthy eating habits and above all easy to reduce the consumption of fermentable carbohydrates with foods products;

• Informing parents about the risk factors for early fault in infants, which include long-term and uncontrolled feeding of the child during laying bed with a bottle, the constant "sucking" or a mixture of milk and others.

The first 3 years of life are the most effective to reduce the importance and implementation of short-circuit risk factors, because it is taking place in the early formation of the microflora of the mouth and the maturation of the immune system. It is believed that if the in first 3 years Str. Mutans the settlement did not happen in the mouth, in the future, this process takes much more difficult due to the balanced composition of the local indigenous microflora, the maturation of local protective factors. Conversely, if contamination has occurred, Str. mutans life remain in the oral microbiota. Therefore an early age can be considered almost the only possibility to prevent colonization of the oral cavity Str. mutans.

Probiotics — a new trend in the short-circuit prevention in children

Probiotics (PB) — are live microorganisms which, when consumed in sufficient quantities have a positive effect on the health of the host organism. The use of probiotic bacterial strains to normalize the intestinal microflora is used for many years with the aim of not only prevention, but also treatment of diseases. The most common in pediatric practice are lactobacilli (LAB) and bifidobacteria (BB). These bacteria are, as representatives of the normal microflora of the mouth, have no role in the initiation of fault, even though they belong to ferment carbohydrates. It produces a number of LAB antimicrobial components, such as organic acids, bacteriocins, adhesion inhibitors, normalizing microbial landscape. The study Sookhee S. et al. it was shown that the antibacterial activity of LAB due to a significant percentage of cases are normalized oral microflora, including inhibiting the growth of Str. mutans.

Selectively inhibit the growth of Str. mutans and thus, can be used with the aim of preventing short circuit. To determine the potential ability to produce substances that inhibit the growth of Str. mutans and Str. sobrinus, studies were conducted when these streptococci were incubated in vitro with LAB, isolated from saliva and plaque sufferers RS and from healthy volunteers. As a result, 23 types allocated LAB, including L. rhamnosus, which completely inhibited the growth of mutant streptococci.

Confirmation of the effectiveness anticaries action PB are also 5 controlled trials, 4 of which were randomized, placebo-controlled, and showed a significant reduction in the number Str. mutans in the saliva. The studies used 53103 L. rhamnosus ATCC [24; 25] L. reuteri ATCC 55730. The first and most revealing, and large-scale study in infants treated with PB L. rhamnosus ATCC 53103 $5-10 \cdot 105$ dairy product, conducted in Finland. The aim of the study was to analyze the effect of PB on the number Str. mutans and the risk of short circuit in general. The study involved 594 children from 18 preschools at the age of 1 to 2 years, that is 5 days per week for 7 months received the same milk product containing (study group) and not containing (control) L. rhamnosus. The average intake of the mixture was 240 ml. per day. It should be noted that the dairy base because of the presence of calcium and the number of colloidal inorganic and organic substances is an ideal origin "conductor" BOP body in order to short-circuit prevention. To determine the oral microbiota collected samples of dental plaque and saliva for 1 hour before breakfast — before the start of the study and after its completion. At the age of 5–6 years, the newly defined microbiological pattern in the saliva. Fault risk is defined as a combination of microbiological and clinical criteria.

The risk was considered high if the CPU index (the number of carious, sealed and extracted teeth) was> 0 and Str. mutans seeded at > 105 KOE/ml; average, if the CPU index is > 0 or Str. mutans was determined at concentrations < 105 KOE/ml; low, when there was fault and displays the values Str. mutans were < 105 KOE/ml.

The results showed that a significant reduction in short-circuit risk was in all age groups, eat foods with L. rhamnosus, who component fault activity decreased from 40 to 34 %, while in the control group rate of RS activity increased with age (from 39 up to 43 %). The most significant reduction in short-circuit of the index observed during the intervention (use of the product). The most significant effect was observed in the group of children 3–4 years old, at the time when the activity of early childhood is the highest short-circuit.

The effect of L. rhamnosus to improve oral health can be explained by two mechanisms. The use of L. rhamnosus leads to a temporary colonization of the oral cavity [27], which corresponds to the criteria applied to the PB, which include the absence of a permanent settlement. Continued use of the BOP L. rhamnosus, thus, necessary to maintain prophylactic effect.

The second mechanism is effective in ensuring the health of the oral cavity can be associated with specific characteristics of this strain PB. Several studies in vitro, showed that L. rhamnosus produces substances which inhibit the growth of Str. mutans, while itself L. rhamnosus does not ferment sucrose, which is an important factor, and very effective in preventing short-circuit, especially in infants.

In summary, it should be noted that early childhood is a very common fault pathology of children during the first 5 years of life. Early and intensive development of caries due to anatomical and morphological features leads to early loss of deciduous teeth, and may be a source of infection. Important factors in the short-circuit prevention is the normalization of the microbial landscape of the oral cavity, reducing the use of readily fermentable carbohydrates, arriving with food, and, of course, proper oral hygiene. In the absence of breastfeeding choice subsequent mixture becomes a key factor in the prevention of short-circuit. L. rhamnosus is a natural antagonist Str. mutant, which plays a key role in the initiation of the caries process. The mixture NAN 3, 4 containing L. rhamnosus 106 KOE/ml in combination with optimal carbohydrate component shown lactose and maltodextrin (low dextrose equivalent) can be one of the possible ways of reducing the risk of faults during the first years of life.

Active participation of pediatricians can provide invaluable assistance in the short-circuit prevention of early childhood. This is possible primarily by increasing the level of knowledge of parents on health and the early diagnosis of dental diseases. In the first months of life must be trained to inspect the mother of his mouth and teeth, to conduct primary prevention of short-circuit, as described above. In case of unwanted changes on the teeth should be timely to appeal to children's dentist, which will use conservative methods of treatment for the rehabilitation of the oral cavity and to minimize the risk of infectious complications. When using the method of "minimally invasive therapy," "relapse" caries observed after 2 years in 6.9–12.8 % of cases, while the "traditional" method in 28,815,4 %, ie 4 times more frequently. In conclusion, I would like to emphasize once again that the disciplined conduct of all of the above recommendations carious process can be stabilized. Because of preventive measures, there is remineralization of initial lesions. It is accompanied by shine of enamel in white spots, also notes the suspension of the development of carious defects, the affected hard tissues are sealed, distinguished from healthy tissue, so during short circuit gets compensated character. This tactic allows not only suspending (or even eliminating) the development of cariogenic situation, but in most cases, avoid, or move to a later date technically complex and uncomfortable for the child treatments fault and its complications.

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Densitometric study of degree of osteointegration of the dental implant "Implant.uz" in experimental conditions

Abstract: In this scientific work degree of osteointegration at border bone — tooth implant by a densitometry method in terms of 1, 3, 6 months was studied. The received results showed a positive tendency of dynamic increase in density of a neoformed bone on border implant — bone during various periods of research.

Keywords: dental implant, osteointegration, densitometry, quantitative analysis, experimental animals, jaw bones.

Nowadays use of dental implantation, as most progressive method of elimination of defects of tooth alignments by fixed tooth prosthetics is especially actual. Its role in restoration of quality of life of patients is great [1].

Increasing the number of dental implants in edentulous patients is accompanied by the need for careful evaluation of the tissues around the implants [2; 3]. Quality and quantity of the bone are two important and effective factors on stabilising the level connection of the implant and bone [4]. In fact, enough bone volume and density are the key factors to successful implant treatment.

A new design of a dental implant "IMPLANT.UZ" was developed in Uzbekistan and the patent (The patent for useful model No. FAP 00819, Uzbekistan) was taken out [5].

For studying of impact of the general and local reaction of an organism to the entered implant, studying of processes of osteointegration, experimental animal experiments were made. Full osteointegration of intra bone implants is a fundamental condition of long-term success of prosthetics with a support on dental implants.

The reliable, quantitative assessment of extent of osteointegration of intra bone implants has crucial importance for a choice of a design of dental prosthesis, tactics of functional loading of implants, forecasting of efficiency of prosthodontic treatment.

It is known that the quantitative analysis of the radiological image promotes improvement of quality and an objective diagnostics. The carried-out researches with application of quantitative characteristics surpass in the informational content traditional radiological research not only at a stage of primary diagnostics.

The principle of a comparative assessment has to be the leader in definition of results and adequacy of the carried-out treatment at different stages of dynamic supervision, in particular at diseases studying of processes of an osteintegration [6].

In clinical practice some opportunities of a quantitative assessment of extent of osteointegration and stability of implants are known [7]: clinical (percussion, manual control of stability of an implant); periotestometry; the torque-test by means of a torque-controlled key; it is frequency or the magnetic and resonant analysis; densitometric assessment of density of a bone tissue.

The last, densitometry — the diagnostic testing uniting in itself various methods of obtaining the image and its quantitative analysis which main objective is determination of mineral density of a bone tissue of object [8].

Densitometric research of X-rays of dental implants in various terms of supervision allows to expand diagnostic opportunities of radiological research at osteointegration process study.

Purpose. To study density of a neoformed bone tissue on border implant — bone by scientific justification of a method of a densitometric assessment of optical density of a bone tissue on x-ray pictures.

Materials. The pilot study is conducted on 12 dogs of both sexes at the age of 2–3 years weight 25–30 kg. The studied dental implants were implanted into jaw bones of experimental animals.

Methods of research. Radiovisiography, densitometric and statistical methods of research.

Radiovisiography was conducted with help of device Wireless Portable X-ray Prox of DigiMed (South Korea) in period: before implantation, during operation, in 1, 3 and 6 months after operation.

The analysis of X-ray images in this work was carried out on the personal computer by means of the public program "Image J" (Wayne Rasband. National Institute of Health, USA. http://rsb.info. nih.gov/ij). On X-ray images measured density of a neoformed bone tissue on border implant — bone.

For an assessment of density of a neoformed bone measured a difference between average value of brightness of pixels in the field of border implant — bone and the next (healthy) site of a bone.

Results are displayed in the form of the histogram with average values. As brightness depends not only on object density, but also on settings of the device to avoid influence of settings for an indicator, x-ray pictures were received under the certain dose of radiation identical on the entire period of research, also calculated relative indicators.

Results of the obtained data were statistically processed with use of the Microsoft Office Excel 2007 program. Calculated an arithmetic average (M), an error of an arithmetic average (m) and a confidential interval (CI) for 95 % reliability level ($\alpha \leq 0.05$). Distinctions of averages considered reliable if confidential intervals weren't blocked.

Results of study. Dynamic control of a condition of regeneration of a bone tissue in the field of an implant, in various terms of supervision (1, 3, 6 months) showed that the obvious, accurately revealed distinctions are observed at the end of 3 months. Stabilization of process is registered at the end of the 6th month.

We consider this tendency on one case. On a place of the absent first premolar on the top jaw dental implantation was carried out on the right.

As a result of radiological researches it is established that at the time of carrying out surgery accurate contours of an alveolar bone are noted. A bone tissue round an operational bed without pathological changes. The good shape of radiological signs of the next tooth is noted.

The periodontal crack of the next tooth in norm testifying to lack of inflammatory process in a bone tissue.

Later 1 month after operation blurring of contours on border an implant — a bone is noted. Again formed fabric, is visually uniform, and only in separate sites the trabecularity of a structure of a neoformed bone tissue is defined.

The top of an alveolar bone hasn't restored yet, has not accurate contours. The horizontal decrease of a bone tissue is in the field observed. In communication with what height of an alveolar bone is reduced.

At this case for the 3rd month after operation, filling of a gleam with a neoformed bone tissue with trabecular drawing on border implant — bone is observed. The top of an alveolar bone isn't restored yet, but already gets more equal contour. The neoformed bone tissue has mainly close-meshed trabecular structure.

For the 6th month of research, on a place of surgery it is noted neoformed bone by fabric with trabecular drawing.

The top of an alveolar bone isn't restored yet, but already gets more equal contour. The neoformed bone tissue on all length of an implant found trabecular structure, completely identical with a surrounding bone tissue. The horizontal decrease of an alveolar bone visually hasn't observed.

On other 11 dogs similar research during which direct dependence of increase in density of a bone round a dental implant from the terms which passed from the moment of operation was observed was conducted. Strengthening of osteoreparative processes is reflected in an operational field on average a gain of x-ray density of a bone and smaller degree of a decrease of a bone tissue of an alveolar shoot.

Positive dynamics of processes of an osteointegration is reached by 6th month, the regeneration which is noted density on border an implant — the confidant's bone to an initial indicator. It is coordinated with the data of Robustova T. G. (2005) who reports about existence of a small trabecular bone in 2–3 months after the performed operation. Though density of a neoformed bone during this period is less than control value, according to Kulakov A. A. (2004) in 6 months it comes nearer to that own bone.

Thus, by results of radiological research and densitometry it is possible to claim about positive dynamics of processes of osteointegration with use of a domestic dental implant.

The radiological data obtained by us testify to existence of a bone tissue in the field of surgery for the third month of research.

Conclusions

The conducted research showed a positive tendency of dynamic increase in density of a neoformed bone on border implant — bone during various periods of research. For definition of dynamics of process of regeneration of a bone tissue we recommend to conduct radiovisiography research with the computer analysis of x-ray images.

For an objective assessment of degree of a increase of a bone tissue and density of a neogenic bone in a hole we recommend to use the ImageJ program (Wayne Rasband. National Institute of Health, USA. http://rsb.info.nih.gov/ij).

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Scientific justification of development of domestic attachments and their clinic-biomechanical assessment of effectiveness at a denture with use of implants

Abstract: Motivation to use of implantation artificial limbs are high esthetic and adaptation opportunities of such designs. However, treatment with use of implants has the increased risk of complications. Fixing of an orthopedic design to implants is the reason of one of widespread complications. Along with it, high cost of import production limits possibility of their broad application. Localization of development and production of latch fastenings from domestic materials will allow improving rendering the dentistry help to the population.

Keywords: attachment, dental implant, prostheses, clinical complications.

The beginning of the XXI century is characterized by the increasing aging of the population, this process will proceed, and it is difficult to predict its result. Dentistry have to take into consideration that the intensive efforts enclosed in prophylaxis and the reduction odontology as a result will lead to that elderly patients will have an increased number of the remained teeth. It will end with huge increase of volume of the dental treatment necessary for elderly patients. The recent researches conducted in Switzerland showed that the increased number of elderly patients would be compensated by release of labor ability of the dental due to successful preventive treatment of teenagers and adults.

Over the last 10 years in Uzbekistan use the dental of implants received a wide distribution as provides a full-fledged restoration of all functions of dental — alveolar system. Designs of artificial limbs on implants on a principle of the fixing divide on: fixed (cement fixing), conditional and removable (screw fastening) and removable artificial limbs. Today the question of a best way of fixing of orthopedic designs with a support on implants remains open. Many foreign authors are another of a conditional and removable prosthetic repair.

In our country rapid development of need for a prosthetic repair with use of latch fastenings, however, in connection with poor amount of information is felt now, still application of attachments and selection of concrete latch connection depending on a concrete clinical situation puts the practicing doctor in a difficult situation.

The most widespread case of a prosthetic repair on the attachment is application of the combined artificial limbs. As connection in the combined artificial limbs except latch fastenings telescopic crowns can be used. The main indication for application of latch fastenings and telescopic crowns in the combined artificial limbs is increase of esthetic results of a prosthetic repair. Use of attachment possibly and in cases of lack of a parallelism of axes of basic teeth.

Various authors and researchers upon transition to new materials and technologies of bases of dentures made rather successful attempts of increase of extent of fixing and stabilization of plate artificial limbs. Esthetic qualities of the fixing elements of dentures, in most cases did not satisfy both patients, and orthopedic surgeons. Only in the seventies last century, in connection with development of the modern technologies and including technologies of molding, dentists of orthopedists had a possibility of creation of highly esthetic dentures with fixing on latch fastenings — attachments.

Prosthetic repair esthetics a far important factor, but it, undoubtedly, has to be combined with the functionality including and the biomechanical aspects combining a set of the factors promoting adaptation and the long-lived period of use of an artificial limb.

The attachments used by domestic dentistry are production of the foreign companies. Import production because of currency high cost is almost not accessible to medical institutions and patients. The conducted researches among domestic producers of medical production revealed possibilities of localization of production of attachments in our republic. Predesigns showed reduction in cost of product cost by 5–6 times in comparison with foreign analogs.

Thus, relevance of a subject of the planned dissertation work is caused by need of health system and an operating control of all levels for researches on creation, rational functioning and development of system of ensuring quality of dental implantation in somatic patients.

The purpose of the planned research: Increase of clinical effectiveness of domestic attachments and a clinical — biomechanical assessment of their effectiveness at a denture with use of implants.

For realization of a purpose, we defined the following research problems:

1. To develop rational designs of domestic attachments and to carry out their preclinical tests.

2. To give a complex assessment of the dental status of patients with the acquired defects of jaws and to define needs in different types of the orthopedic dentistry help with use of tooth implants.

3. To estimate a microbiological, cytologic and functional condition of a mucosa of a prosthetic bed. Use of the device Vista Cam (Germany) for studying of a microbiological study of a prosthetic bed in situ of contact with an attachment and an artificial limb is planned.

4. To estimate adaptable mechanisms of patients to removable artificial limbs with fixing on implants according to an electromyography of masseters. Use of the device Biopac (USA) for objective research neuro-muscle system by filing of electric potentials of masseters is planned.

5. To estimate extent of osteointegration of ventplants for optimization of terms of a prosthetic repair. Use of the device Osstell ISQ (Sweden) for filing of resonance electromagnetic oscillations of an implant and an environmental bone at impact on them of an electromagnetic field is planned.

6. On the basis of the pilot and clinical trials to develop and estimate effectiveness of the program of orthopedic rehabilitation of patients with use of implants.

7. To allocate groups of a dispensary observation and to prove treatment-and-prophylactic actions.

The expected results of the planned research

The rational designs of new domestic attachments executed with use of biologically inert materials and nanotechnologies will be for the first time developed, preclinical tests are carried out them. It will be developed, theoretically and a series of new and advanced designs and manufacturing techniques of attachments, tooth and dental — alveolar artificial limbs for orthopedic treatment of patients with use of implants is clinically proved.

The program of orthopedic rehabilitation of patients with use of implants will be developed and introduced. Clinical effectiveness of the offered designs and methods of orthopedic treatment of patients with use of implants will be estimated.

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The problem of creating a bioactive layer of the intraosseous dental implants in Uzbekistan

Abstract: Calcium phosphate coatings on dental implants accelerate bone growth and enhance bone fixation. To increase the biocompatibility of the electrolytic coating is supposed to use bioactive natural polymer — Chitosan Bombyx mori, extracted from waste silk production in Uzbekistan. It is assumed that the inclusion of chitosan in electrodeposition coating tricalcium phosphate (CFP) will improve the biocompatibility of the coating, while retaining its original mechanical properties.

Keyword: dentistry, dental implants, bio-active layer, three-calcium phosphate coating, chitosan, bombyx mori, biocompatibility, porosity, surface roughness of a bioactive layer.

Calcium phosphate coatings on dental or orthopedic implants accelerate the growth of bone tissue and improve bone fixation [1]. Typically, these coatings promote bone ingrowth during the healing period of the first, leading to permanent fixation technique. Two types of calcium phosphate: hydroxyapatite and tricalcium phosphate are used as a coating material. Hydroxyapatite and tricalcium phosphate are the backbone of naturally occurring inorganic component of bone. Tricalcium phosphate — a porous form of calcium phosphate. Tricalcium phosphate is used as a biological filler which is partly resorbed and replaced by bone. The transformation of tricalcium phosphate is a pivotal point of periodontal regeneration. This "scaffolding" for the formation of new bone, which is then replaced by newly formed bone. Since hydroxyapatite — is imported drug, however local product tricalcium phosphate was used in this study. The plasma spraying method mainly uses calcium phosphate coatings on metal sputtering [2]. However, this method is carried out at high temperatures, which may alter the structure of the coating of calcium phosphate (CFP).

An alternative method for the development of CFR at low temperatures is a method of electrodeposition. In addition, this method allows you to control the porosity and thickness of the coating [3]. To increase the biocompatibility of the electrolytic coating use of our bioactive natural polymer — Chitosan Bombyx mori, extracted from waste silk production in Uzbekistan is supposed. We believe that the inclusion of chitosan in electrodeposition CFP improves the biocompatibility of the coating, meantime it maintains its original mechanical properties.

Conventional methods of obtaining polysaccharide chitosan is characterized by chemical and structural heterogeneity since even after the harsh chemical processing conditions contains small amounts of protein and mineral impurities, and by a broad molecular weight distribution. The latter causes the formation of insoluble gel particles by dissolving chitosan. These factors significantly limit its application field. For our studies highly purified chitosan was required, because its further use is associated with a medical application. For this purpose, cleaning chitosan Bombyx mori from the guild of chitosan, obtained on the basis of the Research Center for Polymer Chemistry and Physics at the National University of Uzbekistan (NUU.) was carried out. Chitosan is a guild grayish pulp particles of irregular shape, strongly contaminated extraneous mechanical impurities. Physico-chemical properties of the starting chitosan examined by elemental analysis, infrared spectroscopy (IR), X-ray analysis, the degree of deacetylation (SDA), molecular weight (MW).

Plant chitosan was characterized by nitrogen content — 7.42 %, ash — 3.37 %, solubilityt — 86.05 %, humidityt — 13.68 %, crystall conditiont — degree of 41 % (Table 1). MM is defined viscometric — 170 kDa; SDA determined Conductivity — 71.5 % (Fig. 1).

On the basis of this sample chitosan purification technique that was developed, which was pre-dissolved in 2 % chitosan in acetic acid, the precipitation and coagulation of the solution at a certain pH, alcohol washing, centrifugation and freeze-dried sample was conducted. Experimentally optimal concentrations of the chitosan solution were chosen, the ratio precipitant — chitosan solution, the coagulation time, pH. The obtained chitosan samples characterized by a high degree of purity: at the IR spectra no peak acetamido group related to chitin, amide II peak at 1590 cm^{-1} peak of greater intensity manifested. The nitrogen content and the solubility of the obtained samples is considerably increased and reaches 98, 8.52 and 8 %, respectively. Reduction of ash samples (1.43 %) is almost 2 times as evidenced by an increase in the purity of the sample (Table 1).
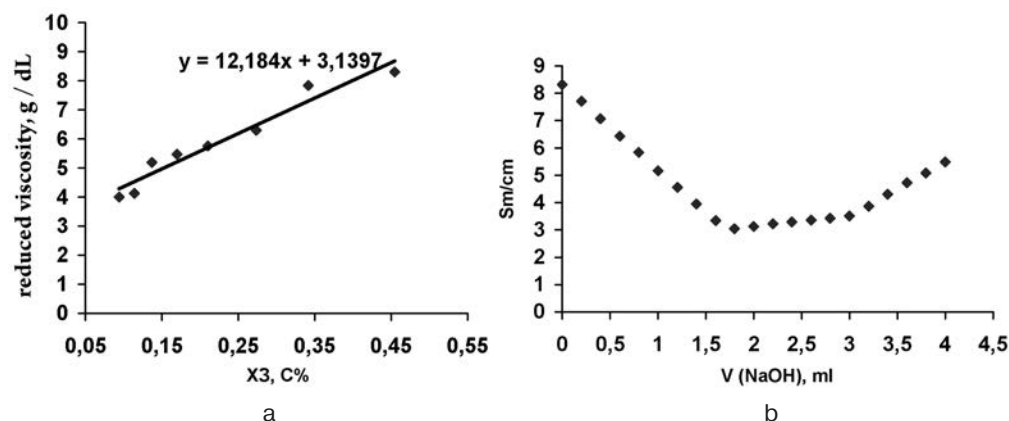
Fig. 1. a — the intrinsic viscosity of the shop chitosan in 0.3 M buffer
SN3SOONa is 3.14 dl/g, MM = 170 kDa; b — SDA = 71.5 %

Table 1. – Test results chitosan Bombyx mori

№	Index	Value		
		TSh 88.2–13:2011	Actual	
			Plant	Purified
1.	Appearance	Loose weight without lumps or powder, with particles of irregular shape	Loose weight with particles of irregular shape	homogeneous powder
2.	Color	Cream, allowed yellowish grayish and brownish shades	Cream	Cream
3.	Moisture conten t %, not more than	12	13.68	10.55
4.	Ash content %, not more than	2	3.37	1.43
5.	Particle size, mm.	10	10	0.2–0.6
6.	Nitrogen content, % not less than	6.8	7.42	8.52
7.	Solubility in 2 % acetic acid	85	86.05	98.85
8	pH 1 %, aqueous solution, not more than	8.5	7.5	7.5
9	Intrinsic viscosity, dl/g, not less than	1.64	3.14	2.5

IR spectroscopic analysis a lack of guild chitosan sample purity chitosan manifestation peak acetamido group in the region was revealed as 1640 cm^{-1} and a weak peak intensity at 1550–1590 cm^{-1} (Figure 2).

On the X-ray diffraction patterns can be seen that a reduction in the degree of crystallinity of the samples up to 36–39 %, which indicates an increase in amorphization of purified chitosan samples (Figure 3).
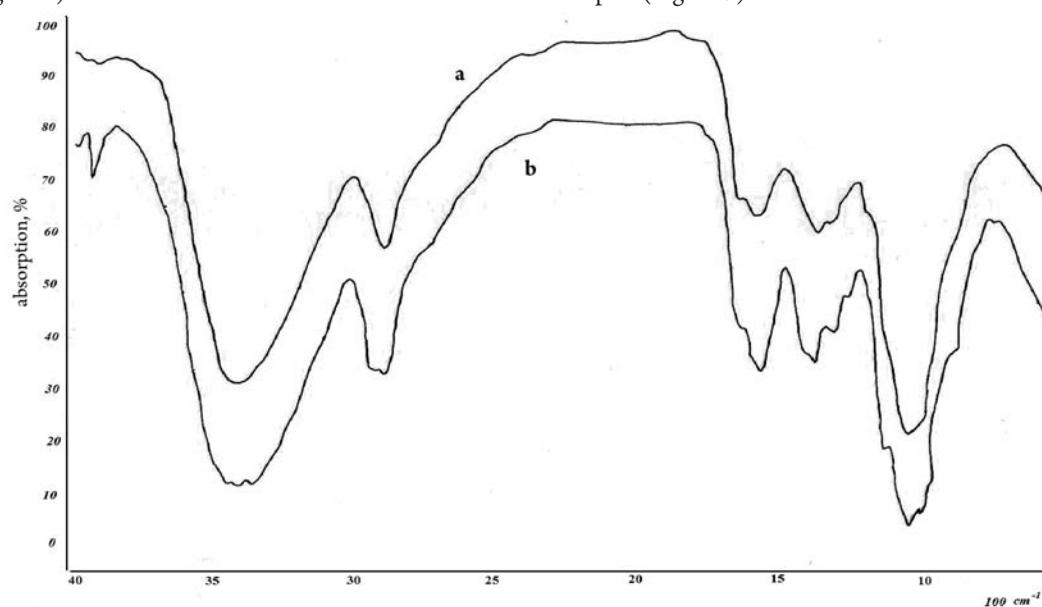
Fig. 2. a — IR-spectrum of chitosan in the guild; b — IR-spectrum of purified chitosan
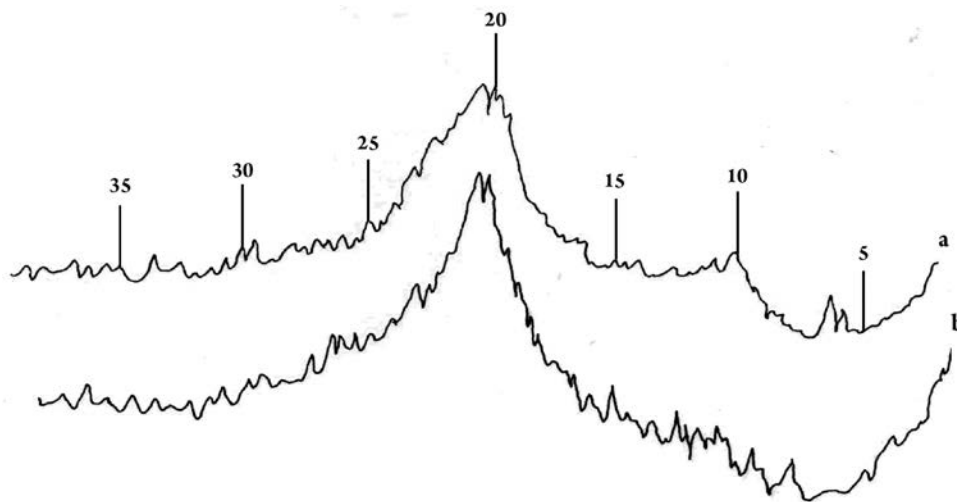
Fig. 3. Diffraction patterns: a — plant chitosan; b — purified chitosa
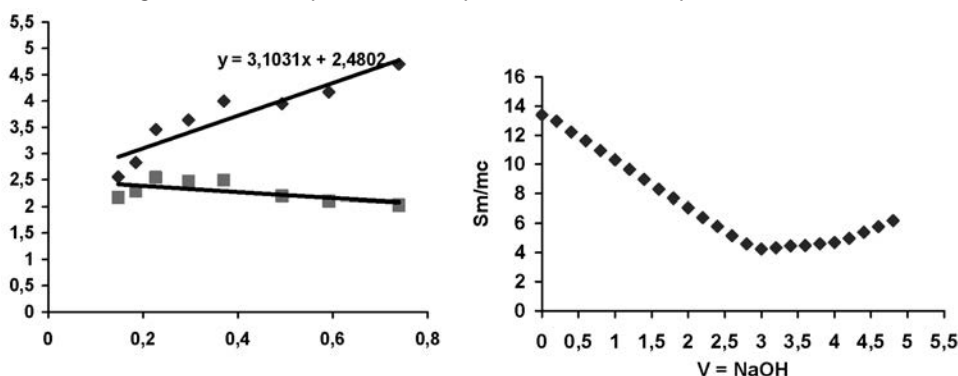
Fig. 4. a — purified HZ SN3SOONa buffer 0.3 M, the intrinsic
viscosity of 2.48 dl/g, M.W. 130 kDa chitosan; b — SDA is 72 %

Fig. 4 shows the purified chitosan deacetylation degree, which is 72 %. The molecular weight of the purified chitosan ranges from 120 to 130 kDa.

Data on physical-chemical indicators of the guild and purified chitosan are shown in Table 1.

The purified chitosan was used for further coating with a titanium plate CFP. Laboratory equipment was assembled for coating, which consists of a thermostated cell equipped with a temperature sensor, two electrodes: a reference electrode and a reference electrode and a cathode, which is attached to a titanium plate (Fig. 5).

Pre titanium plate of 30 mm. were prepared × 10 mm. × 1 mm., which are then processed to a certain roughness. The roughness of the plates was measured with an atomic force microscope brand Agilent Technologies 5500 (US). The data shown in Fig. 6.
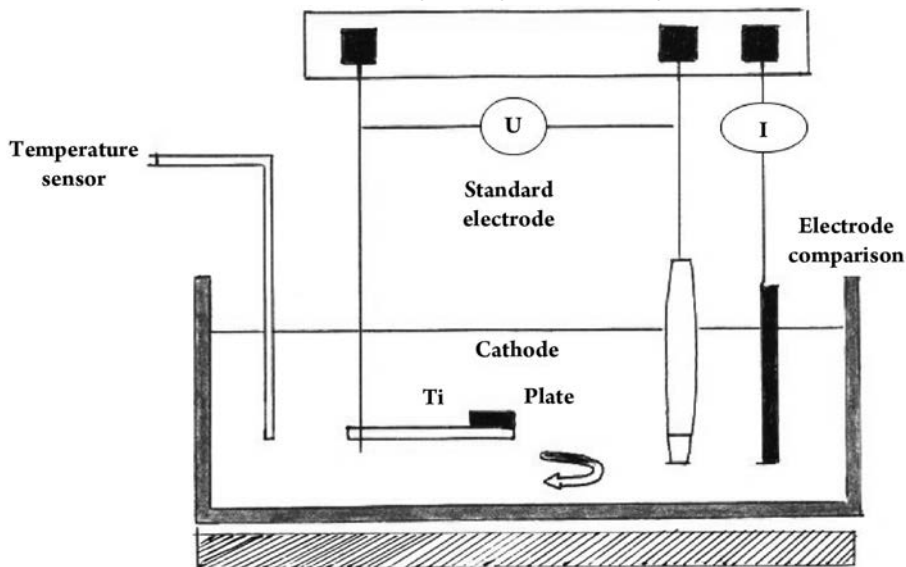
Fig. 5. Scheme of laboratory setup for the electrolytic deposition of coatings on titanium plates
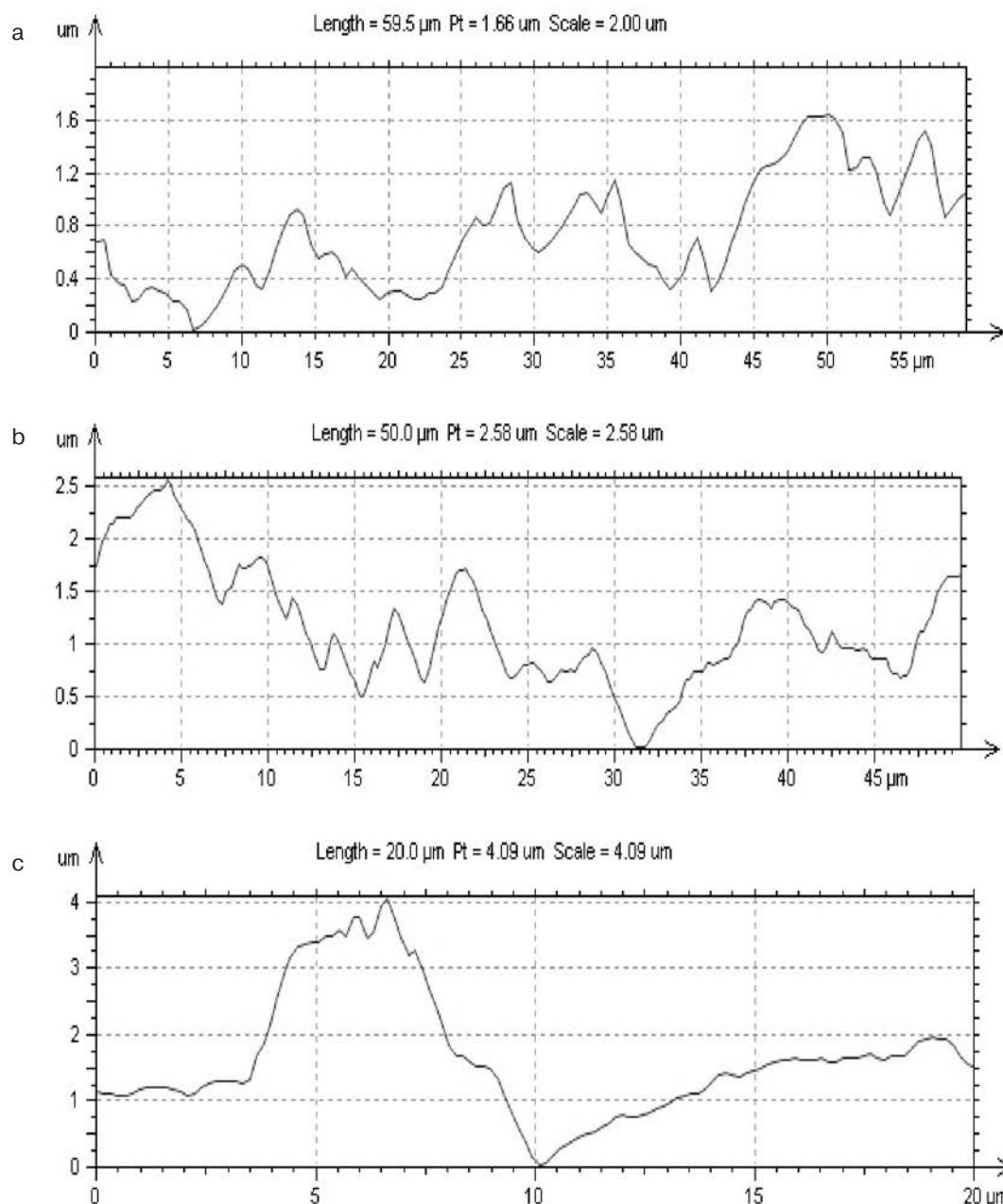
Fig. 6. AFM picture: a — the initial titanium plate, plate roughness 1.66 micron; b — the primary processing — plate roughness 2.58 um; c — the final treatment — roughness of the plate — 4.09 um

The tricalcium phosphate powder ($Ca_3 (PO_4)_2$) was used as the calcium-containing coating. Tricalcium phosphate is a tertiary calcium phosphate, also known as bone ash. This phosphate is a rich source of calcium and phosphorus, which are available to form cells.

As used $Ca_3 (PO_4)_2$, the structural formula:
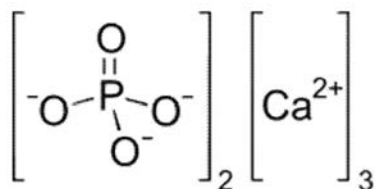
It represents a grayish powder with a molecular weight of 310.18 g/mol and a density of 2.81 g/cc, measured under standard conditions (25°C, 100 kPa).

Elemental analysis data are given in Table 2.

This sample has a large ash content ~ 60 % of cells, poorly soluble in water but readily soluble in 2 % acetic acid to form phosphates. There have also been removed IR spectrum and the powder diffraction pattern of tricalcium phosphate (Fig. 7 a, b).

On $Ca_3 (PO_4)_2$ IR spectrum presence of phosphate anions confirmed broad strong absorption band with a maximum in the range of 1050 cm^{-1} (doublet with the presence of shoulder 1130 cm^{-1}) belonging to the antisymmetric vibration phosphate anion and bending vibrations — $(OPO) = 550$ cm^{-1}.

Table 2. – Physico-chemical characteristics of $Ca_3 (PO_4)_2$

Sample	Humidity, %	Ash, %	Solubility, %	
			H2 O	2 % CH3 COOH
$Ca_3 (PO_4)_2$	1.68	58.40	43.68	96.01
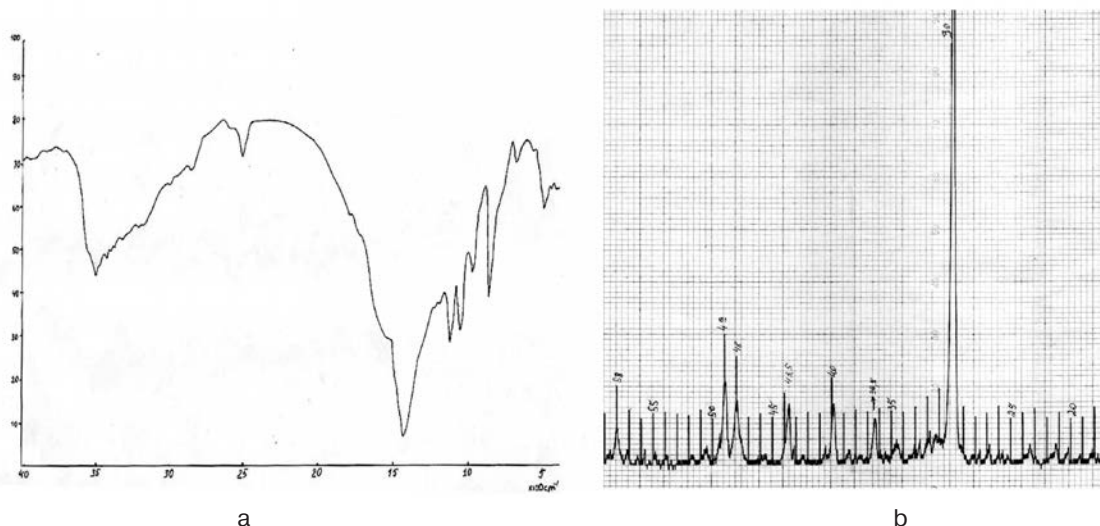
Fig. 7. a — IR; b — diffraction pattern of Ca3 (PO4) 2

As seen from the diffractogram of the sample, the peak at $2\theta = 300$ clearly describes tricalcium phosphate.

Preparation of calcium/phosphate chitosan coatings Ti plate (30 mm. × 10 mm. × 1 mm.) with a roughness of 4.0 microns were cleaned with acetone using ultrasonic, ethanol (96 %), and demineralized water. Electrolytically precipitated calcium phosphate coating was prepared on the Ti cathode plate at 52°C for 10 hours in a TCP (pH 7.0 buffer) supersaturated solution with a supported current 2.0 mA/cm^2 galvanostatic installation. Using scanning electron microscopy (SEM) were recorded for the coating formation TKF Ti plate with a coating thickness of 10 –14 microns.

For electrodeposited on a titanium plate chitosan purified chitosan solution was prepared with a concentration of 0.5 to 0.9 g/l by dissolving chitosan (72 % SDA) in 2 % acetic acid, which is then added to the supersaturated solution TKF. Deposition was done at 52°C for 15 hours in a supersaturated solution with chitosan TKF pH buffer (6.6 ~ 6.7), supported with a current of 2.0 mA/cm^2. The plates were then washed with demineralized water and dried at 50°C for 12 hours.

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Results of dental implantation at patients with the accompanying somatic pathology

Abstract: Until recently operations of dental implantation were performed at patients of not having associated diseases. Now researches of opportunities of dental implantation at different types of the accompanying somatopathies are conducted.

Keywords: dental implantation, somatic pathology, cardiovascular system, excretory system.

Now somatic pathology is considered the relative, and some nosological forms, for example, an uncontrollable diabetes mellitus, chronic general diseases, such as tuberculosis, rheumatism — absolute contraindication to dental implantation [1; 3; 6]. It is bound to the known reasons: decrease in the common and local immunity, microcirculation violation, including in oral cavity fabrics, the lowered response to surgical aggression, progressively increasing risk of development to operational, both local, and systemic complications [2; 6; 8]. Nevertheless, in daily practice such patients meet quite often-1 on 15 addresses [3; 5; 8]. At the same time procedure of implantation at patients with somatic pathology can provoke an aggravation of its clinical manifestations. For example, such factors as fear and pain can provoke development of an ischemia of a myocardium, a bronchospasm, hypertonic crisis [1; 4; 6]. The number of patients with arterial hypertension grows in the world. Therefore, the probability of appearance of patients with an idiopathic hypertensia on reception at the implantologist annually grows [1; 2; 3; 6]. From the point of view of the implantologist important, that at the long-lived arterial hypertension and the regular reception of hypotensive preparations there is a phenomenon of "exhaustion" that is expressed in reduction of a cooperative surface of exchange vessels [3; 6; 8]. Chronic obstructive pulmonary diseases take the third place in the world on abundance, an invalidism and mortality among other types of pathology. In absolute figures, the number of sick chronic obstructive pulmonary disease comes nearer to 10 million people [1; 4; 7]. Abundance of the listed diseases without their extent of compensation resulted in apparent discrepancy between high needs of patients with the accompanying pathology in implantation and low level of its exercise [2; 4; 5; 8]. In other words, it is not the diagnosis, and in degree of safety of compensatory mechanisms. Therefore, the decision of the implantologist on possibility of carrying out implantation in necessary volume has to develop not only depending on the diagnosis of a disease, but its duration and effectiveness of the carried-out corrective therapy [1; 3]. Extent of influence of the accompanying pathology on osteointegration remains almost not studied question that proves already apparent relevance of the chosen subject.

Research objective: justification of possibility of extension of indications to dental implantation to patients with various somatic pathology, with minimization of operational complications due to complex corrective therapy.

Material and research techniques

Researches are conducted based on policlinic of oral surgery and dental implantology. Shared 201 patients (100 men and 101 women) aged from 39 till 72 years with the diagnosis "Partial secondary adentia" in research.

To all patients standard methods of surgical inspection under the "Dental Implantation" protocol are carried out. For increase of effectiveness of treatment methods of hygiene of an oral cavity are recommended. The sanitation of an oral cavity including therapeutic, surgical and orthopedic actions is carried out. Patients are divided into subgroups depending on a dominance of somatic pathology: the first group — was made by patients (n = 96) with diseases of cardiovascular system; the second group — was made by patients (n = 44) with chronic obstructive pulmonary disease; the third group — was made by patients (n = 39) with diseases of excretory system. The control group included 40 patients, is equivalent men and women, aged from 36 till 69 years, without the accompanying pathology.

Before operation to all patients questioning was carried out. Results of questioning compared to data of an out-patient dossier (family policlinic) where the clinical diagnoses made by profile experts, results of laboratory, and instrumental researches were specified.

Single-step implantation at a partial secondary adentia at patients with pathology of cardiovascular system was carried out at 39.9 % of patients of 1 group, at 40.1 % of patients of 2 groups and at 40 % of patients of 3 groups. Single-step implantation after extraction of tooth was used in 28.2 % of cases at patients of 1 group, in 27.9 % of cases at patients of 2 groups, and in 28.1 % — patients have 3 groups. The closed sine lifting with single-step implantation was carried out to 18.7 %, 19 % and 40 % of cases in 1, 2 and 3 groups respectively. The open sine lifting with single-step implantation was applied at 13.2 %, 12.9 % and 13.5 % of patients 1, 2 and 3 groups respectively. From the provided data it is visible that distribution of types of implantation in various groups practically did not differ from each other. Most often (in 40 % of cases) single-step implantation at a partial primary/secondary adentia was used.

To all patients in the studied groups dental implantation was carried out in the conditions of the controlled sedation which is followed not by discontinuous monitoring of indexes of a hemodynamic and saturation. The sedation was carried out by a reference technique. The dose was selected for each patient individually, a titration method. Depending on character and expressiveness of somatic pathology to patients anti inflammatory, antiemetic, antibacterial drugs and diuretics were injected. After operation inspection of patients was performed for 1, 7, 30 days, then in 6, 12 months and further, twice a year for the next 2 years.

Results of researches

As a result of the carried-out questioning it is revealed that about a somatopathy, the patient reports only in 10 % cases. It is long the ill patients are informed on parameters of the disease in 60 %. Know 74 % of patients with a cardiovascula about existence of arterial hypertension pathology. In 37 % the patients who transferred a myocardial infarction to the period from 6 to 12 months before the appointed implantation did not adhere to the scheme of treatment appointed by the cardiologist. In 40 % patients with pathology of excretory system did not consider it necessary to report about existence at them of a glomerulonephritis or pyelonephritis in the anamnesis.

In group with pathology of cardiovascular system indicators of arterial pressure were corrected within 140–150/80–90 mm. of a mercury column. Patients with coronary heart disease and a myocardial infarction in the anamnesis were allowed to operation in the absence of the negative dynamics on an ECG of the last months. In the 2nd group patients at whom the asthma attack which is completely stopped by single-pass inhalation asthma of a pent developed no more than 1 time a month were allowed to dental implantation. Patients with bronchial asthma were allowed to implantation at an oxygen saturation at the time of survey not lower than 94 %.

In group with diseases of excretory system dental implantation was carried out at decrease in an efficient renal blood-groove not less than 402.9 ± 6.9 ml/min. and increases in resistance of renal vessels not higher than 16 536 ± 106.5 min/see the condition of compensation at patients with somatic pathology was controlled and remained in the set limits for 1 months before alleged implantation.

The maximal number of implants which is possible for establishing at patients of the specified groups, was equal 7. This size is greatest possible for installation for one operation (does not exceed a time interval 2.5 clocks) and allows to solve the patient's problem within single-pass visit of the implantologist. Effectiveness of a controlled sedation along with objective indexes made according to questioning: 85 % of patients considered procedure comfortable; absence of

fear and alarm — at 100 %, amnesia — at 95 % that allows to consider a technique efficient. To all patients in the specified groups the sedation was carried out according to the uniform scheme. Exceptions were made by patients of 3 groups at whom in 15 % delayed awakening was noted. Therefore the dose of all injected drugs in comparison with other groups was 25–30 % lower. In the early postoperative period the qualitative and quantitative comparative analysis of the being available clinical manifestations in each of the allocated groups of patients is carried out. Not expressed pain syndrome was noted at 84–88 % of patients in group of patients with somatic pathology. Thus, in control group this index appeared a little lower-80 than a %. Duration of a pain syndrome did not exceed 6 ± 1 days and was most expressed in the 2nd group of patients (25% for the 7th days) and less patients have 3 groups. Clinically significant, pain syndrome was registered for 1–2 days at 15 % of patients of 1 group, at 14.7 % of 2 groups and 14.6 % of 3 groups. The increase the regional of lymph nodes was noted at 43–48.2 % of patients in the first days of the postoperative period, but by 7 days the number of patients in such complication decreased to 5–6 % in 1 and 2 groups. Practically at all patients (86 %) in the first days after operation emergence of a light fibrinous raid in the area of seams and a mucous and periosteal rag, at 8–13 % of the gray-brown raid which completely disappeared against reception of antibiotics by 8 days was noted.

At an assessment of the local status on second day it is revealed that in 1 and the 2nd group the slight swelling in the field of seams and a postoperative wound in 86 % and 74 % respectively was noted. The expressed hypostasis in the field of a seam and a mucous and periosteal rag was defined in 68 % cases in the 3rd group. The atrophy of a bone tissue according to X-ray analysis in the first days after operation is not revealed in one of the studied groups.

In a month after implantation in the analysis of roentgenograms it is established that in 1 and 2nd group the atrophy of a bone tissue made 1–2 mm. By 6th month indexes of an atrophy in these groups remained former that testifies to biointegration process stabilization. In the 2nd group in a month after implantation the atrophy according to X-ray analysis was defined in limits $3–4 \pm 0.02$ mm., by 6th month of supervision — to 4 ± 0.02 mm. In comparison with control group expressiveness of similar clinical symptoms in group of patients with somatic pathology was brighter. Nevertheless, all symptoms were stopped against the carried-out therapy. In comparison with control in all other groups losses of implants, bound to influence of a number of various factors and the reasons are revealed. At patients of 1 group the total loss of implants for 3 years made 11 %. In the first year there was the maximal loss. In the 2nd group of loss of implants had more uniform character. In the first year the percent of successful implantation made 90.6 %. Losses of implants at patients of 3 groups made the first year 42 %.

Conclusions: thus, the conducted research proved possibility of carrying out dental implantation at patients with a secondary adentia with the relative contraindications: pathology of cardiovascular system, chronic obstructive pulmonary disease, pathology of excretory system.

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Section 6. Mechanics

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Asymptotic definition of the periods of relaxation oscillation of strongly nonlinear systems with feedback

Abstract: The problem of asymptotic approximation construction for the periods of relaxation oscillations of strongly nonlinear dynamic system with feedback is considered in the paper. Recurrent formulae to calculate with arbitrary degree of accuracy the periods of relaxation oscillations for corresponding degrees of nonlinearity of the system with feedback are derived.

Keywords: relaxation oscillations, nonlinear dynamics, feedback, recurrent formula, limit cycle, stability.

Consider the self-oscillations of strongly nonlinear system of the type [1]:

$$m\ddot{x} + cx^{2k-1} - a\dot{x} + bx^2\dot{x} = 0, \quad k = 1,2,\ldots ,m,c,a,b > 0, \quad (1)$$

where m — is a parameter defining the characteristics of the object; c — a coefficient of restoring force; a,b — the parameters giving the feedback to the system.

Let us reduce it to a standard form using the notations of dimensionless variables:

$$\tau = \gamma t, \quad u = \frac{x}{l}, \quad \gamma = \sqrt{\frac{c}{m}}\left(\frac{a}{b}\right)^{\frac{k-1}{2}}, \quad l = \sqrt{\frac{a}{b}}, \quad \varepsilon = \frac{a}{\sqrt{cm}}\left(\frac{a}{b}\right)^{-\frac{k-1}{2}}$$

$$\ddot{u} + u^{2k-1} - \varepsilon\left(1-u^2\right)\dot{u} = 0, \quad (2)$$

where γ, l — are the parameters of transformation; $\varepsilon > 0$ has the meaning of the coefficient of feedback.

Note that the study of numerous radio-technical schemes as well as dynamic systems with feedback leads to the systems of the second order (2) [2; 3].

Introducing the notations $u = x_1$, $\dot{u} = x_2$, the equation (2) acquires the form:

$$\dot{x}_1 = x_2;$$
$$\dot{x}_2 = -x_1^{2k-1} + \varepsilon\left(1-x_1^2\right)\cdot x_2. \quad (3)$$

At large values of the parameter $\varepsilon > 0$ the equation (3) may be reduced to the system of the form [2]:

$$\varepsilon\dot{x} = f(x,y)$$
$$\dot{y} = g(x,y). \quad (4)$$

Introducing the notations:

$$y = \int_0^u \left(u^2 - 1\right)du + \frac{1}{\varepsilon}\cdot\frac{du}{d\tau}, \quad t = \frac{\tau}{\varepsilon}, \varepsilon_1 = \frac{1}{\varepsilon^2}, \quad (5)$$

the system of equations (3) is transformed into the form when t is written instead of τ:

$$\varepsilon_1 \frac{du}{dt} = y - \frac{u^3}{3} + u;$$
$$\frac{dy}{dt} = -u^{2k-1}. \quad (6)$$

We may approximately calculate the period of relaxation oscillations in the system described by the equation (6) at $k=1$:

$$\varepsilon_1 \frac{du}{dt} = y - \frac{u^3}{3} + u;$$
$$\frac{dy}{dt} = -u. \quad (7)$$

Note that degenerate system:

$$y - \frac{u^3}{3} + u = 0;$$
$$\dot{y} = -u, \quad (8)$$

according to [2] the relation (8) has a closed phase trajectory β_0 (Fig. 1), which consists of two regions P_2S_1 and P_1S_2 of slow motion and two regions S_1P_1 and S_2P_2 of fast motion. The coordinates of the points of separation S_1 and S_2 and points of fal P_1 and P_2 are as follows:

$$S_1\left(-1,2/3\right), S_2\left(1,-2/3\right), P_1\left(2,2/3\right), P_2\left(-2,-2/3\right). \quad (9)$$

Further instead of variable u we take x.
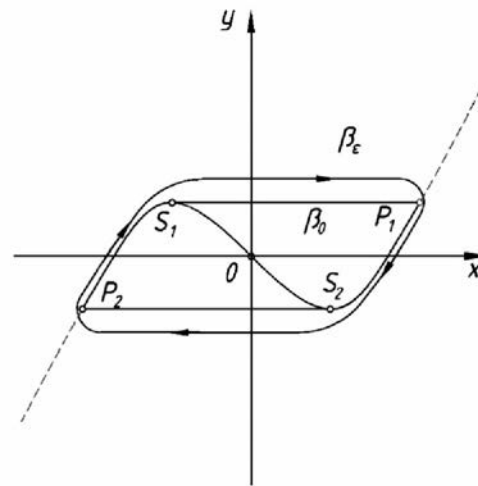
Fig. 1.

It was the theoretically proved [2], that in nondegenerate system (7) at each comparatively small value of the parameter ε_1 there exists a single and stable limit cycle β_ε, with $\beta_\varepsilon \to \beta_0$ uniformly at $\varepsilon_1 \to 0$, and for the system (3) possible limit cycles are determined in [1]. In other words, the system described by the equation (3), at comparatively large values of the parameter ε performs stable relaxation oscillation, numerically given in [1].

To construct an asymptotic approximation of the period of relaxation oscillation described by the system (6) we would make use of the theorem [2].

Theorem. For the period T_ε of the limit cycle β_ε of nondegenerate system (7), an asymptotic representation is true:

$$T_\varepsilon = \oint_{\beta_0} \frac{dy}{g(x,y)} + \sum_{m=1}^{M} \Delta_m T + O(\varepsilon^{4/3}), \qquad (10)$$

here the value of $\Delta_m T$, $m=1,\cdots,M$, corresponds to a pair $(P_{m-1}S_m ; S_m P_m)$ of adjacent sections of the trajectory β_0 and is calculated by the formula:

$$\Delta_m T = \mathcal{K}_{2,0}^m \varepsilon^{2/3} + \mathcal{K}_{3,1}^m \varepsilon \ln\frac{1}{\varepsilon} + \mathcal{K}_{3,0}^m \varepsilon, \qquad (11)$$

where:

$$\mathcal{K}_{2,0}^m = \gamma^{2/3}(S_m)\Omega_0 \chi(S_m P_m), \quad \mathcal{K}_{3,1}^m = \frac{1}{3}\gamma_\xi'(S_m)\chi(S_m P_m) + \frac{1}{6}\gamma(S_m)\delta_\xi'(S_m),$$

$$\mathcal{K}_{3,0}^m = \oint_{P_{m-1}S_m} \frac{g_x'(x,y)}{f_x'(x,y)g(x,y)}dx + \oint_{S_m P_m} \frac{dx}{f(x,y)} - \frac{1}{g(P_m)}\oint_{S_m P_m} \frac{g(x,y)}{f(x,y)}dx +$$

$$+\left[\gamma_\xi'(S_m)\Omega_1 - \frac{1}{3}\gamma_\xi'(S_m)\ln\gamma(S_m) + \gamma_\xi'(S_m)\ln\varphi'(S_m)\right]\chi(S_m P_m) +$$

$$+\gamma(S_m)\frac{\varphi''(S_m)}{2\varphi'^2(S_m)}\mathrm{sign}\, f_x^{(2)}(S_m)\chi(S_m P_m) -$$

$$-\gamma(S_m)\delta_\xi'(S_m)\left[J_0 + \frac{1}{6}\ln\gamma(S_m) - \frac{1}{2}\ln\varphi'(S_m)\right]; \varphi'(S_m) = \sqrt{\frac{f_x^{(2)}(S_m)}{2f_y'(S_m)}},$$

$$\varphi''(S_m) = \frac{f_x^{(3)}(S_m)f_y'(S_m) - 3f_{xy}''(S_m)f_x^{(2)}(S_m)}{6f_y'^2(S_m)\varphi'(S_m)}\mathrm{sign}\, g(S_m),$$

$$\chi(S_m P_m) = \left[\frac{1}{g(S_m)} - \frac{1}{g(P_m)}\right]\mathrm{sign}\, g(S_m), \qquad (12)$$

$$\gamma_\xi'(S_m) = \frac{6f_x^{(2)}(S_m)g_x'(S_m) - 2f_x^{(3)}(S_m)g(S_m)}{3[f_x^{(2)}(S_m)]^2}\mathrm{sign}\, g(S_m),$$

$$\delta_\xi'(S_m) = -\frac{g_x'(S_m)}{g^2(S_m)\varphi'(S_m)}\mathrm{sign}\, f_y'(S_m),$$

$$\gamma(S_m) = |g(S_m)|\sqrt{\frac{2}{|f_x^{(2)}(S_m)f_y'(S_m)|}}$$

$$\Omega_0 = \lim_{u\to\infty} v_0(u), \quad \Omega_1 = \lim_{u\to\infty}[v_1(u) - \ln u],$$

$$J_0 = 1 + \int_{-\infty}^{0} z_0(u)du + \int_{0}^{\infty} v_0(u)du.$$

According to (10) for the period T_ε of the limit cycle β_ε of the system (7) an asymptotic representation is true

$$T_\varepsilon = T_0 + \Delta_1 T + \Delta_2 T + O\left(\varepsilon^{4/3}\right), \qquad (13)$$

where T_0 — is a period of closed trajectory β_0 of the system (8), and the values $\Delta_1 T$ and $\Delta_2 T$ correspond to the pairs $(P_2 S_1 ; S_1 P_1)$ and $(P_1 S_2 ; S_2 P_2)$ of adjacent sections of this trajectory. Determine $T_0^{(1)}$, which is given in the form of a closed integral according to (8) (Fig. 1).

At $k=1$:

$$T_0^{(1)} = \oint_{\beta_0} \frac{dy}{-x} = \oint_{\beta_0} \frac{(x^2-1)dx}{-x} = \oint_{P_2 S_1} \frac{(x^2-1)dx}{-x} + \oint_{P_1 S_2} \frac{(x^2-1)dx}{-x}. \qquad (14)$$

The first integral by $(P_2 S_1)$: $-\int_{-2}^{-1}\frac{dx}{x} - \int_{-2}^{-1}xdx = \frac{3}{2} - \ln 2$,

the second integral by $(P_1 S_2)$: $\int_{2}^{1}\frac{dx}{x} + \int_{2}^{1}xdx = \frac{3}{2} - \ln 2$, hence:

$$T_0^{(1)} = 3 - 2\ln 2. \qquad (15)$$

At $k=2$:

$$T_0^{(2)} = \oint_{\beta_0} \frac{dy}{-x^3} = \oint_{\beta_0} \frac{(x^2-1)dx}{-x^3} = \oint_{P_2 S_1} \frac{(x^2-1)dx}{-x^3} + \oint_{P_1 S_2} \frac{(x^2-1)dx}{-x^3}, \qquad (16)$$

the first integral by $(P_2 S_1)$: $-\int_{-2}^{-1}\frac{dx}{x^3} - \int_{-2}^{-1}\frac{dx}{x} = \ln 2 - \frac{3}{8}$,

the second integral by $(P_1 S_2)$: $\int_{2}^{1}\frac{dx}{x^3} + \int_{2}^{1}\frac{dx}{x} = \ln 2 - \frac{3}{8}$, hence:

$$T_0^{(2)} = 2\ln 2 - \frac{3}{4} \qquad (17)$$

At $k=n$:

$$T_0^{(n)} = \oint_{\beta_0} \frac{dy}{-x^{2n-1}} = \oint_{\beta_0} \frac{(x^2-1)dx}{-x^{2n-1}} = \oint_{P_2 S_1} \frac{(x^2-1)dx}{-x^{2n-1}} + \oint_{P_1 S_2} \frac{(x^2-1)dx}{-x^{2n-1}}, \qquad (18)$$

the first integral by $(P_2 S_1)$:

$$-\int_{-2}^{-1}\frac{dx}{x^{2n-1}} - \int_{-2}^{-1}\frac{dx}{x^{2n-1}} = \frac{1}{2(n-1)(n-2)} + \frac{1}{2(n-1)2^{2(n-1)}} - \frac{1}{2(n-2)2^{2(n-2)}},$$

the second integral by $(P_1 S_2)$:

$$\int_{2}^{1}\frac{dx}{x^{2n-1}} - \int_{2}^{1}\frac{dx}{x^{2n-3}} = \frac{1}{2(n-1)(n-2)} + \frac{1}{2(n-1)2^{2(n-1)}} - \frac{1}{2(n-2)2^{2(n-2)}},$$

hence:

$$T_0^{(n)} = \frac{1}{(n-1)(n-2)} + \frac{1}{(n-1)2^{2(n-1)}} - \frac{1}{(n-2)2^{2(n-2)}}, n > 2. \qquad (19)$$

As seen from relation (19), at $n > 2$ it appears to be a recurrent formula for the period T_0 of a closed trajectory β_0 of the system (6).

Note that the field of velocities of the system (7) possesses the central symmetry, therefore $\Delta_1 T^{(1)} = \Delta_2 T^{(1)}$. With formulae (12) and (9), we obtain:

$$\varphi'(S_1) = 1, \quad \varphi''(S_1) = -\frac{1}{3}, \quad \chi(S_1 P_1) = \frac{3}{2},$$

$$\gamma(S_1) = 1, \gamma_\xi'(S_1) = -\frac{2}{3}, \quad \delta_\xi'(S_1) = 1.$$

At k of the highest order, the values of coefficients $\chi_n(S_1 P_1)$, $\gamma_{\xi n}'(S_1)$ and $\delta_{\xi n}'(S_1)$ may be derived from recurrent formulae:

$$\chi_n(S_1 P_1) = 1 + \frac{1}{2^{2n-1}}, \gamma_{\xi 1}'(S_1) = -(2n-1) + \frac{1}{3}, \delta_{\xi n}'(S_1) = 2n-1. \qquad (20)$$

Needed to formulate an asymptotic representation of the period $T_\varepsilon^{(n)}$ of the system (6) (Table 1).

Table 1.

Parameters	$g(x,y)$				
	$-x$	$-x^3$	$-x^5$	$\cdots$	$-x^{2n-1}$
$\gamma_\xi'(s_1)$	$-\dfrac{2}{3}$	$-\dfrac{8}{3}$	$-\dfrac{14}{3}$	$\cdots$	$-(2n-1)+\dfrac{1}{3}$
$\delta_\xi'(s_1)$	1	3	5	$\cdots$	$2n-1$
$\chi(s_1 p_1)$	$1+\dfrac{1}{2}$	$1+\dfrac{1}{8}$	$1+\dfrac{1}{32}$	$\cdots$	$1+\dfrac{1}{2^{2n-1}}$
$\gamma(s_1)$	1	1	1	$\cdots$	1
$\varphi'(s_m)$	1	1	1	$\cdots$	1
$\varphi''(s_m)$	$-\dfrac{1}{3}$	$-\dfrac{1}{3}$	$-\dfrac{1}{3}$	$\cdots$	$-\dfrac{1}{3}$
	$g'(x,y)$				
	-1	$-3x^2$	$-5x^4$	$\cdots$	$-(2n-1)x^{2(n-1)}$

Table 2.

$g(x,y)$	$\oint\limits_{P_{m-1}S_m} \dfrac{-g'_x(x,y)dx}{f'_x(x,y)g(x,y)}$
$-x$	$\int\limits_{P_2 S_1} \dfrac{dx}{-x(-x^2+1)} = \dfrac{3}{2}ln2 - \dfrac{1}{2}ln3$
$-x^3$	$3\int\limits_{P_2 S_1} \dfrac{dx}{-x(-x^2+1)} = 3\left(\dfrac{3}{2}ln2 - \dfrac{1}{2}ln3\right)$
...	...
$-x^{2n-1}$	$(2n-1)\int\limits_{P_2 S_1} \dfrac{dx}{-x(-x^2+1)} = (2n-1)\left(\dfrac{3}{2}ln2 - \dfrac{1}{2}ln3\right)$

Table 3.

$g(x,y)$	$\oint\limits_{S_m P_m} \dfrac{g(x,y)dx}{f(x,y)}$
$-x$	$\int\limits_{-1}^{2} \dfrac{-xdx}{(x-2)(x+1)^2} = 3\int\limits_{-1}^{2}\dfrac{x^2+3}{x^4}dx + 3\int\limits_{-1}^{2}\dfrac{2x^2+9x+6}{x^4(x-2)(x+1)^2}dx$
$-x^3$	$\int\limits_{-1}^{2} \dfrac{-x^3dx}{(x-2)(x+1)^2} = 3\int\limits_{-1}^{2}\dfrac{x^2+3}{x^2}dx + 3\int\limits_{-1}^{2}\dfrac{2x^2+9x+6}{x^2(x-2)(x+1)^2}dx$
$-x^5$	$\int\limits_{-1}^{2} \dfrac{-x^5dx}{(x-2)(x+1)^2} = 3\int\limits_{-1}^{2}\dfrac{x^2+3}{x^0}dx + 3\int\limits_{-1}^{2}\dfrac{2x^2+9x+6}{x^0(x-2)(x+1)^2}dx$
$-x^7$	$\int\limits_{-1}^{2} \dfrac{-x^7dx}{(x-2)(x+1)^2} = 3\int\limits_{-1}^{2}(x^2+3)x^2dx + 3\int\limits_{-1}^{2}\dfrac{x^2(2x^2+9x+6)}{(x-2)(x+1)^2}dx$
...	...
$-x^{2n-1}$	$\int\limits_{-1}^{2} \dfrac{-x^{2n-1}dx}{(x-2)(x+1)^2} = 3\int\limits_{-1}^{2}(x^2+3)x^{2(n-3)}dx +$ $+3\int\limits_{-1}^{2}\dfrac{x^{2(n-3)}(2x^2+9x+6)}{(x-2)(x+1)^2}dx$

Determine the values entering the formulae (12) of generalized integrals at the highest values of k, listed in the Table 2 and 3.

$$\oint\limits_{S_m P_m} \frac{dx}{f(x,y)} = \int\limits_{-1}^{2}\frac{dx}{y-\frac{1}{3}x^3+x} = \frac{2}{3}ln3 - \frac{1}{3}. \qquad (21)$$

Using the representation of the relation (21):

$$\oint\limits_{S_1 P} \frac{-xdx}{y-\frac{1}{3}x^3+x} = 3\int\limits_{-1}^{2}\frac{xdx}{(x-2)(x+1)^2} = -\frac{4}{3}ln3 - \frac{1}{3}. \qquad (22)$$

$$\oint\limits_{S_1 P_1} \frac{-x^3dx}{y-\frac{1}{3}x^3+x} = 3\int\limits_{-1}^{2}\frac{x^3dx}{(x-2)(x+1)^2}. \qquad (23)$$

For convenient integration, the element of integration of the relation (23) is separated an aliquot and expanded in elementary fraction, then we obtain:

$$3\int\limits_{-1}^{2}\frac{x^3dx}{(x-2)(x+1)^2} = -\frac{16}{3}ln3 - \frac{1}{3} + 9. \qquad (24)$$

Calculated values of the integrals from the Table 3 are presented in Table 4.

Writing out the expression for the value of $\Delta_1 T^{(2)}$ at $k=2$ according to (11) with relations (17), (20), (21) and (24), first we determine the following:

$$K^1_{2,0} = \Omega_0 \cdot \frac{9}{8}, \quad K^1_{3,1} = -\frac{1}{2}, \quad K^1_{3,0} = \frac{9}{2}ln2 - \frac{1}{6}ln3 - 3\Omega_1 - 3I_0 - \frac{2}{3}, \text{ hence:}$$

$$\Delta_1 T^{(2)} = \frac{9}{8}\Omega_0 \varepsilon_1^{2/3} - \frac{1}{2}\varepsilon_1 ln\frac{1}{\varepsilon_1} + \left(\frac{9}{2}ln2 - \frac{1}{6}ln3 - 3\Omega_1 - 3I_0 - \frac{2}{3}\right)\varepsilon_1.$$

Then, according to formula (13) the period T_ε of the limit cycle β_ε of the system (7) with consideration of the central symmetry, has the form:

$$T^{(2)} = 2ln2 - \frac{3}{4} + \frac{9}{4}\Omega_0 \varepsilon_1^{2/3} - \varepsilon_1 ln\frac{1}{\varepsilon_1} +$$
$$+ \left(9ln2 - \frac{1}{3}ln3 - 6\Omega_1 - 6I_0 - \frac{4}{3}\right)\varepsilon_1 + O\left(\varepsilon_1^{-5/3}\right). \qquad (25)$$

Universal constants Ω_0, Ω_1 and I_0 entering the expressions are determined according to (12). Note that here the period is calculated relative to time. If return to time τ and parameter ε (see (5)), the equality (25) should be rewritten in the form:

$$T_\varepsilon^{(2)} = (2ln2 - \frac{3}{4})\varepsilon + \frac{9}{4}\Omega_0 \varepsilon^{\frac{2}{3}} - \varepsilon ln\frac{1}{\varepsilon} +$$
$$+ \left(9ln2 - \frac{1}{3}ln3 - 6\Omega_1 - 6I_0 - \frac{4}{3}\right)\frac{1}{\varepsilon} + O\left(\varepsilon^{\frac{4}{3}}\right). \qquad (26)$$

Table 4.

$g(x,y)$	$\oint\limits_{S_m P_m} \dfrac{g(x,y)dx}{f(x,y)}$						
x	$[(-4$	-0	-0	$+0$	$+0$ ...	$... +0+0)\,ln3 - 1]\dfrac{1}{3}$	
x^3	$[(-3\cdot4$	-2	-2	$+0$	$+0$ ...	$... +0+0)\,ln3 - 1]\dfrac{1}{3}$	
x^5	$[(-9\cdot4$	-8	-4	$+0$	$+0$ ...	$... +0+2)\,ln3 - 1]\dfrac{1}{3}$	
x^7	$[(-27\cdot4$	-32	-8	$+0$	$+0$ ...	$... +0+0)\,ln3 - 1]\dfrac{1}{3}$	
x^9	$[(-81\cdot4$	-128	-32	-4	$+0$ ...	$... +0+2)\,ln3 - 1]\dfrac{1}{3}$	
...	... ...						
x^{2n-1}	$\Bigg[\Bigg[(-3)^{n-1}\cdot4 - \left(2^{2n-3}+2^{n-1}\right)\cdot\dfrac{\left((-1)^{n!}+1\right)\left((-1)^{2n}+1\right)}{2} - 2^{n-3}\cdot\dfrac{\left((-1)^{n!}+1\right)\left((-1)^{(n-1)\cdots(n-4)}+1\right)}{2} - \cdots$ $\cdots - 2^{2n-2m+1}\dfrac{\left((-1)^{n!}+1\right)\left((-1)^{(n-1)\cdots(n-m)}+1\right)}{2} + 2\cdot\dfrac{\left((-1)^{(n-1)!}+1\right)\left((-1)^{(n+1)}+1\right)}{2}\Bigg]ln3 - 1\Bigg]\dfrac{1}{3}$						

At $k=1$ the system of equations (6) presents a Van-der-Paul equation.

An asymptotic representation for the period of trajectory β_ε of the system (6) at $k=1$ has the form:

$$T_\varepsilon^{(1)} = (3 - 2ln2)\varepsilon + 3\Omega_0 \varepsilon^{\frac{2}{3}} - \frac{1}{3}\varepsilon ln\frac{1}{\varepsilon} +$$
$$+ \left(3ln2 - ln3 - 2\Omega_1 - 2I_0 - \frac{3}{2}\right)\varepsilon + O\left(\varepsilon^{\frac{4}{3}}\right). \qquad (27)$$

This is a well-known Dorodnitsyn's formula for the period of relaxation oscillations of the system described by a Van-der-Paul equation [3]. Similarly an asymptotic representation for the period of the trajectory β_ε of the system (6) could be determined at other values of $k = n$ using the Table 4.

So, recurrent formulae allowing to calculate with arbitrary degree of accuracy the period of relaxation oscillations described by nondegenerate system obtained from strongly nonlinear dynamic system with feedback of the second order are derived; with a satisfying steady limit cycle β_ε.

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Qualitative study of strongly nonlinear dynamic self-oscillating system with feedback

Abstract: A problem of qualitative study of oscillations of strongly nonlinear dynamic system with feedback is considered in the paper. The behavior of trajectories of the system in the state planes and near singular points is studied by applying Lyapunov's criterion. Sufficient conditions of the stability of the system as a whole are stated. Based on Poincare method of contact curves, the possible limit cycles are determined. A transitional process from unstable focus to self-oscillating and relaxation regimes of oscillations is established, as well as the corresponding limit cycles that are consistent with the analytical determination of the rings containing these limit cycles.

Keywords: self-oscillation, non-linear dynamics, trajectory, feedback, relaxation, Lyapunov's function, stability, transitional process.

Consider self-oscillations of strongly non-linear system of the form [1]:

$$m\ddot{x} + cx^{2k-1} - a\dot{x} + bx^2\dot{x} = 0, \quad k = 1,2,\ldots,m, c, a.b > 0 \qquad (1)$$

where m — is a parameter defining the characteristic of the object; c — is a coefficient of restoring force; a,b — are the parameters giving feedback to the system.

Let us reduce the equation to a standard form using the notations to dimensionless variables:

$$\tau = \gamma t, u = \frac{x}{l}, \gamma = \sqrt{\frac{c}{m}}\left(\frac{a}{b}\right)^{\frac{k-1}{2}}, l = \sqrt{\frac{a}{b}}, \varepsilon = \frac{a}{\sqrt{cm}}\left(\frac{a}{b}\right)^{-\frac{k-1}{2}},$$

$$\ddot{u} + u^{2k-1} - \varepsilon(1 - u^2)\dot{u} = 0, \qquad (2)$$

where γ, l — are the parameters of transformation; $\varepsilon > 0$ has the concept of a feedback factor.

Introduce the notations $u = x_1, \dot{u} = x_2$ then, the equation (2) has the form:

$$\begin{aligned} \dot{x}_1 &= x_2 \\ \dot{x}_2 &= -x_1^{2k-1} + \varepsilon(1 - x_1^2) \cdot x_2. \end{aligned} \qquad (3)$$

We would study the trajectories of the system (3) in the state plane:

$$u = x_1, \dot{u} = x_2, \dot{x}_2 = \ddot{u}.$$

From the system (3) it is evident that the origin of coordinates is a singular point corresponding to the state of equilibrium of the system. Determine the stability of this singular point. If the state of equilibrium is asymptotically stable, then, with increased τ the affix $x_1(\tau), x_2(\tau)$ must tend to the origin of coordinates.

Consider a circle defined by the equation:

$$V(x_1, x_2) = x_1^2 + x_2^2 = r^2, \qquad (4)$$

where r — is a distance between some point and the origin of coordinates.

According to [2] the origin of coordinates is an asymptotically singular point, if $V(\tau)$ is a decay function τ, tending to zero at $\tau \to \infty$.

Differentiating the equation (4), we get:

$$\frac{dV}{d\tau} = 2x_1\frac{dx_1}{d\tau} + 2x_2\frac{dx_2}{d\tau}.$$

Substituting here $\dot{x}_1, \dot{x}_2$ from the system of equations (3) and simplifying, we get:

$$\frac{dV}{d\tau} = 2x_1 x_2 (1 - x_1^{2(k-1)}) + 2\varepsilon x_2^2 (1 - x_1^2), \qquad (5)$$

at $k = 1$:

$$\frac{dV}{d\tau} = 2x_1 x_2 + 2\varepsilon x_2^2 (1 - x_1^2), \qquad (6)$$

at $k = 2$:

$$\frac{dV}{d\tau} = 2x_1 x_2 (1 - x_1^2) + 2\varepsilon x_2^2 (1 - x_1^2), \qquad (7)$$

as seen from relationships (5) — (7), the affix that starts its motion in any initial point $x_1(0), x_2(0)$ of the plane x_1, x_2, with increased τ tends to: a) in case of $k = 1$ and small values of ε it tends insideout, which indicates an instability of the origin of coordinates; b) in case of arbitrary k and ε — it tends from outside to inside, which indicates a stability of the origin of coordinates.

It should be noted that in case of $k = 1$ the equation (3) coincides with generally known Van der Paul equation.

To study the behavior of trajectories near the origin of coordinates we would apply Lyapunov's criterion [2] to the system (3). Lyapunov's function is determined in the form:

$$V(x_1, x_2) = \frac{1}{2}(\gamma_1 x_1^2 + 2\gamma_{12} x_1 x_2 + \gamma_2 x_2^2). \qquad (8)$$

Unknown coefficients γ_1, γ_{12} and γ_2 are determined so that the derivative $\frac{dV}{d\tau}$ is a negatively determined function of the form:

$$\frac{dV}{d\tau} = -(x_1^2 + x_2^2). \qquad (9)$$

Derivative of function $V(x_1, x_2)$ (8) has the form:

$$\frac{dV}{d\tau} = \gamma_1 x_1 \frac{dx_1}{d\tau} + \gamma_{12}\left(x_2 \frac{dx_1}{d\tau} + x_1 \frac{dx_2}{d\tau} \right) + \gamma_2 x_2 \frac{dx_2}{d\tau}, \qquad (10)$$

Taking into consideration a linear part of the system (3) and comparing with the expression (10), we obtain:

$$\gamma_{12} = 1, \quad \gamma_1 - \gamma_2 + \varepsilon\gamma_{12} = 0, \quad \gamma_{12} + \varepsilon\gamma_2 = -1. \qquad (11)$$

Solving these equations relative to γ_1, γ_2 and γ_{12} we determine:

$$\gamma_1 = -\frac{2 + \varepsilon^2}{\varepsilon}, \quad \gamma_2 = -\frac{2}{\varepsilon}, \quad \gamma_{12} = 1. \qquad (12)$$

Then, Lyapunov's function has the form:

$$V(x_1, x_2) = \frac{1}{2}\left(-\frac{2 + \varepsilon^2}{\varepsilon} x_1^2 + 2x_1 x_2 - \frac{2}{\varepsilon} x_2^2 \right). \qquad (13)$$

Form the conditions $\gamma_1, \ \gamma_2 - \gamma_{12}^2 > 0, \quad \gamma_2 > 0$ it is evident that the first condition presents a possibility of two scenarios of trajectories behavior:

a) at $\varepsilon > 0, V(x_1, x_2)$ — is a negatively determined function for any values of x_1 and x_2, then, the trajectory of the system is directed inside the ellipse (13);

b) at $\varepsilon < 0$ the trajectory of the system is directed to the surface of the ellipse (13).

Now we would return to initial non-linear system (3). Using Lyapunov's function (8), we could determine $\frac{dV}{d\tau}$ in the form:

$$\frac{dV}{d\tau} = -x_1^{2k} - x_2^2 + 2x_1^2 x_2^2 - \varepsilon x_1^3 x_2, \qquad (14)$$

at $k = 1$ with correlations:

$$\frac{dV}{d\tau} = -x_1^2 - x_2^2 + 2x_1^2 x_2^2 - \varepsilon x_1^3 x_2. \qquad (15)$$

As seen from expressions (14) and (15) they differ only in the first term, that is, the relationship (15) is a particular case (14).

So, according to the expressions (14) and (15) we may conclude that for sufficiently small values of x_1 and x_2 the derivative $\frac{dV}{d\tau}$ for both cases is negative. This means that the origin of coordinates is a singular stable point, that is, any trajectory with an increase in time τ intersects the surface $V = const$ from outside to inside. As seen from the correlations (13), (14) and (15), Lyapunov's functions satisfy Lyapunov's theorem.

Theorem (Lyapunov's theorem of stability)

If for the system (3) there exists in the domain D a sign-determined function V, its derivative in time $\dot{V}$, taken as a system (3), is a sign-constant function of the sign opposite to the one of the function V, then the equilibrium position is stable in Lyapunov's point of view.

	k = 1	*k = 2*	*k = 3*
ε = 0.01			
ε = 0.5			
ε = 2			
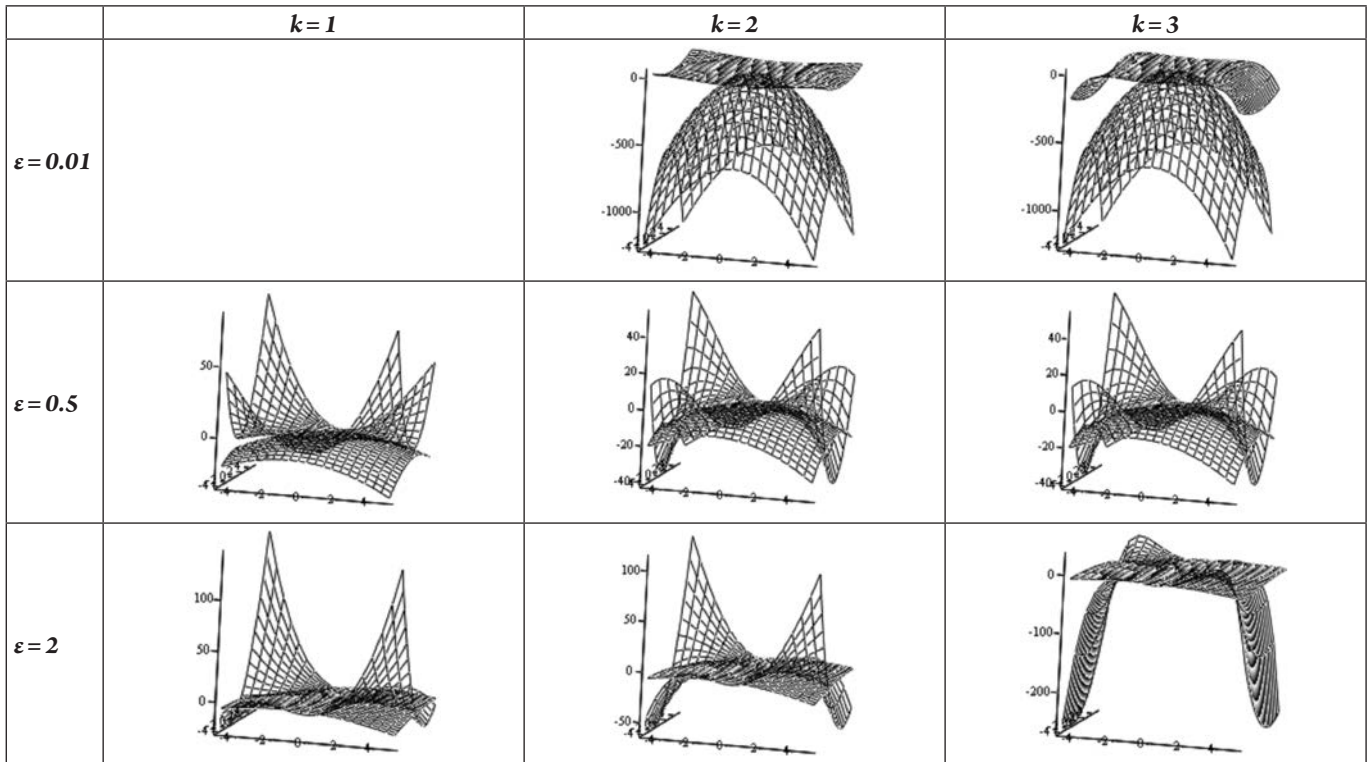
Fig. 1. Diagrams of the surfaces of Lyapunov's functions and their derivatives under different values of the parameter of feedback

Figure 1 shows the diagrams of the surfaces of Lyapunov's functions and their derivatives; it is seen that the greater the feedback factor and the degree of non-linearity, the better dynamic stability of the system on the whole.

So, sufficient stability conditions are stated for the system on the whole. An increase in feedback factor and consideration of non-linearity of higher orders facilitate an improvement of the stability margin of dynamic system.

To determine possible limit cycles we would utilize Poincare Method of contact curves [3]. Consider a set of concentric circles with a center in singular point of the equations (3). Define on a plane $x_1 x_2$ a geometrical position of the points, where these circles touch the integral curves of the equations (3). This geometrical position of the points forms a contact curve. Excluding the time τ from the system of equations (3), we have:

$$\frac{dx_2}{dx_1} = \frac{-x_1^{2k-1} + \varepsilon(1-x_1^2)}{x_2}. \qquad (16)$$

We should note that limit cycles at $t \to \infty$ satisfy the condition of central symmetry $x_2(-x_1, \varepsilon) = -x_2(x_1, \varepsilon)$, since the equation (16) does not change at the value of $x_1 \to -x_1$ and $x_2 \to -x_2$. As the origin of coordinates is a singular point, we would consider a set of concentric cycles with the center in the origin of coordinates: $x_1^2 + x_2^2 = const$.

Differential form of these cycles has the following form:

$$\frac{dx_2}{dx_1} = -\frac{x_1}{x_2}.$$

Contact curve is determined by the equation:

$$(1-x_1^{2(k-1)})x_1 + \varepsilon(1-x_1^2)x_2 = 0. \qquad (17)$$

Introducing polar coordinates, the equation (17) is transformed into:

$$(1-r^{2(k-1)}\cos^{2(k-1)}\theta)r\cos\theta + \varepsilon(1-r^2\cos^2\theta)r\sin\theta = 0. \qquad (18)$$

Everywhere except the point $r=0$, contact curve is determined by the equation:

$$r^{2k-1}\cos^{2k-1}\theta + r^2\cos^2\theta\sin\theta - (\cos\theta + \varepsilon\sin\theta) = 0, \qquad (19)$$

at $k=1$ the relationship has the form:

$$r^2 + r\frac{2}{\sin 2\theta} - \left(\frac{2}{\varepsilon\sin 2\theta} + \frac{1}{\cos^2\theta}\right) = 0. \qquad (20)$$

From quadratic equation (20) we determine:

$$r_{1,2} = -\frac{1}{\sin 2\theta} \pm \sqrt{\frac{1}{\sin^2 2\theta} + \frac{2}{\varepsilon\sin 2\theta} + \frac{1}{\cos^2\theta}}.$$

Maximum and minimum values of r with an angle θ have the form:

$$r_{max} = -1 + \sqrt{\frac{3\varepsilon+2}{\varepsilon}}, r_{min} = -1 - \sqrt{\frac{3\varepsilon+2}{\varepsilon}}. \qquad (21)$$

For the rest of the values of the order of non-linearity k the values of r_{max} and r_{min} may be determined as well [4]. This means that there exists a ring with the center in the origin of coordinates, containing all possible limit cycles; their boundaries being the cycles of the least r_{min} and the greatest r_{max} radii of correlations (21), touching the contact curves, determined by the equation (18). Figure 2 shows integral curves and the diagrams of phase trajectories built numerically by Mathcad 13 program package for the cases $k=1$, $k=2$ and $k=3$ at various values of the parameter ε.

Figure 2 shows transition processes from unstable focus to self-oscillating and relaxation modes of oscillations, and corresponding limit cycles which agree well with analytical definition of the rings, containing these limit cycles.

An increase in feedback factor ε and in the order of non-linearity k of differential equation (3) in the system leads to occurring of self-oscillating and relaxation vibrational processes.

Some of data above were announced in the Proceedings of the XI All-Russian Congress in Fundamental Problems of Theoretical and Applied Mechanics. Russia, Kazan, 2015.
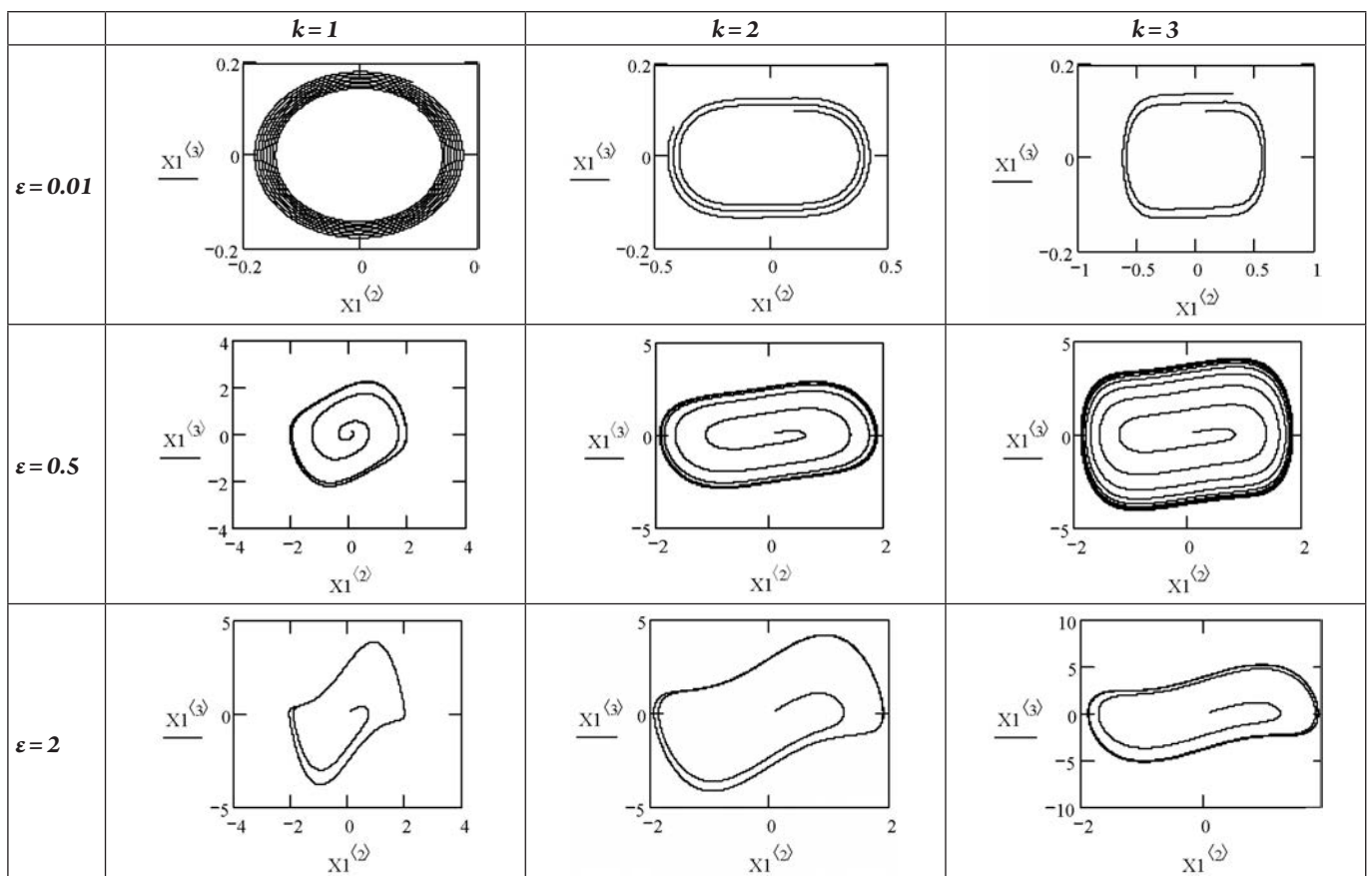
Fig. 2.

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Forgotten alternative to crank mechanism

Abstract: In the history of the industry of Europe, there was the mechanism with a screw surface for reception of rotation movement from linear movement. Having found new outlines in XIX century, but using the same principle, it took replaced the crank in the steam engine. Because of the big dimensions, it has ceased to be used and has been forgotten. The new design has appeared now, allowing to return to an old principle.

Keywords: crank mechanism, engine, drive, torque moment, screw surface, cylindrical wedge mechanism.

Transformation of translational motion into rotational motion is traditionally associated with a crank mechanism. They surround us everywhere and have become usual and indispensable. But why are screw surface mechanisms not used for this purpose? What obstructed their wide spread? Let's take a look at history.

The authors associate the first use of a screw surface in mechanics with Archytas, 428–365 BC. Archimedes went down in history as the author of a screw pump. The Mechanica by Hero of Alexandria considers simple mechanisms, including a screw. But all these examples describe the use of a screw surface as a transformer of rotational motion into translational motion.

The use of a water wheel in Europe in X–XV centuries was a foundation for future mechanization. Some processes required not rotational motion, but reciprocal motion of an output element, for instance, in blacksmithing, metal industry, construction and weaving. Hence, crank mechanism gained widespread.

Although, according to literature sources, another mechanism with a screw surface was used apart from the water wheel. Thus, the book of an Italian architect and engineer Giovanni Branca «Le Machine», 1629 depicts such mechanism in figures XVI, XIX, XX in the first part [1]. It transforms linear motion into rotation. The mechanism is based on a drum capable of revolving about its axis — it is installed vertically in the support blocks. Two spiral pipes installed at the angle of elevation over 45° are fixed on the cylindrical surface of the drum. Water is used as a vertically moving body. Supplied from top, under gravitation force, it runs down spiral pipes; herewith, affecting the walls of the pipes, radial component of gravitation force makes the light drum revolve. A toothed wheel is attached to it at the bottom and the revolving is transferred to burr stones as shown in figure XVI (Fig. 1).

Figure XIX depicts a cascade of three such drums, one below another (Fig. 2).

Figure XX shows the use of such machine in household — the drum is located in the cellar of the house and it puts the spinning wheel upstairs in motion (Fig. 3).

Thus, one can conclude that such mechanisms were widely applied in Europe in XVI–XVII centuries.

100 years before this Middle, or as it is also called «High» Renaissance, in one of his codices, Codex Madrid I, 1493, kept at the National Library of Spain under registration number 8937, Leonardo Da Vinci (1452–1519) described the structure of an endless screw in page 70. The mechanism is known under the code Madrid Ms. I (BNM), MSS/8937, fol. 70r [2]. The entire mechanism transforms the rotation from one plane into the rotation in the other plane. It is possible due to screw surfaces with a high angle of elevation. Let us suppose that if one makes such surfaces on a cylinder, installs a screw in such a way that it cannot move along axis, and makes the cylinder move linearly, the screw will revolve sliding along the turns. In the mechanism of Leonardo, such cylinder is convolved and forms a torus (Fig. 4). With the help of an input element — gear wheel m-n, that has projections, which correspond to pockets in the torus supported by worm rollers, starts rotating in the horizontal plane, and the output element — screw, sliding on the screw surfaces, also starts rotating but in the vertical plane. The figure does not show that the screw is fixed against the movement on the axis of the torus, but, according to the comment by Leonardo to the figure, «if one makes the endless screw rotate with the help of gear wheel m-n, and firmly keeps the screw f-s in place to make it possible for it to rotate, the rotation of the screw will undoubtedly take place with a strong force» [3]. Thus, one can assume that it is the first, from archive data, mechanism using screw surfaces with the angle of elevation over 45° to create rotation of the output element. Although, due to the difficult production, it was most probably never manufactured as well as many constructions of Leonardo that were ahead of time.

Fig. 1.
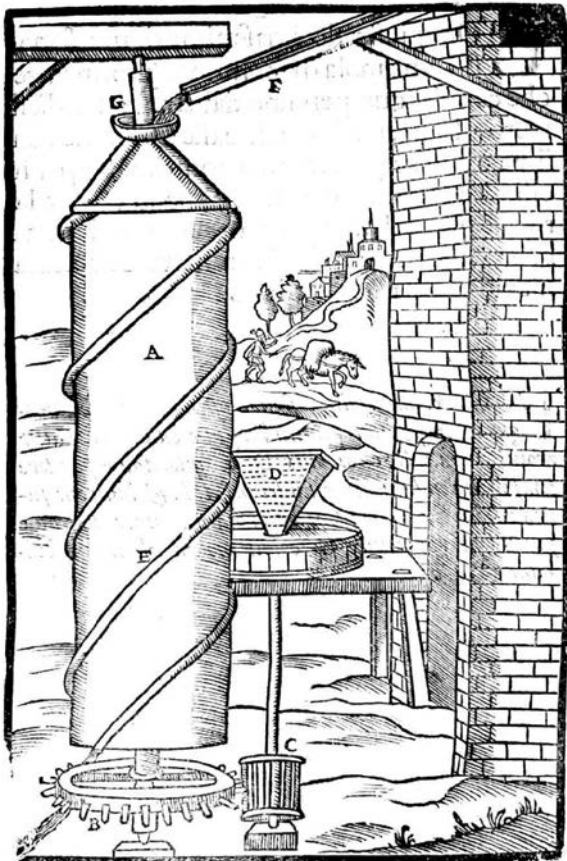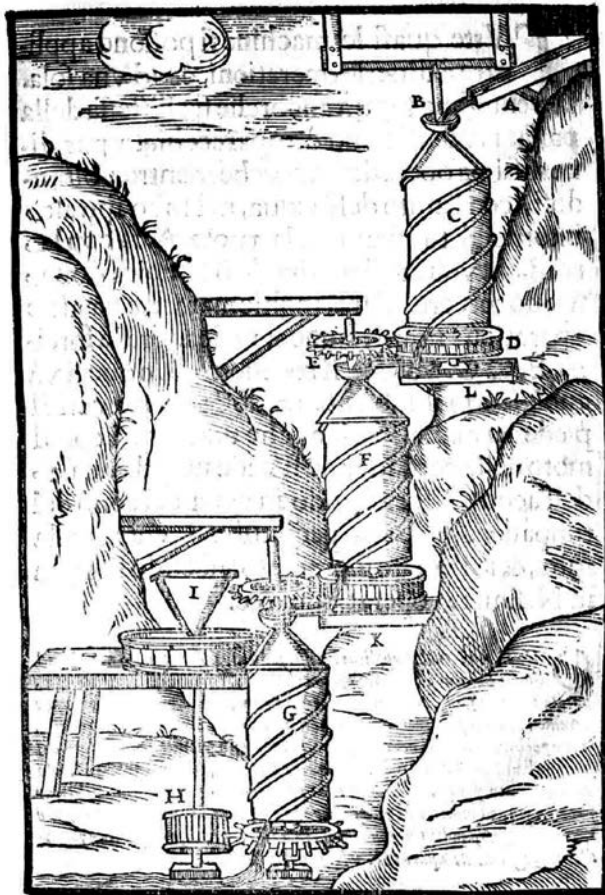
Fig. 2.
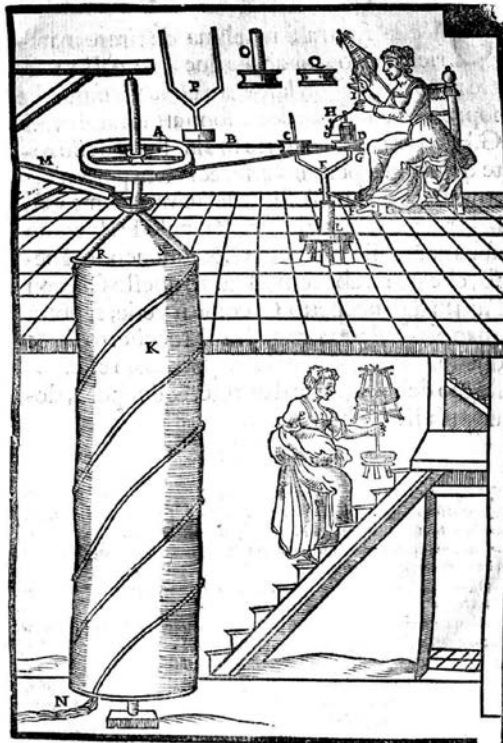
Fig. 3.
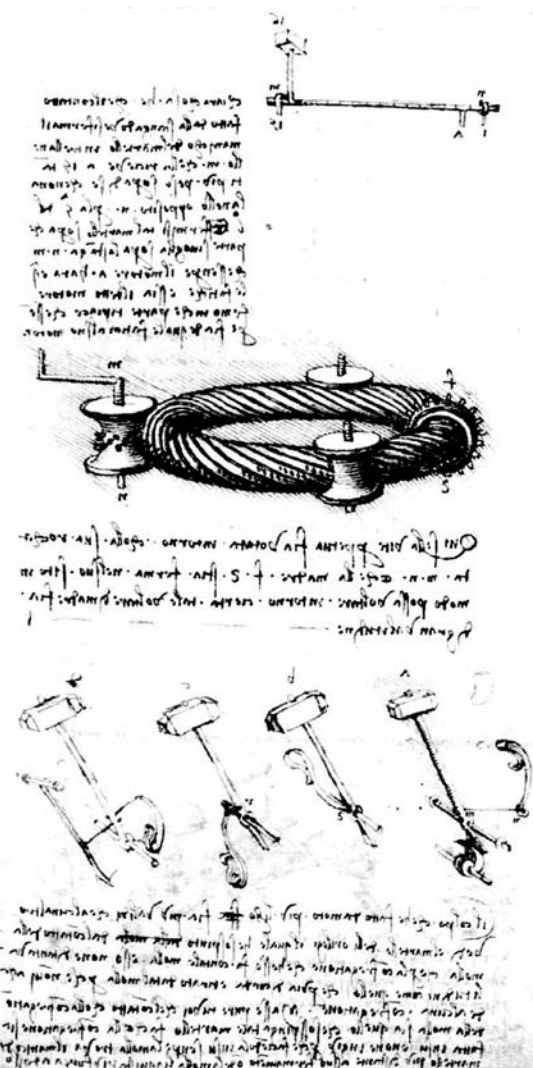
Fig. 4.

In the Modern age, when the energy of falling water was replaced by the steam, and Watt steam engines were widely applied, the mechanism with a screw surface to obtain rotational motion from linear motion gained a new shape. Thus, there is an element under number 167 in the collection of illustrations and descriptions contained in the book of Henry T. Brown «Five hundred and seven mechanical movements» published in New York in 1871 [4] (Fig. 5).

MECHANICAL MOVEMENTS.
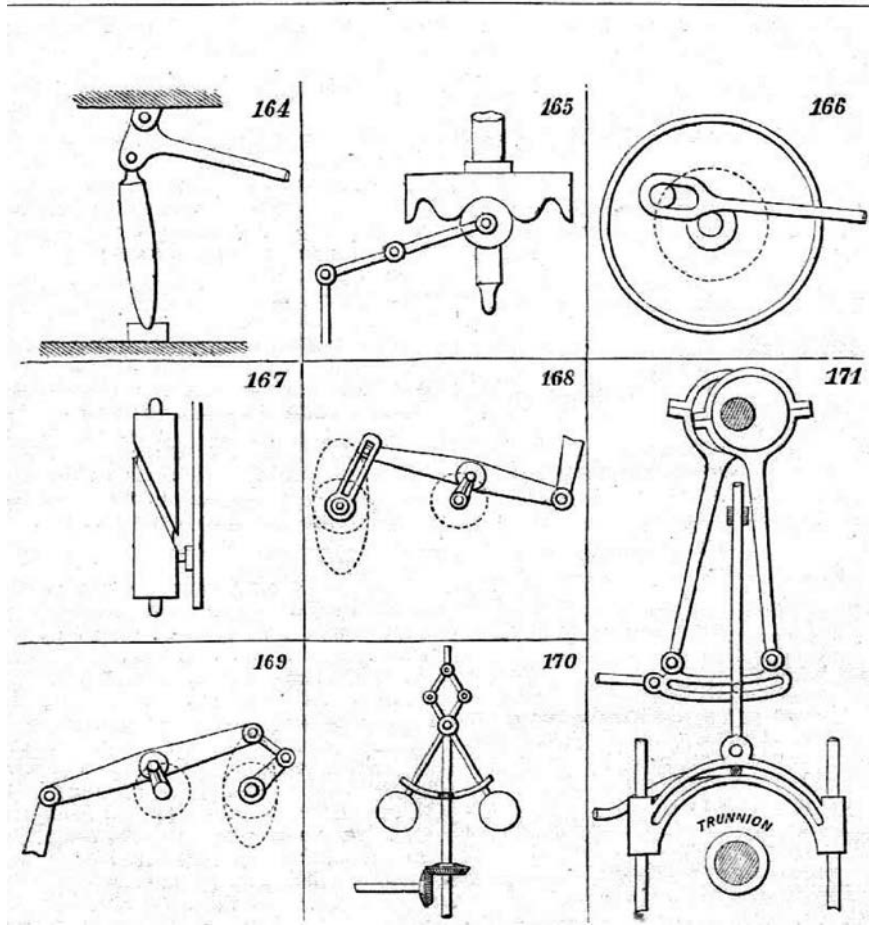
Fig. 5.

It is described as follows: «A drum or a cylinder with an endless helical groove spread around it; one half of the groove has an inclination in one direction and the other half has an inclination in the opposite direction. The pin on the rod performing reciprocal straight line motion moves in the groove thus transforming reciprocal motion into rotational motion. It was used as a replacement of crank in the steam engine».

Now, mechanisms transforming reciprocal motion of the input element into reverse rotational motion of the output element with the help of a screw surface with an angle of elevation over 45° are rarely applied. Series-produced ball screw gears (BSG) allow transforming translational motion into rotational one. There are BSGs whose lead is twice as big as the nominal diameter of the screw, i. e. the elevation angle is 32°28′. There is no BSG with an angle of elevation of 45° because, then, the screw will be too long as, constructively, the number of turns in the screw is usually from 1 to 6 [5]. But when it is required to create a high pulling torque, when it is required to obtain only rotational motion — it is not effective to use BSG, and even impossible. It makes sense to use a screw pair for this purpose, whose angle of elevation of helical curve is over 45°, i. e. when the screw pair becomes a mechanical enhancer. All mechanisms using such transformation have a significant advantage — developed torque moment is even in the time function under constantly acting force and there is no one-sided effect on the output element. However,

there is a significant disadvantage as well — longer helical curve, i. e. large size and a small angle of turn of the output element. The effort to reduce height, i. e. reduce the motion of the input element, leads to the limitation of turning angle and, consequently, to inevitable reversibility — during reverse motion there is a turn in the reverse direction. These disadvantages overshadow the advantages of screw pair, where the elevation angle of helical curve is over 45° in mechanisms for transformation of translational motion into rotational motion. Thus, the opportunity to obtain even torque moment on the output element without one-sided effect on it is not used. This explains a rare use of similar mechanisms in the past and today.

However, one can limit oneself to a small part of the screw surface with an angle of elevation over 45°, and, herewith, obtain rotational motion in one direction from reciprocal motion. Such drive constructions are described in a patent for the invention RU 2389925 C2 [6], the authors of which are the authors of the present article.

Torque moment in all variants of drives is created with the help of wedge mechanism folded around rotation axis. For the sake of convenience, instead of the phrase «power mechanism with a screw kinematic pair with a screw surfaces made under the required law, with the elevation angle significantly bigger than the friction angle, with intermediate bodies of rolling or sliding between the screw and nut or with their direct contact», the authors of the invention introduce *a new notion* — cylindrical wedge mechanism (CWM). Unlike

the known wedge mechanism, the members of which form only rectilinear pair, CWM contains a screw pair that allows transforming translational motion into rotational one. Considering the forces in a regular screw pair, it is convenient to turn the screw to medium diameter in the inclined plane, and replace the nut with a sliding member. The screw pair allows, just like the wedge, gaining advantage in force. The notion of CWM was introduced to emphasize this fact, as well as due to a significant similarity to wedge mechanism, the input element of which the translational motion is reported to, and also to make it clear which screw pair is meant. As an example of *cylindrical wedge*

mechanism — CWM, let's consider the drive construction based on item 2 of the formula similar to figure 1 of the patent [6].

The drive in figure 6 contains a fixed member 1 of the wedge mechanism, which is simultaneously a drive case, in this example — the case of hydro-cylinder, firmly tied with the second fixed member 9 of the wedge mechanism due to functional and constructive reasons, as well as moving element 2 of the drive, input element 3, intermediate element 7, mechanism of one-way action 14 and output element 11. Control system is not shown in figure 6 — it may be of any type.
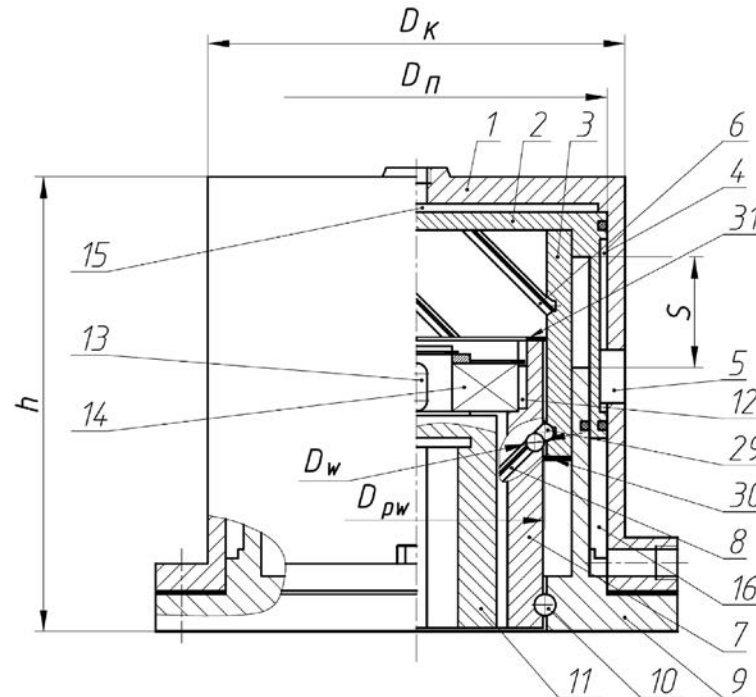
Fig. 6. Construction with cylindrical wedge mechanism

A piston, the moving element 2 of the drive, can be placed inside the fixed member 1. Any linear drive can be used in the description of the invention [6]. Due to functional and constructive reasons, the moving element 2 is firmly tied with the input element 3 of the wedge mechanism that has several helical grooves 6. The intermediate element 7 has response helical grooves 8. Screw working surfaces of the grooves 6 and 8 is made according to the required law, have the elevation angle significantly bigger than the friction angle and have a needed shape in the section. To reduce losses during operation, elements 3 and 7 are divided by the rolling elements 29 located in the helical grooves 6 and 8. The moving element 2 has additional helical grooves 4 — directional grooves setting the law of its motion, and the motion of the input element 3 of the wedge mechanism firmly tied to it. The surfaces of these directional grooves 4 can slide along several directional elements 5 fastened in the fixed member 1 of the wedge mechanism. Since the elevation angle of the helical grooves 6 and 8 is significant, the change of the position of the moving element 2 with the input element 3 allows gaining turning motion of the intermediate element 7 of the wedge mechanism in accordance with the law set by the helical grooves 6 and 8 as well as the law set by the additional helical grooves 4. To simplify this, let's consider that the grooves 4 are vertical. Elements 3 and 7 with screw working surfaces, contacting with each other through rolling element 29, are the basic elements of the cylindrical folded around the axis turn of the output element 11 of the wedge mechanism. It acts as a power mechanism. Plates 30 and 31 are fixed on the end surface of elements 3 and 7 to prevent the release of rolling

elements 29 beyond the sphere of their mutual contact with helical grooves 6 and 8. It is possible to apply separator for rolling elements or use a by-pass channel to make close the chain of rolling elements. Intermediate element 7 relies upon the ring-shaped row of rolling elements 10 installed between the intermediate element 7 and fixed element 9 of the wedge mechanism.

Between the intermediate element 7 and output element 11 of the wedge mechanism, mechanism of unilateral action 14 intended for rendering of torque moment from the intermediate element 7 to the output element 11 only in one direction is installed with the help of fixed connections 12 and 13. For instance, unilateral free-wheel clutch or ratchet gear can serve as such mechanism.

The drive operates according to fig. 6 as follows.

Operating environment is supplied to the upper pocket 15 of the drive under pressure. At the same time, moving element 2, firmly tied with the input element 3 of the wedge mechanism, starts moving downwards sliding along the directional elements 5 that render the appearing reaction moment to the fixed member 1 of the mechanism. Axial force developed by the moving element 2 and rendered to the input element 3 of the wedge mechanism and further through contact surfaces of the helical grooves 6 and 8 with rolling elements 29 to the intermediate element 7, is taken by the ring-shaped row of rolling elements 10. Thus, input element 3 of the wedge mechanism going downwards turns the intermediate element 7, which renders torque moment through the fixed connection 12 to the mechanism of unilateral action 14. This mechanism renders rotation to the output element 11 through fixed connection 13.

In the bottom position of the moving element 2, there is a double line sensor installed in the control system (control system is not depicted in fig. 6) that sends a signal for reversing of movement of the moving element 2. During this free movement of the moving element 2, the output element 11 does not turn. Now, the operating environment under pressure is supplied to the bottom pocket 16 of the drive. The moving element firmly tied with the input element 3 of the wedge mechanism starts moving upwards; herewith, the intermediate element 7 turns backwards because the directions of axial and peripheral forces, as well as contact surfaces of helical grooves 6 and 8 of the elements 3 and 7 with rolling elements 29 changed. But now, the intermediate element 7 cannot turn the output element 11 because the mechanism of unilateral action 14 in this direction does not render torque moment and the output element 11 is still. When the moving element 2 reaches the upper position, one double line is completed and the intermediate element 7 turns to the same angle as when moving downwards.

If the required angle position is achieved through one double line, the sensor of angle position of the output element 11 installed in the control system sends a signal for the completion of the drive's work. Otherwise, there is another double line of the moving element 2. Thus, the turn can be performed to any required angle.

In case of repeated double lines, interrupted rotation will take place. One should remember that patent [6] has variants of constructions that have both lines as operating.

The considered construction has more than one double line, which, on the one side, leads to reduction of height of the drive, and on the other side, increase of the time of turning to a required angle. If the second factor is important for the drive, it can be kept within required range at the expense of increasing the speed of movement of the moving element and input element 3 firmly tied with it. The increase of the speed of the input element allows construction with CWM serve as alternative to the constructions with crank mechanism.

As a result of experimental studies of cylindrical wedge mechanism, with same parameters for all samples:

- ball diameter $Dw = 7.94$ mm.;
- diameter of circumference of ball location $Dpw = 50$ mm.;
- number of operating grooves on a sample $i = 3$;
- number of balls in one groove $z = 2$,

dependences on axial force under different profiles and elevation angles were obtained (fig. 7). Samples № 21, 22, 23 have a trapezoid profile and elevation angle of the groove 62.25°, 70°, 80° respectively. Samples № 25, 27, 29 have an arc profile and elevation angle of the groove 62.25°, 70°, 80° respectively.
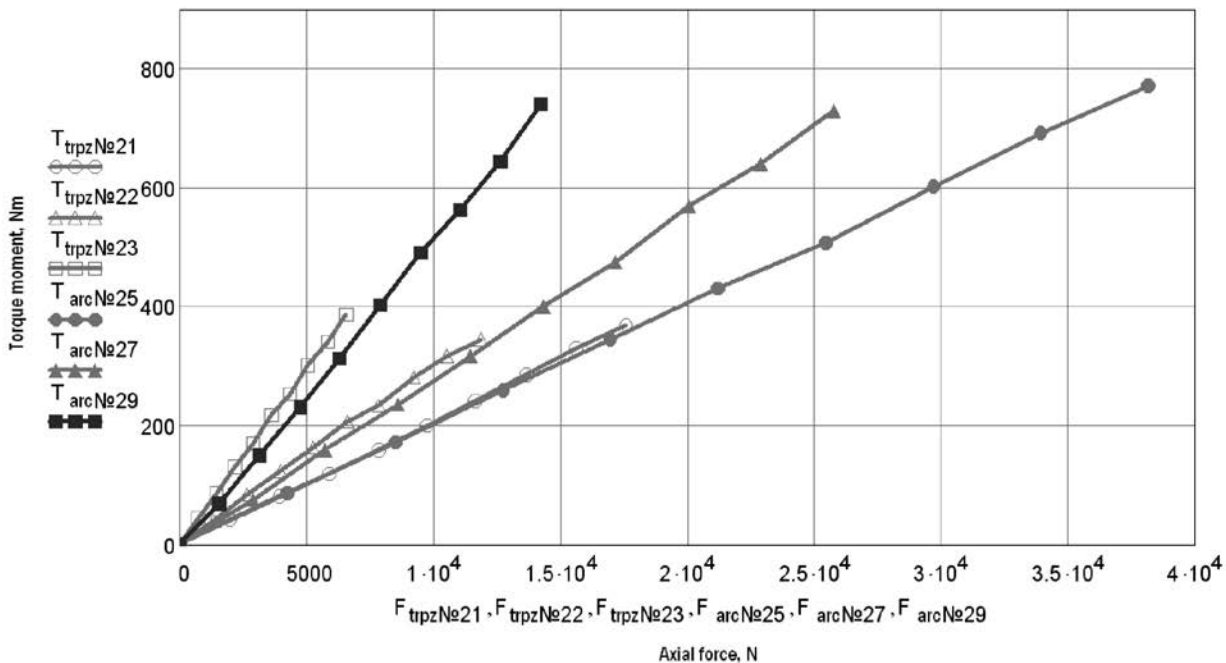
Fig. 7. Dependence of the moment on axial force under different profiles and elevation angles

Fig. 7 depicts the influence of the profile and elevation angle on the change of the moment and axial force in case of same properties of the material for all samples. With the increase of the elevation angle of the helical groove, the moment increases and the required axial force reduces. The increase of the permitted contact stress allows increasing the moment significantly.

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Section 7. Pedagogy

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Scripchenko about the ways of development primary school students' thinking (1960)

Abstract: The article reveals O. Scripchenko (1921–2007) psychological and pedagogical views according to development of primary school students' thinking. It focuses on scientist's researches of generalization and other kinds of thinking operations, the acquirement of them is considered to be the guarantee of development students' of the 1st – 4th forms thinking.

Keywords: O. Scripchenko, primary school students', primary school, intellectual development, thinking.

In the National Strategy for Development of Education in Ukraine until 2021 (2013) one of the strategic direction is reconstruction of the process of teaching and upbringing on the principles of evolving pedagogics which is directed to the precocious identification and the most complete revelation of the children's potential taking into account their age-specific and psychological specialties.

In the context of learning ideas about the ways of formation primary school students' thinking it is worth to analyze the contribution of Ukrainian scientist Oleksandr Scripchenko (1921–2007), who was investigating effectively the special peculiarities of primary school students' thinking operations in the process of studying.

The aim of the article is to analyze psychological and pedagogical views of O. Scripchenko about the ways of formation primary school students' thinking (1960s).

During 1960s the scientist had been investigating the development of primary school students' thinking which became the continuation of his researches that were started in 1950s. Theoretical generalization and conclusions determined by him were based on the results of experiments which were held in many institutions of general education and scientific data which he obtained didn`t lose their actuality up to this time. So, sind 1964 O. Scripchenko together with his wife, who was a scientist, N. Scripchenko and the teachers had been conducting the complex experiment in the school № 166 in Kyiv, the aim of which was «systematical investigation of the mental development of primary school students in the conditions of learning the educational data according to the experimental programme from language and mathematics» [9, 48]. Saying «mental development» the scientists meant «development thinking and speaking of the students' in the 1st – 4th forms» [5, 90]. Describing the experience of experimental reconstruction of the teaching in the first forms, the scientists mentioned that the experiment held during 1964–1965 school year enclosed all educational categories in two first forms [9, 48]. 79 students were involved to take part in the experiment, their progress was compared to the progress of the control classes (the first and the second) in other schools in Kyiv. The chief thing is that the experimenters accomplished the approbation of original programmes from language and mathematics developed by them, in particular of putting the elements of algebra into the course of mathematics of the 1st – 2nd forms. Later, in the article «Experimental studying of the arithmetic in the 2 form» (1966), analyzing the mentioned experiment, the scientist accentuated that

the aim of it was not only to identificate the peculiarities of children in the sense of mastering new programme material but, also, investigation of «correlation of studying and mental development (of children — L. K.), the dynamics of this development and verification of the effective ness of forming students' generalized methods of execution the educational tasks…» [7, 89]. The scientist proved that educational work from language and mathematics gives rich data for article forming students' generalization and expression of independency according to their age. In his view, «the operation of generalization forms the most effectively in the process of solving mathematical tasks» [8, 17]. O. Scripchenko didn't agree which the point of view of psychologist of that L. Zankov [4, 28], who affirmed that it is difficult for the students of the first form to solve difficult tasks and that's why we shouldn't speed with this category of work but should start to work with the tasks only from the third quarter of the 1st form. O. Scripchenko didn't agree with the approaches of famous scientist V. Davydov in those methodical treatment solving of the tasks didn't occupy a fitting place neither in the 1st or 2nd nor in the 3rd forms [3, 117]. O. Scripchenko, who had his own seeing of the problem, proved that we have to form primary school students' ability of using the generalized methods of solving tasks from the beginning of studying. The letter symbols in this sense were used him as the apparatus of generalization in the process of teaching students to solve the tasks with the help of both arithmetical and algebraic methods. The using of schematic notation of the task, graphic diagrams, which showed the full consistency of operations in solving analogical exercises and helped children to think favoured the successful studying. To our mind, such work assuredly motivated students to create, favoured the effective formation of primary school students' creative and other kinds of thinking. In his experiment O. Scripchenko excepted from the content of teaching some unimportant educational data in particular of the number of training exercises, instead of this students were proposed to learn new conceptions and notions which were necessary for general development of students. The scientist thought that «one of the conditions of the developing studying is discovering the most expedient correlation between theoretical and practical components in studying language, mathematics and other subjects» [9, 49]. In his mind, the role of theoretical data in formation of knowledge by students was unappreciated in the programmes of studying in those days, that's why he added in his experimental programme the explanation

of «some theoretical data» to the students of the 1st forms. As the scientist mentioned later, the experimentators were able to speed the learning of summation and subtraction not only within the first but also the second ten exactly due to acquaintance the students of the 1st forms with the elements of the algebraic theory of this operations which students have mastered without any problems. In teaching language scientists were able to extravagate the existing educational programme for the 1st form with the help of introduction the learning of the themes «Unstressed vowels» more detailed learning of the theme «Stress», which helped to activate the students' thinking activity, to form generalized methods of doing tasks [9, 53].

In the next 1965–1966 school year the experimental work was continued in the three 2nd forms of the school № 166 in Kyiv. Their progress was compared to the progress of the students in the control classes of the other schools in Kyiv. The programme of experiment involved «all categories of teaching and educational work» [7, 89]. As the scientist affirmed during revising the material which students learn in the first form, it was discovered that second formers of the experimental classes during the holidays «have forgotten generalized, expressed by letter symbols material. And just activating these generalizations, teachers could update the forgotten operations with numbers comparatively easy» [7, 90]. The special head was paid to solving of the tasks on the reduce to one and the reciprocal tasks which were solved by arithmetical method and by generation of education. To the types of their tasks which were solved by the second formers the authors of the experiment the tasks on movement. Moreover, as O. Scripchenko mentioned in the article «Experimental studying of arithmetic in the 2nd form» (1966), firstly was the attempt to form students' conception about the rate of movement which was based on the analysis of their living conception and obtained mathematical knowledge and skills [7, 92]. The scientists paid special attention to mastering by students some ways of drawing conclusions by analogy. It is worth to mention that children also were learning to draw conclusions based on their observations [7, 93].

Continuing the experiment in 1966–1967 school year in which the students on the 3rd forms of the school № 166 in Kyiv were involved, the scientists gave each children two check-up tasks every 8–12 days to evaluate the effectiveness of students studying in the experimental and control classes. In sum by the end of the school year the students had solved 16 checking tasks by six variants which were similar in structure that guaranteed independency of doing and objectivity of control the knowledge. The research gave O. Scripchenko rise to the conclusion about that the reconstruction of the studying process in the experimental classes, in particular of teaching to make formulas, numerical and letters expressions, helped children to master the structure of the task more effectively. Summing up the results of all the experimental researches, O. Scripchenko wrote that «in all experimental classes the educational work changed substantially, especially from language and mathematics» [6, 58]. Thusly, in the article «The influence of the content and methods of teaching on the mental development of students of the 1st – 3rd forms» (1967) he described the experimental facts that testified to positive influence of updated content and methods of teaching not only on the quality of knowledge but also on mental development of students. The thing is that the scientist accentuated that obtain much more information, get a better development than by traditional in those days. The scientist proved the opinion that the content and methods of teaching influence on the development of students' thinking, formation generalized methods of solving tasks, on the speeding of transformation from differentiation to integration of thinking structures [6, 10].

It is worth to accentuate that the scientist's researches of development the operations of generalization which primary school students have found practical use in the process of reconstruction the studying of mathematics in primary school in 1971–1973 school years. Taking into consideration positive results of experiments which O. Scripchenko received and opinions of the teachers, algebraic propedeutics, in particular of solving tasks on generation of education and, also studying letters expressions were involved into teaching programmes for the 2nd – 3rd forms. Scientific innovations propounded by O. Scripchenko later became pedagogical axioms of the content of teaching mathematics in the 1st – 4th forms and were developed creatively in the textbooks of the famous Ukrainian, scientist-methodologist M. Bogdanovich. Substantial is O. Scripchenko's conclusion about that that in primary school age the ability of studying, the main parts of which are generalized mental activities methods of their solving, is formed in students [6, 66]. These scientist's ideas hadn't lost the importance up to this time and the ability of studying is determined nowadays one of the most important competences, the formation of which at the present stage of development primary school education became the learning task for teachers according to National Educational standards of primary school [1].

Scientist's masterprice and results of his experimental and theoretical work influenced essentially on improvement the content of the school course from mathematics for primary school.

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Correction and reconstruction work speech therapists in addressing cross-cutting issues neurorehabilitation

Abstract: the article substantiates the interdisciplinary problem which is related to issues of patient rehabilitation after stroke, requires the solution of a general medical and social and institutional, correctional and educational problems.

Keywords: neurorehabilitation, stroke, type of correctional and pedagogical work, interdisciplinary problem, concept.

According to the World Health Organization (WHO), stroke, occupies a leading position after heart disease and cancer [6]. Rehabilitation concept, developed by WHO experts and recommended for implementation in practice with regard to economic, organizational and other capacities of countries, is a system of measures aimed at the most rapid and complete recovery of physical, psychological and social status of the patient. The main objective of these measures — the integration of the patient into society to achieve it possible for the social and economic independence. In Russia, there is more than 500–550 thousand. Strokes per year, that number is equal to the average population of the regional city of [5]. The majority of surviving patients have a variety of functional disorders: the end of the acute period of more than 50 % of patients — speech disorders and other higher mental (cognitive) functions. Based on the study of the works of Russian scientist V. M. Practice Shklovsky, and others. Neuro-rehabilitation seems as hard pathogenetically based process multidisciplinary comprehensive treatment and recovery programs with mandatory use of medical methods, medical and psychological, medical and pedagogical and medico-social impact, the significance and intensity of which vary at different stages of the disease, treatment, primarily to the individual patient [1].

The methodology of an interdisciplinary approach to treatment and neuro-rehabilitation was laid neurologists (V. M. Behterev, S. N. Davidenkov), physiology (I. P. Pavlov, L. A. A. Orbeli, P. K. Anohin, N. A. Bernshteyn), psychologists (L. S. Vygotsky, A. R. Luriya, A. N. Leontev, B. G. Ananiev, etc.), teachers, psychologists, speech therapists L. S. Tsvetkova, V. Shklovsky, M. K. Shokhor and Trotsky (Burlakova), O. S. Orlova, O. P. Purtshvanidze, E. S. Berdnikovich et al. Rehabilitation of patients after cerebral stroke, aimed at disability prevention, reduction of its severity and help to patients in terms of their maximum possible physical, mental, social and vocational adaptation, is one of the most important multidisciplinary (medical, educational, social and et al.) concerns. In this regard, in spite of the significant intensification of the study of many aspects of correction and replacement of pedagogy, medicine, many questions concerning neuro-rehabilitation of patients still remain insufficiently studied [4].

The purpose of the research — to develop a model of correctional and rehabilitation work with a speech therapist rehabilitation of post-stroke patients, based on the concept of rehabilitation potential, including a strategy analysts of this potential and the associated practical issues, technology diagnostic and psycho-pedagogical (speech therapy) support patients after stroke. The content of this study is defined by the basic contradiction — increasing frequency acute evolving vascular events, including acute cerebrovascular accidents (CVA), an increase in stroke prevalence in people of working age and the lack of effectiveness of existing on the date of the system of rehabilitation and preventive measures, not taking into account the psychological and pedagogical, correctional and pedagogical aspects of rehabilitation potential of patients, their subject position and deficits (not only cognitive, and a host of emotional, personal, and behavioral problems in rehabilitation, caused by organic lesions of the brain). At the heart of the development of the stated fundamental and applied problems is the need to confirm the following hypothesis: the development of conceptual and technological strategy of correction and rehabilitation work speech therapist in the rehabilitation of post-stroke patients will reveal the psychological and educational deficits and rehabilitation potential of post-stroke patients, to determine the basic principles of support, taking into account the structure of the psychological activity of correctional-pedagogical potential formation of a subject position of post-stroke patient. Development of rehabilitation technologies correctional health recovery post-stroke patients with regard to the criteria included in the group of patients early, late recovery period and the period of the consequences of acute ischemic attacks would achieve the optimal level of well-being and habilitation, which is possible in their situation. Develop a set of measures to improve the pedagogical competence of medical personnel dealing with post-stroke patients, improve the quality of post-stroke rehabilitation care to patients. The result of the study will be the optimal recovery of speech disorders, improving the quality of communication and interpersonal relationships, improving performance of functional systems and optimization of the psycho-emotional sphere of post-stroke patients, which is not limited to the time frame and can quite successfully held in the later periods of recovery. And not only in specialized hospitals, rehabilitation centers, but also in clinics in the community, as well as self-study at home. The lack of comprehensive interventions, including regular sessions with a speech therapist, a teacher, a psychologist reduces the efficiency of the process of reintegration and rehabilitation: the deterioration of the quality of the restoration of speech disorders, quality of communication, reduce the level of performance of functional systems, violation of the psycho-emotional state of post-stroke patients. In the end, it leads to the formation of different types of response to disease (from disharmonious to harmonious). However, despite the obvious relevance and importance of the process of reintegration and rehabilitation of post-stroke

patients in all periods of recovery organization of this process as a process of continuous, integrated and differentiated impact on the post-stroke patient by means of correction and rehabilitation work speech therapist in the process of comprehensive rehabilitation are not well understood [1; 2; 3; 4; 7; 8; 10].

Existing methodological approaches, methods, tools and technologies to the organization and conduct of correctional and rehabilitation work speech therapist in the process of comprehensive rehabilitation of post-stroke patients in the later periods of stroke in order to continue the restoration of speech disorders, improve functional capacity and optimize the psycho-emotional state in clinics in the community and at home require further more detailed study [4; 9].

In summary, we note that a stroke — an interdisciplinary problem, which is related to the issues of nursing and patient rehabilitation due to the severity of the consequences and complications, requires solving both general medical and social, organizational and pedagogical problems that determines, ultimately, the effectiveness of treatment and rehabilitation. This is an area of medical psychology, medical, pedagogical and medico-social assistance, which is an integrated, multidisciplinary system is required for the implementation of months or even years. It is a specialized field of activity, which is obligatory under the neuro-rehabilitation process, allowing to achieve the maximum possible recovery of lost higher mental (cognitive), motor function and activities of social functioning of patients with sequelae of focal brain lesions. The complex biomedical and psycho-pedagogical knowledge required for their development of a multidisciplinary approach, where neuropsychology, personality psychology, special psychology and pedagogy occupy a leading position.

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The idea of scientific professional communication in subject-variative career extension

Abstract: The article discusses the specifics of the subject-variative extension of teacher's professional career as a holistic multi-purpose complex of educational features in its formal, non-formal and informal ways, contributing to the implementation of teacher's career aspirations. The author proves the potential of scientific communication to provide the variety of high-grade, high-quality selection of specific options for a professional career development.

Keywords: subject-variative extension; scientific communication, educational trajectory, life-long education; professional career, variety, career development.

The formation of life-long professional pedagogical education is a complex, multifactorial and controversial process. Practice shows that there is no single strategy of the professional career. Each person is unique, and the process of developing career strategy in each case is unique.

The development of the professional career as a way to self-realization can be achieved only through the choice. "To be a person, — writes Galperin P., — is to be the conscious, socially responsible subjects" [2]. It is the person, who regulates his activity on the basis of consciousness, that constitutes indicative part of his actions.

Kolesnikov V., Leshkevich T. focus on creative, active potential of the personality who uses in the process of the self-consciousness full potential of science and culture [4; 5].

The problem of modern human existence is that he has to adapt constantly to the unstable, ever-changing world. On the other hand, the spiritual expression of human inevitably appears as a combination of rationality and faith in man.

Thanks to this unity of faith and rational the comprehension of reality is performed. This feature of human existence is called virtual reality, which becomes characteristic for education. It is becoming more and more updated today as a qualitative characteristic of modern education [4].

The process and the need for the development of the person as a whole does not depend on the specifics of a particular professional career. However, its specified focus can be ontological determinant of achievements.

According to Gorshkova V. S. research "social time pressure, ruthlessness and cruelty of continuing reformations and innovations make a person be under stress". On the other hand, the complication of living requires the revision of the prevailing conservative views and attitudes, overcoming of one's former self-conscience, enhanced reflection one's existing valuable experience, bringing the benefits and success of daily life philosophy [3].

The idea of activity chosen by a man "directs the course of life" (Frankl V.), becoming the mode of existence of the subject, defining his social position, a creative orientation of professional work and its ontological content.

Personal development of the professional, success of the career phased implementation involves some dynamics of its properties and qualities that are represented as "increments" of the personality.

The teacher's career development is specific compared with the professional development of other categories of workers. Mentality of the teacher is interdependent with his spiritual and practical activities focused upon the preservation and transmission of spiritual and moral values to new generations. Personality of the teacher is his main professional tool.

Moreover, the development of teacher personality can be viewed upon in two aspects: as the goal of the professional activity and as a target for professional development. Consequently, the achievement of these two forms of target layers should be similar, in particular — forms of collective and group activities as the most effective for the development of personality [4]. This approach is particularly productive in the process of teacher's professional development.

Unlike most professions, for the teacher, these forms are not only important as a means of self-development, but also as a professional tool. Teacher himself uses forms of collective and group activities, managing the development of the students, that is he performs his professional role. The specificity of the teaching profession is that it creates favorable conditions for the realization of the concept of lifelong learning included in the professional activity [6]. Thus, the development of a professional career becomes the value necessary for teachers as the subject of activity.

The idea of a balanced interaction between the processes of the internal development of the teacher and his external social movements in the development of career space helps to resolve the main problem of the formation of XXI century human. It's the identification of regularities, individual and personal ways of becoming human in the general educational practice, professional career development, revival of his spirituality and genuine intelligence and the sustainable progressive development of our civilization, overcoming the negative effects of informatization of education, which may be the predominant in the conditions of market relations [4].

Focusing on life-long continuity of the professional career development [7], we emphasize the complementary-character and diversity of forms of life-long education — formal, non-formal and informal. The scheme of interaction of the processes of teacher's formal, non-formal, informal education and the development of his career is represented in the illustration.

The interaction of formal, non-formal and informal spheres of life-long education determines the range of distribution of the three-dimensional subject-variative extension and the overall trajectory of teacher's personal career development.
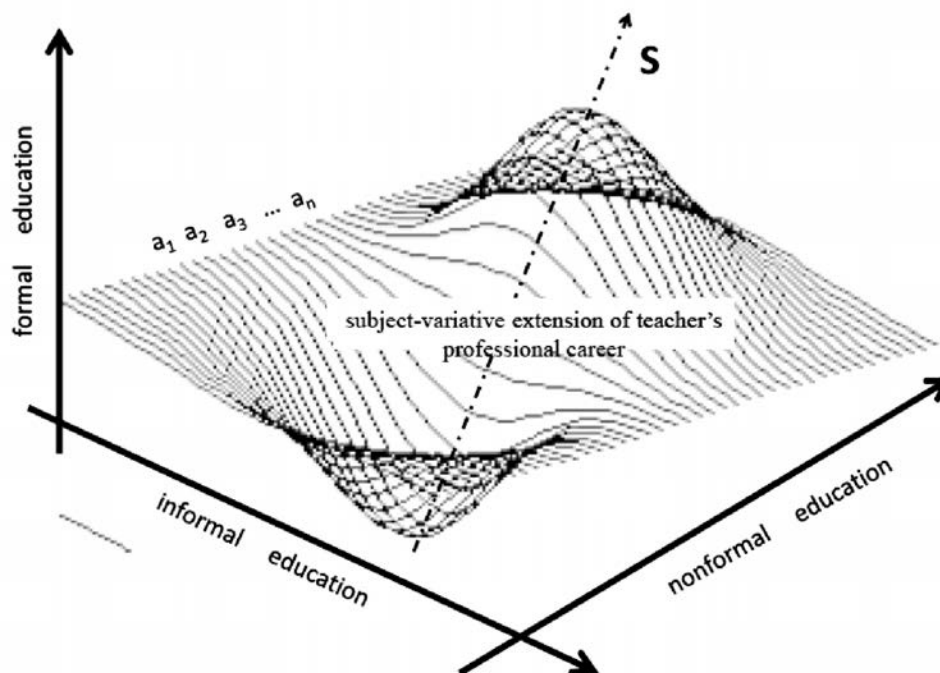
Fig. 1. Interaction of the processes of formal, non-formal, informal education and development of teacher's professional career: S — The axis of the subject-variative extension; a_1, a_2, a_3, ... a_n — The functional line of teacher's professional career development

The subject-variative extension of teacher's professional career is holistic multi-purpose complex of educational features in its formal, non-formal and informal ways, contributing to the implementation of teacher's career aspirations, who is defining the limits of free choice of the strategy of subject and professional updating, as well as responsibility for its consequences.

This complex provides a teacher a full-fledged diversity of quality-specific variants of meaningful career choice.

The subject-variative extension of teacher's professional career is based on two-dimensional professional areas that reflect the ratio of a certain level of professional careers teacher at any given point of time.

The nature of the subject-variative extension of teacher's professional career is unified, but it consistently demonstrates personal movement. The variety and diversity of forms of teacher's career determines its development. The multivariance of professional career development is its main defining characteristic.

The functional line of teacher's professional career development reflects infinitesimal points a_1, a_2, a_3, … a_n, each of which we consider to be the cause, and the following one as a consequence.

The dynamics of teacher's professional career in space and time is represented in the form of a continuous chain of small causes and effects, the number of options of which is endless. Any starting point results in a chain of cause-and-effect relationships a_1, a_2, a_n. The axis of the subject-variative extension S is represented as a system of personal abilities, knowledge, skills, and beliefs. That determines the development of professional career, eventually urging the teacher to professional self-realization and self-development.

Each of the components (formal, nonformal and informal) contributes to the development of a professional career. When the parameters of the key component change, there is a transition to the next phase of professional career development. It is internally necessary movement, "self-movement" from the existing career potential to the highest levels of professional career. The external (society, lifelong learning) always acts through internal (personal abilities, knowledge, skills, beliefs, needs). The nature of the subject-variative extension is unified, but consistently demonstrates different guises. There is the only undoubted fact that unites and reconciles all fields of knowledge — the variety and diversity of forms of professional career development.

Professional career is built on the acceptance of plurality and diversity of life, the inevitability of coexistence of differences, based on the extension of the teacher's own experience by initiation him to the views of other cultures, the environment itself [8; 9; 10]. All this leads to the expansion of its the subject-variative extension.

There is a continuous, consistent, content-structured accumulation of knowledge and skills, the conglomeration of teacher professional achievements in the concentrated form at each transition to the next phase of development of a professional career, and each of the results is an integral part of the general fund. It isn't neglected by the subsequent success of a professional career, but only reinterpreted and updated. The transformed results of each of the previous phase are included in the subsequent career phase.

The efficiency of each new stage of career development depends on the productivity and achieved results of the previous stage, the intensity of the feedback, the validity of corrective actions, the use of appropriate technologies, as well as the quality of the organizational and pedagogical support of career development. Thus, there is the deployment of the subject-variative extension, some required movement, "self-movement" from existing career potentials to the highest levels of professional career.

In the development of a professional career the mechanisms of self-realization of the teacher as a professional are laid. They become, necessary for the formation of a distinctive personal image and dignity of human life, for the dialogic and safe interaction with people, nature, culture, and civilization.

Particularly important is the incorporation of the modern teacher in the process of science communication. Communication in the scientific community is specially ordered system of social interactions in search for the accumulation and dissemination of scientific knowledge of reality, implemented through various channels, means, forms and institutions of the communication.

The analysis of the communicative aspects of scientific activity shows that the informal structure of the teaching staff may be regarded as an open system of communicative interactions, integrating the specific team in research and teaching community of higher level, as well as differentiating members within the team according to the density of communication links and the availability of specific roles under the division of labor in the collective.

Scientific communication is a universal object correlated with many aspects of professional career. Revitalization of the form and content of scientific communications enhances subject-variative career extension in its formal, non-formal and informal ways. There is an exchange of information within the informal communication of teachers. Expansion in the professional environment of pedagogically informal communication has a positive effect on the productivity of the teacher as a professional, his contribution to the development of pedagogics.

Disclosure of the nature and content of professional communication in science leads to the conclusion of the special role of the array of publications as the most informative source of information about the specifics of modern pedagogical activity, the main directions of collective action.

In Russian pedagogic community there are problems associated with maintaining the external scientific communication and, as a consequence, with the integration with the world scientific and educational community.

The period of globalization has prospects for further development of teacher community. This is due to the emergence of new forms of professional scientific communication with significant specificity: chat rooms, forums, blogs, and social networks.

Teacher in the process of creating his own the subject-variative career extension is free to determine the vector of career development, the choice of forms and methods of implementation of the process and at the same time is responsible for his actions to himself, to the subjects of the educational process, the future of the nation. This sense of responsibility to themselves, society, and the state is often a synonym of patriotism and justice, personal freedom for everyone. The development the subject-variative career extension is determined by the interaction of different factors, the unity of formal, non-formal and informal education, social needs, as well as the overall strategy of the professional career development.

They are closely linked, and changes in each of these forms lead to changes in all the components, which in its turn causes the qualitative transformation in the process of orientation in teaching profession in teaching activities, as well as in the implementation of continuous variable programs.

The idea of the teacher's subject-variative career extension allows establishing the process of career development providing its progressive direction, intensity, fundamental incompleteness, variability of career development in the system of inner management, to determine the direction of changes in the organization of the system of long-life education.

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Section 8. Political science

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The main directions of international cooperation within ASEAN

Abstract: The article discusses the main tasks which are important for Indonesia, Malaysia and Singapore are, these are the issues of ensuring the highest standards of management, transparency, corporative management and supremacy of law. The conducted analysis lets us conclude that for the leaders of the association there is a difficult task of maintaining the work of the organization in such conditions when there are big changes in the organization, region and the world.

Keywords: ASEAN, Malaysia, Indonesia, Singapore, regionalism, foreign policy, integration processes, cooperation.

The historical conditions and political aspects of the development of South-Asian countries in the second half of the XX century brought about "rise, institutional shape and development of the unique regional organization, whose existence is considered to be one of the successful regional integrations" [1, 29].

According to E. G. Mirakyan huge "significance in forming ASEAN is due to the world system after the Second World War, first, due to the appearance of socialistic states, due to the fact that some states became independent and their tendency of leading a policy of neutrality, the weakening of military-strategic positions of the UK, the rise of military-political block ANZYUS, the expansion of the influence of the USA, the aspiration for the bipolar structure of APR" [2, 12]. Thanks to the circumstances in this region, all of the conditions for the uniting the states into the regional organization were created, and the main function of this organization would be the unification of mutually dependent and mutually connected states on the base of regionalism. On the whole the process of forming and developing ASEAN is the result of the process of regionalization based on their political cooperation, and also the cooperation in the sphere of education, science and culture.

Today ASEAN is at the third place after the European Union and NAFTA and it is among the most developed unions in the world whose main target is the integration of states with economic and political benefits for itself [1, 28–37].

Member-states of ASEAN significantly differ from each other according to their level of economic and political development. For example, Singapore is the combination of postindustrial state, the world's financial center and the biggest sea transport junction, while Malaysia, Thailand, the Philippines and Indonesia are the countries which mainly develop thanks to the development of such industrial fields which are directed into export. Thus, our compatriot researcher A. A. Sharapov is right in saying that the expansion and further functioning of ASEAN has become the result of uniting two mutually supplementing processes of regionalization and globalization [3, 75–77].

As we know at first the organization of ASEAN was established mainly for cooperation in the economic direction, however, the importance of building international relations directed into political cooperation was already emphasized in Bangkok declaration [4, 45–50]. This is also noted by Russian researcher N. P. Maletin, who emphasizes that "Despite its declared aims of economic cooperation ASEAN from the beginning of its functioning has been solving political issues" [5, 56–72].

The main motive of establishing ASEAN was the complicated political situation at that time in the 60s in South-East Asia and for this region it was usual to maintain the communistic ideology at the north of the region, and this ideology was threatening to spread to the south of the region. What's more, the war in Vietnam created the tense political atmosphere in the region and the political consolidation of countries was necessary.

In such situation for the states of this region firstly, the problem of modernization of the economics, the maintenance of political stability, the maintenance of the independence of peace, the rise of their image and influence on the world arena were important. This fact was considered positive not only in South-East Asian countries. For example, the vice-president of the USA H. Haffrey during his visit to Indonesia in 1967 said that "establishing ASEAN is very important for creating the barrier on the way of spreading communism in South-East Asia, the USA are supporting ASEAN whose members' cooperation must help maintain defense in this region" [5, 9].

Certainly, the states of ASEAN had to react to the cardinal shifts in global international structure, which were happening in 60–70-s of XX century. One of these reactions was that the members of ASEAN accepted the Malaysian conception of neutralization of South-East Asia, and this conception was first declared in Kuala-Lumpur in 1968 during the discussion of joining of Malaysia the agreement on collective defense with the participation of the UK, Austtralia, New Zealand and Singapore.

Thus, the establishment of ASEAN as a political union was took place during the first decade of its existence. In our opinion, the most important result of this stage of development of the organization was the Declaration of peace, freedom and neutrality adopted in November, 1971, in which the states of ASEAN undertook to build their relations on the base of principles of peaceful coexistence, to refrain from participating in the conflicts between the great powers, and also to refrain from giving their territories for the foreign military bases.

ASEAN hold its 6th Summit in Hanoi in December 1998. The Summit declared Hanoi Declaration and Hanoi program. In these documents, ASEAN proposed measures and the way to overcome the crisis in Southeast Asia, as well as measures to the development of cooperation among members in the last years of the twentieth

century and in the beginning of the XXI century, to implement the concept of "Vision 2020" [1, 30].

Today, ASEAN countries are going on innovative ways of the development, the need to which the predetermined by the desire to effectively enter the global production, which requires strengthening of regional cooperation, development of fundamentally new approaches in the process of strengthening relations with foreign countries, especially in the regional integration [6, 280].

The peculiarity of the statute was that it marked the main directions of development, and identified tasks aimed at the implementation of strategic objectives of the international organization such as the provision of the relevant guarantees in several areas.

The first, it is a legal provision, suggesting strict observance the statute, especially in case of conflict situations between member states. Thus, the document helped members to promote integration processes in the common or similar legal framework.

Secondly, the definition of legal status made it possible to ASEAN develop relations with the outside world and to sign important agreements with other countries and structures as a single subject.

Our analysis of the political processes in the ASEAN countries, enables us to accept the opinion of N. P. Maletin [7, 105–107] that in the organization are present, on the one hand, centripetal factors that contribute to the integration processes, and on the other, centrifugal, respectively to prevent it.

The territorial proximity, common problems and the purposes, common colonial past (except for Thailand) are the basis of centripetal factors (or factors of similarity).

In turn to the centrifugal factors of ASEAN, factors of diversity are the following:

- Southeast Asian states are part of different religious and linguistic groups;
- the presence of territorial disputes between Member States of ASEAN;
- lack of a strong leadership capable of lead the process of association how in the past, for example was the Suharto;
- the existence in the organization of two-tier economic space, implying the gap in the levels of economic development [7, 107].

According to Ibrahim Zawawi, to the centrifugal factors ASEAN relates also often arising tension within the triangle Singapore-Malaysia-Indonesia, which he calls it as "strategic basis of ASEAN " [8].

Deep causes of conflicts between these countries, according to the researcher, lie in the claims of the role of the leader of ASEAN, as well as dissatisfaction of Malaysia and Indonesia strengthening of the influence of huatsiao (Chinese diaspora). At the same time it should be noted that the establishment of business links between huatsiao and local businessmen from the beginning was contributed by the economic integration of ASEAN on the non-state level. Chinese capital firm took the leading position in Indonesia, Malaysia Philippines and Thailand, especially Singapore in which 77 % of the population are ethnic Chinese.

The study of stages of the formation of ASEAN and the role of this organization in the era of globalization allows us to make the following general conclusions:

1. ASEAN from the first days of its existence had a clear program and general course. Later, with the adoption of the Declaration on neutrality of Southeast Asia, rates and politics is constantly improved and supplemented. This allowed ASEAN to establish effective cooperation between Member States in the most different spheres, such as, in politics, security, in the economy, trade in the field of culture, in Science and Technology, in international relations, and so on. ASEAN pursued a clear goal to develop all countries joined in this organization.

2. In the period of "Cold War" cooperation in the field of policy and security was the most important and the most effective for ASEAN. Economic cooperation within the ASEAN was marked more than modest results compared to the success in the field of policy and security. However, at the present stage economic cooperation has acquired the status of priority for all member states of ASEAN.

3. ASEAN showed perseverance, the sequence and independence in the implementation of their initial tasks: to develop an association and turn it in the regional organization of all peoples of Southeast Asia. Accession of Vietnam in ASEAN has become a clear example of how the ASEAN has overcome fear in relation to the other social and political build and other ideological views. And then, Laos, Myanmar, and Cambodia was set to join ASEAN as a result of which, ASEAN has become a regional organization in orbit of activity which includes all ten countries Southeast Asia at the end of the twentieth century.

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Indonesia's foreign policy strategy in the context of globalization

Abstract: In the article author writes about Indonesia's foreign policy, strategies and its links with ASEAN. Historic observes to Indonesia's foreign policy, the state ideology. Besides these Author draws attention to the directive of the state since the beginning of the new century, Indonesia aims to achieve a strong foreign policy and diplomacy; increase foreign economic cooperation; to participate in the bilateral, regional and multilateral cooperation.

Keywords: Foreign policy strategy, ASEAN, the directive of the state, bilateral, regional and multilateral cooperation, regional "players", inter-religious dialogue.

As proclaimed in the mid 1940s the Indonesian state was able to finally complete its institutionalization process as an independent actor, despite the fact that Indonesia's Sukarno proclaimed independence on 17 August in 1945 [1, 28], which was mainly caused by a desire to reach a compromise between secular and Muslim nationalists.

Many of the ideas and views expressed by Indonesian leader significantly outperformed the period. He was the architect of the non-aligned movement and the peaceful coexistence of States with different political systems. In 1955, in Bandung, Sukarno offered one of the global projects of the twentieth century — the Bandung Code of peaceful coexistence, in which visible similarities with the Helsinki Final Act of 1975 were examined. In Belgrade on September 1, 1961, Sukarno had outlined its new vision of international relations and the global balance of power. He proposed the concept of new "emerging forces", considering world is not divided into three camps — Eastern, Western and non-aligned countries, but two — the "old established forces" and the "new emerging forces".

Referring to the sources of foreign policy of Indonesia, it is important to note that, as in any other country, it was formed as a result of various factors, including nation's history, geographical conditions, demography, security and national interest. In 1948, these factors led Indonesia to determine its foreign policy as independent and active. The Russian researcher V. F. Urlyanov notes that, in its foreign policy, Indonesia abides by the following guidelines:

- Pancasila, the state ideology;
- Wawasan Nusantara, (archipelagic meaning);
- National resilience;
- Clear outlines of state policy [2, 35–36].

In order to achieve these objectives or directives, the following measures were identified: to establish Indonesia's international relations with the countries of the world; to develop economy and improve public welfare; provide assistance in strengthening national unity, stability and integrity to maintain national sovereignty; to develop bilateral relations, especially with countries that can support stable and beneficial trade relations in Indonesia by investing to help in the revival of the economy; as well as to promote international cooperation, which helps to build and maintain peace in the world.

In order to provide assurance for the fulfillment of the objectives, the foreign ministry is emphasizing the diplomatic relations with the countries that are within a series of concentric circles.

The main one which Indonesia regards as a priority in its foreign policy is the Association of South-east Asian Nations (ASEAN). In addition, Indonesia similarly understands the importance of promoting the relations with its eastern and southern neighbors,

in the occurrence of Indonesia in the Pacific Islands Forum (PIF), the South-west Pacific Dialog, and the Tripartite Consultation among Indonesia, Australia and East Timor.

The second concentric circle is ASEAN + 3 [3]. Indonesia is banking on the development of the relations with the United States and the European Union, which are the main economic partners of Indonesia.

In the next concentric circle, Indonesia has been cooperating with developing countries through various forums, such as the Non-aligned movement, the Organization of the Islamic Conference, the Group of 77 (G77) and the Group of 15 (G15), in which Indonesia has played an active role. Indonesian diplomacy in this circle is seeking to strengthen collective efforts of developing countries to establishing a bridge between developed and developing countries.

At the global level, Indonesia seeks to strengthen multilateralism through the United Nations, consistently stressing the central role of the UN and its collective responsibility of Member States in matters of world peace and security issues, respectively, rejecting all unilateral decisions that taken outside the UN.

The main challenges of Indonesian diplomacy at the modern stage is the creation of favorable external conditions for the security of the country, the strengthening of statehood and national unity, the preservation of the territorial integrity of Indonesia, as well as the promotion of social and economic development of the republic. The given problems are designated by realization of Indonesia's inner policy which includes constant struggle with terroristic organizations and an increase in crime, as well as attempts to eradicate poverty as one of the sources of terrorism. The policy of Indonesia has been able to achieve the required level of security, including its security in touristic areas [4, 1–2].

The analysis of the studied literature has shown that Indonesia's cooperation with the United States and the countries of the European Union is quit ambiguous and contradictory [5, 86]. For example, noting the crucial importance of political, trade and economic ties with the US, which is the main investor and the largest market for Indonesian goods, expresses negative reactions to attempts of interfering with the internal affairs of the country under the pretext of combating terrorism and the protection of human rights.

In our point of view, the main complexity in the process of normalization of bilateral relations is the fact that the Indonesian leadership is forced to seek a compromise between the interests of Muslim majority of Indonesia, which is followed by pronounced anti-American positions while demonstrating its loyalty to Washington policy.

Development of cooperation of Indonesia with the EU is mainly based on attracting investments, financial assistance and procurement

of military equipment. However, as in the case of the United States, countries of Western Europe are directly linked to the improvement of relations with Jakarta in the normalization of the situation in the sphere of human rights in Indonesia, the elimination of corruption at all levels of government and to the deepening democratic change in the society. With this in mind, the president continues to pursue the course of previous leadership of the republic, aimed at the expansion of contacts with the countries of Central and Eastern Europe, including Russia and CIS countries, which are viewed by Jakarta as alternative sources of investment, high technology, and relatively low-cost modern weapons and military equipment.

In recent years, Indonesia has significantly improved its relations with China. During the visits in 2005 with heads of state, the parties had been able to move significantly in the deepening bilateral political and economic relations, removing many contradictions and to sign a number of important documents, including the Treaty on strategic partnership. In Jakarta, PRC is considered as a meaningful political, military and strategic and economic force, capable to compensate for trends to enhance the impact of the US in East Siberia. From these positions it is necessary to consider the visit of Indonesian delegation, led by the Coordinating Minister of the economy Aburizal Bakrie in China, held on June 2005. This visit was a direct continuation of bilateral agreements reached in 2005, during the visit of the President of China Hu Jintao in Indonesia, and was designed to prepare a response four-day visit by President of Indonesia, S. B. Yudhoyono to China. One of the main trade partners of Indonesia continues to be Japan. However, much attention is paid to the development of the bilateral dialogue. The Indonesian government pays serious attention to the development of bilateral relations with Russia, which is seen in Jakarta as an influential political and military-strategic point of power, as well as a potentially important energy, trade and economic partner. In addition, the similarity of positions on key international issues, including the problems of Afghanistan, Iraq, Iran, the fight against terrorism and separatism, the settlement of the situation in the Middle East, the role and place of the UN in the modern world, promotes a closer relationship between the two countries. Indonesia also welcomes the position of the Russian Federation, which consists in recognizing the importance of deepening regional economic development in ASEAN, leading role of ARF in the establishment of security in Southeast Asia. The Indonesian leadership is a consistent supporter of the UN in the resolution of international problems and expressing the need to reform the organization, by increasing the number of permanent members of the Security Council [6, 44].

As already mentioned, one of the priorities of the foreign policy efforts of the Government of Indonesia is the development of relations with partners in the Association of South-East Asia.

Indonesian leadership is seeking to restore its traditional leading position in ASEAN undermined as a result of political and economic crisis in 1998 by broadening and deepening of regional cooperation [7, 98–99]. In this regard, Indonesia has put forward a number of initiatives in the area of regional security and the fight against terrorism, including the proposal to establish the ASEAN Security Community, which provides for the formation of a 2020 single operational and legal environment in Southeast Asia. The main point of this initiative was the idea of a peacekeeping mechanism in ASEAN to ensure security and stability in the region. At the same time, Indonesia responded to the Malaysian proposal to establish an East Asian Community (EAC), which, in the opinion of Jakarta, leads to the "blurring" ASEAN's role, and generates additional regional structure with a duplicate existing mechanisms function as in the ASEAN + 3. In the understanding of Indonesians, this leads to a weakening of the overall position of the Southeast Asian countries in establishing relationships with other international organizations of a regional nature.

Confident and consistent policy in the past to unite Indonesia Southeast Asian countries has led to the establishment of ASEAN as an organization. In the beginning of 2011, Indonesia received a great opportunity to enhance their role in ASEAN, when it officially became chairman of the Committee of Permanent Representatives to ASEAN. The Secretary General of this regional organization Surin Pitsuwan mentioned: "This year Indonesia is going to lead ASEAN, with an official motto", One ASEAN Community in the global community of nations, "thus reflecting their willingness to further promotion of the association in the world". In turn, the Minister of Foreign Affairs of Indonesia, Marty Natalegawa, said that "The contemporary world is radically different from the one in which the Association has existed previously, challenges of the second decade of the XXI century are complex and multifaceted, they occur simultaneously and have supranational nature. That's why they require such decisions, which are by their comprehensive nature of cooperation both within regions and between themselves".

Today, the internal political and economic crisis in Indonesia, ASEAN's largest country in terms of population, area and size of GDP, has a negative impact on the economic cooperation in the region. Despite the fact that the current foreign policy of the «new order» is characterized by a modest regional hegemony in ASEAN (in which Indonesia makes up 60 % of the population), Indonesia continues to be a consistent supporter of development and strengthening the position of ASEAN in Southeast Asia and in the world, while also having a fear of losing their traditional role as a regional leader due to the dominance of economically more developed regional «players». Thus, the government of Indonesia opposes the transformation of ASEAN from economic to military-political bloc.

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Section 9. Technical sciences

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Computerization medical institutions for the organization and optimization of clinical processes

Abstract: Article is devoted introduction of the medical is information — communication technologies in emergency medical aid Uzbekistan. On the basis of practice introduction of complex medical information system is shown, that introduction of such systems in medical institutions, is a basis of effective gathering, storage, processing and use of the medical information.

Keywords: information system, an information stream, medical information system, electronic case record, an automated workplace.

Healthcare reform of the Republic of Uzbekistan brings to the forefront the problem of information support of all levels of the system, as the main problems of practical medicine. The significance of this problem is especially important in a system of emergency medicine.

In connection with it, realizing step — by step transition of paper information technology to electron information — communication technology of the medical — diagnostic process (MDP) organization is becoming emergent task and also the basis for creation information infrastructure of medical prophylactic institution (MPI) on which automation the organizing will be based and managements both MDP and MPI as a whole. Thus, information status becomes as resource especially in emergency medicine institutions as strategic. Next, it demands the presence of operative reception possibility for important information on patients, their illnesses, and appropriate professional knowledge.

In this channel, it is necessary first of all to change MDP organization from intuitive to demonstrative (applied, testimonial) and its management from bureaucratic to information basis which demands attraction for optimization of organization of medical informational technology, special program security and technical collection means, storage, processing and information representation [1; 2; 3], Besides electron-communicational system for their import and export on MDP scale, region and in case of need department [4; 5; 6].

It is known that MDP is a technology of information interaction of physician with the patient and on the other hand, all medical personnel having relations to the patient. Automation MDP mustn't change its main point moreover it should develop and improve this point with its handling methods with information.

First of all it is necessary to automate interaction between participants of MDP and documenting process all steps of this interaction.

The basic and obliged carrier of this complex organized exchange traditional is the paper case record (CR).

It serves for storing information accepted by medical decisions, being not only medical, but also legal document.

But absence of possibility to use it simultaneously by several practice paints of MDP is difficult to read, and also arbitrary maintenance of records, absence of formalization medical information makes difficult operative and high grade use in practice of emergency medicine.

It is established that [7], the quantity of readable information in paper CR doesn't exceed 75 %, and beneficial factor of saved information is 82 %. In result, in conditions of a strictly limit of time, that is characteristic for emergency medicine, paper CR takes much working hours (not less than 30 %) for registration, remains only passive information storage, which doesn't meet the requirements of maintenance quality.

Obviously, MDP organization in an urgent condition on the basis of paper documentary circulation becomes serious brake for improving this process. Decision is obvious, it is necessary to introduce electron information — analytical and communication technologies.

In this case, on the other hand, there are possibility of automated formation of medical document, and with another their long — term and safe storage and in need operative processing, transfer and representation by the user i. e. to provide with information and intellectual support of MDP. Besides, realizing complex approach in designing medical informational system (MIS), one can achieve by automation conducting not only CR, but also organization of other main components of MID. Let's note, automation of medical institutions is first of all creation of unique MDP information field, that allows to create automated workplaces of doctors, and databases, to carry electrons case records (ECR), create their electrons archive and to connect in a unique system all medical, diagnostic, administrative, economic and financial processes.

Thus, modern development and improvement of emergency medical aid efficiency demands to carry out its complex automation on the basis of operative authentic (reliable) information in real time (scale).

Mentioned below our first complex information — communication and analytical system "ExterNET" [8], realizing in clinical practice all above mentioned functions and introduced into Fergana branch of Republican scientific emergency medical center.

It presents MIS, consisting of 82 computers united in a unique local network, server stations and specially developed software.

Programed technical complex system "ExterNET" is intended for automation emergency medicine institutions activity, which has versatile hospital, receiving — diagnostic department, clinical laboratories, functional diagnostics, drugstores blood transfusion

department, food block, administration and important engineering technical and other providing divisions.

Let's nite that, in order to generalize full information on patients and medical processes (actions) organize and operate medical processes we need ECR and local network.

According to it our purpose was designing and creating ECR which function is not only automating conducting patients' medical records, but new technology support for intellectual and communication support for making medical decisions, by representing primary processed information in the form of analytical data, and also new effective interaction technology of different subdivisions of the hospital and MDP's participants.

Case record should become as full and structured, as it is necessary to form any secondary documents from its elements: appoint prescription sheet, analyses sheet, recipe for pharmacy, laboratory order, extract from case record and so on.

Nowadays Electrons Case History (ECH) standard hasn't accepted yet in the Republic we were guided by requirements of Russian national standard (GOST-52636) "Electron Case Record General principles regulations" implemented into practice since January 1, 2008 and establishing general requirements for formation, creation, support and use of information systems type "Electrons Case Records" [9].

According to it: as under ECR we are accepting storage on electronic carriers, search and delivery on a query (including electronic communication channels) personal medical records (PMR), patients further named electrons personal medical records (EPMR). Relative to EPMR we provided with the main requirement of the standard that is to provide with the following conditions:

– Invariance and authenticity during the whole storage period;
– Regulation for access rights and confidentiality;
– Persoificty (possibility to define the author and a record origin at any time moment).

By functioning possibilities our ECR belongs to collective class and is an integral element of MDP.

In connection with it EPMR is alienated from their authors and can be taken from electronic archive by other medical person having on this right and can be used as official medical document, accepting medical decisions on its basis, or carry out definite procedural action [10].

EPMR structure includes all necessary elements (patient identifier, identifier given by EPMR, date and time, CR number, identifier of EPMR author, text reflecting its content and e.t.c.), providing with medical and legal status. Under the leadership of Fergana branch of the Republican Scientific Center for Emergency Medical Aid we worked out and introduced regulations for creation and implementation EPMR of patients into the system where determined medical staff has the access right, and also information structure set by standard recommendations.

Such statement of ECR question will serve as the main medical information system (MIS) of multiprofile hospital, which is the scientific center of emergency medicine and its branches.

Let's notice, that ECR instead of "paper" is undoubtedly, the basis for automating medical process. Common CR is primary data carrier in usual work system, ECR is automated.

Creation of ECR has some realization versions among chosen designing and working out CR conducting ECR, integrating all other functional modules (Registry, Laboratory, Pharmacy, Functional diagnostics, Blood transfusion department, Statistics, Administration and others) which is necessary for organization and management MDP. All modules can work independently or in "ExterNET" system.

Such information systems functionality range for medical purposes are determined by solving the following tasks:

– Collection registration and data documenting;
– Providing with information exchange;
– Star age and search of the necessary information;
– Control of illness course;
– Support of accepting decision;
– Organization of patients resource maintenance;
– Static analysis of data.

It is necessary to notice once again, application information technology in clinical medicine should have purposes not to replace experience and ability of the doctor and opposite to raise its role, to supply with information and knowledge in proper time and in convenient format make it possible to concentrate on clinical work, to present him important information in needed moment, place and in demanded volume.

Thus we developed mathematical formalisms, person technology that is computer interaction and necessary computer program toolkit [11], allowing in aggregate to carry out not only collecting, storage and representation medical information, but also intellectual processing massive medical data during the work with patients and solve important problems on information and also intellectual support of medical decisions.

Physicians should have computer programs and electronic technologies suitable for their work purpose. Contact of user with medical informational system "ExterNET" is carried out by means of specially created automated workplaces (AWP) and their interfaces. Thus, we created 25 suitable AWPs for various types of users, representing possibility for realizing all actions which the user do in his work, that is considering functional duties of every category of employees.

Registration of functional duties of employees is the main demand necessary for observing in choosing interface decisions in created software MIS.

Let's notice, that by working out AWPs and the user interface we considered all demands of the standard namely in the interfaces of developed by us intuitively clearly and dose not suppose ambiguous interpretation and is executed taking into account ergonomic require ments, and also have elements allowing unequivocally to define; what patient concern given EPMR data time described in EPMR events; the status, a stage of life cycle EPMR and so on.

For convenience information introduction on survey the special system offers the doctor survey samples which is created by leading experts of the center using the international standards of medical terms SNOMED.

We will note that, in advance prepared text samples, is a perfect way of marking casy doctor's work and simultaneous increase his culture, if only not to give forming these samples to all who want. The problem consists of that by means of highly skilled experts to make a set of the best, fullest and differentiated stereotypic descriptions. The developed samples of the required quantity on clinical medicine of service programs system "ExterNET".

Considering an urgency of intellectual support of acceptance process of medical decisions, we developed special applied program and its database (DB) [12] providing automatic data processing ECR and make their analysis taking into account norms available in clinical practice dynamics, etc, with the subsequent representation to the doctor for their use.

Naturally database, the knowledge base and algorithm calculation and the analysis of medical parameters, of the program are created physician experts for every emergency medicine direction separately. They should be based or on officially confirmed or suggested sources.

As a result, the conducting CR system developed by us became information-analytical and architecture, DB structure projected by us taking into with its given function.

MIS "ExterNET" is based on client-server architecture. For maximum efficiency the system uses objective relational principle DB formation.

It is known that medical diagnostic standard's allow a regulation of the main technological process of emergency medicine — is the suitable diagnostics menacing to the patient's life conditions and qualified elimination at the rendering stages of emergency medical al aid.

In this connection ECR developed by us provides automatic registration of date and time formation of those or other MDP, and its DB keeps the asserted or recommended regulations of the standard were brought which allows to automate, within the limits of ECR, the control over their correct performance.

Our ECR and "ExterNET" technology, passed clinical tests in 2008, in Fergana Branch of Republican Scientific Center for Emergency Medical Aid and was accepted in experimental operation on hospital conditions where today works and develops successfully. For maintenance daily and continuous work of program-technical part of the system, support its users, was created special department in Republican Scientific Center Emergency Medical Aid structure completed by programmers among the developers and engineering-technical personnel.

Effective operation of information system are provided by training all users in special teaching courses, by confirmed programs, with passing exam on certificate.

The conclusion — Our MIS "ExterNET" in clinical practice of emergency medicine gives the following possibilities: the whole complex of medical documentary, including case records transfers into electronic format, provides their automated formation, transfer, processing's, search and archive's; creating unique information space in MPI provides information, intellectual and communicative organization support of MDP, and acceptance of optimum medical decisions; performance of medical-diagnostic standards and their operative control; automates interrelations among clinical, par clinical and other divisions of MPI in patients interests; providing automated reception of various reports, data, and official static reports and on their basis the analysis activity as MPI as a whole and its structural divisions, increases efficiency of administrative work; provides safety of the medical information in needed level.

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Working out and implementation of the safflower cleaning machine

Abstract: In article the technological scheme, a principle of work of the car for primary clearing of seeds of olive cultures safflower are resulted.

Keywords: safflower, seeds cleaning machine, sieve, oscillations.

Introduction

At present time the safflower crops are being harvested by such combine machines as Case–2366, Dominator–130, New Holland, TC–5060, Don–1500B, Lan, Horizont, KZS–9–01 Slavutich, Don–1500B, Jon Deer. It is recommended to adjust the choosing the rotations number of drum approximately 800–1100 rpm., and the higher sieve jalousies to 5–7 mm., as well as the lower sieve jalousies to 7–8 mm. The harvested seeds need to pass preliminary cleaning, if necessary drying processes. According to the basis norms, the humidity for storage or reprocessing of the safflower should be 13 %, the quantity of foreign admixtures should be 3 % [1].

In cleaning the oily cultures' seeds the machines being used in grains cleaning OBC–25, OBP–20A, «Petkus–vibrant», K–521, «Petkus–Gigant» K–531 are being applied. The seeds' size-mass indicators and aerodynamic properties of the safflower and other oily cultures even if are closer to grain, but these machines in cleaning the safflower will give lower productivity; the power consumption is high due to using the high capacity electrical engines; and in this case transportation of this machine from a certain farm to the other farm is uncomfortable due to its size. Therefore there can not be achieved the sufficient productivity when using the above specified machines.

Considering all above, at IMEA a compact newly light-weight designed seed cleaning machine purposed for cleaning of the oily cultures' seeds has been worked out [2].

The results of research

Seeds cleaning machine consists of the following parts: silo 1, supplying channel 2, sucking roller 3, fan 4, dust sinking device 5, the higher sieve 6, the lower sieve 7, electrical engine 8, connecting rod 9, oscillating device 10, machine framework 11 (Fig.1).

Technological process of worked out seeds cleaning machine running is as in the following: the oily cultures' seeds will be put into the machine silo 1 and it is supplied by measuring through the supplying roller 2 to sucking tube 3.

By means of airstream produced by the fan 4 the light admixtures containing, in the seeds will be separated out in sucking tube; after it is supplied to dust sinking device 5. As they are sunk after it will be supplied outside. It avoids from the dust smokes around when machine is being operated and improves to facilitate a good labor conditions for employees.

As seeds are cleaned from the light admixtures, they are supplied to lower part, to the higher sieve 6. The seeds are separated out from the large admixtures at the higher sieve functioning by connecting rod 9 and oscillating device 10 and from the small admixtures at the lower sieve 7.

As above said the large fractured admixtures are containing the most part of foreign mixtures the higher sieve plays the main role in the technologic process of the seeds cleaning machine. Because the stalks' parts, pieces of basket, piece of dried mud, stone, one part of weeds' seeds and other impurities containing in the seeds mixture are separated out at the higher sieve.

Number of oscillation occurring at the seeds cleaning machine sieve is dependable to the seed purity, and it showed (table 1) when a number of oscillations were 300 min^{-1}, and 350 min^{-1} the separation process of seeds from the foreign admixtures developed actively and it amounted in 97.3 % and 98.0 %; when the number of oscillations were 400 min^{-1} and 450 min^{-1} the seed purity amounted 98.7 % and 99.1 %.
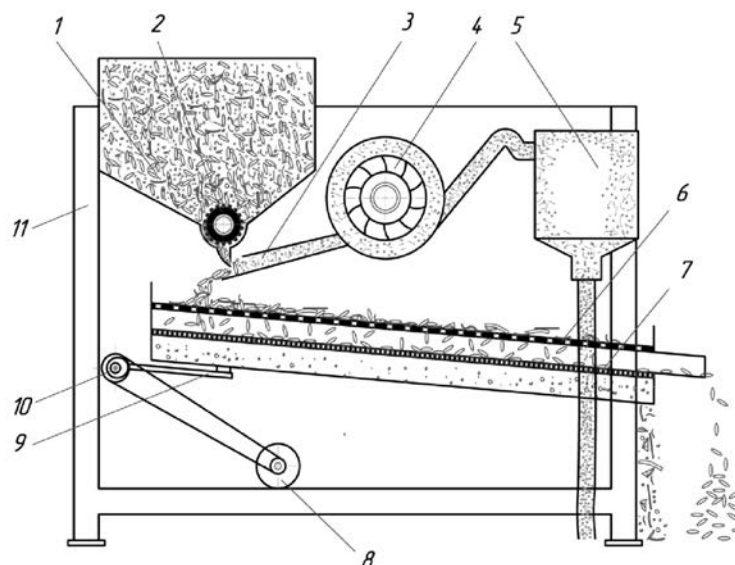
Fig. 1. Technological scheme for the oily cultures' seeds cleaning machine:
silo — 1; supplying channel — 2; sucking roller — 3; fan — 4; dust sinking device — 5; the higher sieve — 6; the lower sieve — 7; electrical engine — 8; connecting rod — 9; oscillating device — 10; machine framework — 11

Table 1. – Influence of number of the sieve oscillations on the seed purity and losses

No	Performance quality indicators	Number of sieve oscillations, min^{-1}				
		300	350	400	450	500
1.	Separation of foreign admixtures, in %	97.3	98.0	98.7	99.1	99.3
2.	Seed losses, in %	0.1	0.4	0.8	2.0	4.0

When the number of sieve oscillations increased up to 500 min^{-1} the separation of seeds from the foreign admixtures amounted 99.3 %, that means it almost didn't change. But the seeds began to output from the sieve together with the large admixtures in a big quantity.

In analysis of conducted experiments in relation with the number of sieve oscillations showed that (table 1) while number of oscillations was 200 min^{-1} and 250 min^{-1} the loss almost has not been noticed and accordingly it amounted in 0.1 % and 0.4 %. At the event when

a number of oscillations increased from 300 min⁻¹ to 350 min⁻¹ the seed losses developed actively and at a result it amounted in 0.8 % and 2.0 %. When a number of oscillations increased up to 400 min⁻¹ the seed losses increased sharply that amounted in 4.0 %.

At the event when a number of oscillations was 500 min⁻¹ the seed losses will sharply increase, and the reason for it the seeds actively move together with the foreign admixtures, a certain part will move throughout the sieve surface by jumping and comes out of sieve; it results in sharp increasing of the seed losses.

When oscillations amplitude was 5 mm., 10 mm., 15 mm., 20 mm. and 25 mm. the seed purity has amounted accordingly 98.2 %, 98.9 %, 99.1 %, 99.4 %, 99.4 % (table 2).

Table 2. – Influence of sieve oscillations amplitude on the seed purity and losses

No	Performance quality indicators	Sieve oscillations amplitude, mm.				
		5	10	15	20	25
1.	Separation of foreign admixtures, in %	98.2	98.2	99.1	99.4	99.6
2.	Seed losses, in %	0.3	1.3	2.4	3.7	5.8

After conducted experiments it was identified in case as the oscillations amplitude higher as the seed mixture movement ahead would be bigger; and as a result it was determined due to fast movement of seeds mixture the impure admixtures will pass through the sieve gap less.

In this case we think that due to that when the sieve's small oscillations amplitude (5 … 10 mm.) the seed's movement ahead was smaller it will not consider the sufficient sieve gap in order for it to pass through the sieve and it slides down further on come out to waste; meanwhile due to higher amplitude of seed oscillations the seeds movement ahead would be so high and it outcomes in the seed losses.

The sieve sloppiness in its turn affects on the seed purity and losses (table 3). In the specified table there is shown that when slopping angle is ranging from 3 degr. to 15 degr. the grain losses and purity increase. When it was 3 degrees the seed purity amounted in 92.4 %, the losses were not noticed. And when the slopping angle was 15 degrees the seed purity and losses accordingly amounted in 99.3 % and 3.1 %.

Table 3. – Influence of sieve slopping angle on the seed purity and losses

No	Performance quality indicators	Sieve slopping angle, in degrees				
		3	6	9	12	15
1.	Separation of foreign admixtures, in %	92.4	96.6	98.6	99.1	99.3
2.	Seed losses, in %	–	0.2	0.6	1.3	3.1

As the slopping angle of seed cleaning machine was enlarging the grain purity and losses was increasing. At the event when the slopping angle was rising from 3 degr. to 9 degrees the seed purity enlarging increased. And it did outcome to when the slopping angle was rising from 12 degr. to 15 degrees the seed losses increased actively.

The seed purity and losses are characterized in a change depending on the sieve slopping angle and while the seed admixture moves slowly in small volumes slopping angle throughout the sieve surface; and its results in enlarging the volume of the small and large admixtures pass through the sieve together with the seeds; when the seed admixture moves slowly in big volumes the slopping angle throughout the sieve surface and it results in that its most part comes out to waste.

Conclusion

In accordance with the achieved results after conducting experiments in the event when the number of sieve oscillations ranged from between 350–400 min⁻¹ the seed purity amounted in 98.0–99.0 % losses amounted in 2.0–4.0 %; when the oscillations amplitude ranged between 10 … 15 mm. the seed purity amounted in 98.9–99.1 %, losses — 1.3–2.4 %; moreover when the slopping angle of sieve ranged between 9–12 degrees the seed purity amounted in 98.6–99.1 %, the loss — 0.6–1.3 % and more good indicators has been achieved.

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Design methods of seismodynamics of complex systems of underground pipelines

Abstract: Several problems of oscillation of complex systems of underground pipelines under seismic loading are considered in this paper. Derived system of equations is solved by the Method of finite differences of the second order of accuracy.

Software is based on the algorithm of computer realization in oriented language Borland Delphi 7. Results of the solution are presented in the form of graphs.

Keywords: complex systems of underground pipelines, seismo-dynamics, seismic effect, interaction in "pipe-soil" system, the Method of finite differences.

Seismo-dynamic theory of underground structures is based on actual data of the aftermath of strong ground motion on underground structures, namely Ashkhabad and Tashkent earthquakes [1]. Fifty years ago when a dynamic theory of seismic stability of the pipelines just began to form, the data on the damage and destruction of underground structures during the earthquakes were practically none. There existed few works on the aftermath of the USA and Japan earthquakes. This is explained by the fact that the pipe range in seismic active zones was comparatively short, so to reveal the damage was very difficult and not likely [2; 3].

Dynamic problem of the complex system of underground structures is sufficiently simplified and reduced to a problem of independent longitudinal motion of the main pipeline with reduced conditions of conjugation of a complex assembly and simple joints. With sufficient accuracy we can take that relative transverse displacements of the pipelines on a certain distance from the assembly are small compared with the amplitudes of soil oscillations, so for transverse motion of the pipeline is it enough to take the boundary conditions on other ends as the relative displacements at infinity being equal to zero. Also with sufficient accuracy we may neglect the force of inertia of relative transverse motions of the pipelines due to their small value compared with the rest of the terms of motion equation. These two conditions are validated and they considerably simplify the problem, since the determination of transverse displacement of pipes and the use of all kinematic conditions are also simplified [1; 4].

Statement of the problem

The problem of longitudinal oscillations of underground pipelines with complex assemblies is considered. It is known [5], that the system of differential equations of longitudinal oscillations of underground pipelines with complex assemblies, has the following form (in this case $I_y = I_z = 0$ — are axial moments of inertia):

$$\begin{cases} -\rho F \dfrac{\partial^2 u'}{\partial t^2} + EF \dfrac{\partial^2 u'}{\partial x^2} - 2\pi R k_x \left(u' - u_0 \right) = 0; \\ -\rho_1 F_1 \dfrac{\partial^2 u^0}{\partial t^2} + EF \dfrac{\partial u'}{\partial x} - EF \dfrac{\partial u''}{\partial x} - 2\pi R_{uz} H_{uz} k_x^{uz} \left(u^0 - u_0 \right) = 0; \quad (1) \\ -\rho F \dfrac{\partial^2 u''}{\partial t^2} + EF \dfrac{\partial^2 u''}{\partial x^2} - 2\pi R k_x \left(u'' - u_0 \right) = 0. \end{cases}$$

In the first and third equations of the system (1), differential equations of the motion of the left and right pipelines are given in relation to complex assembly. In the second equation a differential equation of the motion of absolutely rigid assembly is given (in point representation). Consider the system of equations (1) by the Method of finite differences of the second order of accuracy.

Transferring to dimensionless displacements and coordinates: $u' = \overline{u}'R$, $u^0 = \overline{u}^0 R$, $u'' = \overline{u}'' R$, $x = \overline{x} l$, $t = \overline{t} t_0$, $u_0 = \overline{u}_0 R$, we get the following system of equations in dimensionless parameters:

$$\begin{cases} \dfrac{\partial^2 \overline{u}'}{\partial \overline{t}^2} - \dfrac{\partial^2 \overline{u}'}{\partial \overline{x}^2} + \dfrac{2\pi R l^2 k_x}{a_T^2 \rho F} \left(\overline{u}' - \overline{u}_0 \right) = 0, \\ \dfrac{\rho_1 F_1}{\rho F l} \dfrac{\partial^2 \overline{u}^0}{\partial \overline{t}^2} - \dfrac{\partial \overline{u}'}{\partial \overline{x}} + \dfrac{\partial \overline{u}''}{\partial \overline{x}} + \dfrac{2\pi R_{uz} H_{uz} R k_x^{uz} l}{\rho F a_T^2} \left(\overline{u}^0 - \overline{u}_0 \right) = 0, \quad (2) \\ \dfrac{\partial^2 \overline{u}''}{\partial \overline{t}^2} - \dfrac{\partial^2 \overline{u}''}{\partial \overline{x}^2} + \dfrac{2\pi R l^2 k_x}{a_T^2 \rho F} \left(\overline{u}'' - \overline{u}_0 \right) = 0, \end{cases}$$

where $a_T = \sqrt{\dfrac{E}{\rho}}$.

Algorithm of solution of complex systems of underground pipelines under the effect of seismic loads

The system of differential equations (1) with account of boundary conditions is solved by the Method of finite differences. Here an approximation of the second order of accuracy with central difference scheme is mainly used [6].

$$\frac{\partial^2 \overline{u}'}{\partial \overline{t}^2} \approx \frac{\overline{u}_i'^{\,j+1} - 2\overline{u}_i'^{\,j} + \overline{u}_i'^{\,j-1}}{\tau^2}, \; \frac{\partial^2 \overline{u}''}{\partial \overline{t}^2} \approx \frac{\overline{u}_i''^{\,j+1} - 2\overline{u}_i''^{\,j} + \overline{u}_i''^{\,j-1}}{\tau^2}, \quad (3)$$

$$\frac{\partial^2 \overline{u}'}{\partial \overline{x}^2} \approx \frac{\overline{u}_{i+1}'^{\,j} - 2\overline{u}_i'^{\,j} + \overline{u}_{i-1}'^{\,j}}{h^2}, \; \frac{\partial^2 \overline{u}''}{\partial \overline{x}^2} \approx \frac{\overline{u}_{i+1}''^{\,j} - 2\overline{u}_i''^{\,j} + \overline{u}_{i-1}''^{\,j}}{h^2}, \quad (4)$$

$$\frac{\partial^2 \overline{u}^0}{\partial t^2} \approx \frac{\overline{u}_i^{0\,j+1} - 2\overline{u}_i^{0\,j} + \overline{u}_i^{0\,j-1}}{\tau^2}. \quad (5)$$

When approximating the systems of differential equations (1) we use the approximating formulae (3)–(5) and as a result we obtain the system of algebraic equations. An obtained system of algebraic equations is solved in explicit scheme. Here τ — is a step in time, satisfying Currant's condition $\tau \le \dfrac{h}{4}$.

Computer realization

On the basis of developed methods a computer realization of discussed problems is formed. The algorithm of computer realization of the solution of the problem on longitudinal oscillations of a pipeline with two fixed ends is given below.

1. Initial data:
2. $k = 1$;
3. $j = 0$;
4. $\overline{u}_i^{01(k)} = \dfrac{\dfrac{\tau^2 2\pi R_{uz} hRk_x l^2}{\rho_1 F_1 a_T^2} \overline{u}_{0i}^{0(k)} + \dfrac{\tau^2 \rho Fl}{2h\rho_1 F_1}\left(\overline{u}_{i+1}'^{0(k-1)} - \overline{u}_{i-1}'^{0(k-1)} \right)}{2} -$

   $- \dfrac{\dfrac{\tau^2 \rho Fl}{2h\rho_1 F_1}\left(\overline{u}_{i+1}''^{0(k-1)} - \overline{u}_{i-1}''^{0(k-1)} \right)}{2};$
5. $1 \le i \le N - 1$;
6. $\overline{u}_i'^{1(k)} = \dfrac{\dfrac{2\tau^2 \pi R l^2 k_x}{a_T^2 \rho F} \overline{u}_{0i}^{1(k)}}{2}$;
7. $\overline{u}_i''^{1(k)} = \dfrac{\dfrac{2\tau^2 \pi R l^2 k_x}{a_T^2 \rho F} \overline{u}_{0i}^{1(k)}}{2}$;
8. $j = 1$;
9. $i = 1$;
10. $\overline{u}_1^{02(k)} = \left(2 - \dfrac{\tau^2 2\pi R_{uz} hRk_x l^2}{\rho_1 F_1 a_T^2} \right) \overline{u}_1^{01(k)} + \dfrac{\tau^2 2\pi R_{uz} hRk_x l^2}{\rho_1 F_1 a_T^2} \overline{u}_{01}^{1(k)} +$

    $+ \dfrac{\tau^2 \rho Fl}{2h\rho_1 F_1}\left(\overline{u}_2'^{1(k-1)} - \overline{u}_0'^{1(k-1)} \right) - \dfrac{\tau^2 \rho Fl}{2h\rho_1 F_1}\left(\overline{u}_2''^{1(k-1)} - \overline{u}_0''^{1(k-1)} \right);$
11. $\overline{u}_1'^{2(k)} = \left(2 - 2\dfrac{\tau^2}{h^2} - \dfrac{2\tau^2 \pi R l^2 k_x}{a_T^2 \rho F} \right) \overline{u}_1'^{1(k)} + \dfrac{\tau^2}{h^2} \overline{u}_2'^{1(k)} + ;$

    $+ \dfrac{2\tau^2 \pi R l^2 k_x}{a_T^2 \rho F} \overline{u}_{01}^{1(k)};$
12. $\overline{u}_1''^{2(k)} = \overline{u}_1^{01(k)} + \left(2 - 2\dfrac{\tau^2}{h^2} - \dfrac{2\tau^2 \pi R l^2 k_x}{a_T^2 \rho F} \right) \overline{u}_1''^{1(k)} + \dfrac{\tau^2}{h^2} \overline{u}_2''^{1(k)} +$

    $+ \dfrac{2\tau^2 \pi R l^2 k_x}{a_T^2 \rho F} \overline{u}_{01}^1;$

13. $i = i + 1$;

14. $\bar{u}_i'^{2(k)} = \dfrac{\tau^2}{h^2}\bar{u}_{i-1}'^{1(k)} + \left(2 - 2\dfrac{\tau^2}{h^2} - \dfrac{2\tau^2 \pi R l^2 k_x}{a_T^2 \rho F}\right)\bar{u}_i'^{1(k)} + \dfrac{\tau^2}{h^2}\bar{u}_{i+1}'^{1(k)} +$

$+ \dfrac{2\tau^2 \pi R l^2 k_x}{a_T^2 \rho F}\bar{u}_{0i}'^{1(k)}$;

15. $\bar{u}_i''^{2(k)} = \dfrac{\tau^2}{h^2}\bar{u}_{i-1}''^{1(k)} + \left(2 - 2\dfrac{\tau^2}{h^2} - \dfrac{2\tau^2 \pi R l^2 k_x}{a_T^2 \rho F}\right)\bar{u}_i''^{1(k)} + \dfrac{\tau^2}{h^2}\bar{u}_{i+1}''^{1(k)} +$

$+ \dfrac{2\tau^2 \pi R l^2 k_x}{a_T^2 \rho F}\bar{u}_{0i}''^{1(k)}$;

16. $i \le N - 2$ if the condition is fulfilled turn to item 13, otherwise — to item 17;

17. $i = N - 1$;

18. $\bar{u}_{N-1}'^{2(k)} = \dfrac{\tau^2}{h^2}\bar{u}_{N-2}'^{1(k)} + \left(2 - 2\dfrac{\tau^2}{h^2} - \dfrac{2\tau^2 \pi R l^2 k_x}{a_T^2 \rho F}\right)\bar{u}_{N-1}'^{1(k)} + \bar{u}_1'^{01(k)} +$

$+ \dfrac{2\tau^2 \pi R l^2 k_x}{a_T^2 \rho F}\bar{u}_{0N-1}'^{1(k)}$;

19. $\bar{u}_{N-1}''^{2(k)} = \dfrac{\tau^2}{h^2}\bar{u}_{N-2}''^{1(k)} + \left(2 - 2\dfrac{\tau^2}{h^2} - \dfrac{2\tau^2 \pi R l^2 k_x}{a_T^2 \rho F}\right)\bar{u}_{N-1}''^{1(k)} +$

$+ \dfrac{2\tau^2 \pi R l^2 k_x}{a_T^2 \rho F}\bar{u}_{0N-1}''^{1(k)}$;

20. $j = j + 1$;

21. $i = 1$;

22. $\bar{u}_1^{0 j+1(k)} = \left(2 - \dfrac{\tau^2 2\pi R_{uz} h R k_x l^2}{\rho_1 F_1 a_T^2}\right)\bar{u}_1^{0 j(k)} - \bar{u}_1^{0 j-1(k)} +$

$+ \dfrac{\tau^2 2\pi R_{uz} h R k_x l^2}{\rho_1 F_1 a_T^2}\bar{u}_2^{j(k)} + \dfrac{\tau^2 \rho F l}{2h\rho_1 F_1}\left(\bar{u}_2'^{j(k-1)} - \bar{u}_0'^{j(k-1)}\right) -$

$- \dfrac{\tau^2 \rho F l}{2h\rho_1 F_1}\left(\bar{u}_2''^{j(k-1)} - \bar{u}_0''^{j(k-1)}\right)$;

23. $\bar{u}_1'^{j+1(k)} = \left(2 - 2\dfrac{\tau^2}{h^2} - \dfrac{2\tau^2 \pi R l^2 k_x}{a_T^2 \rho F}\right)\bar{u}_1'^{j(k)} + \dfrac{\tau^2}{h^2}\bar{u}_2'^{j(k)} -$

$- \bar{u}_1'^{j-1(k)} + \dfrac{2\tau^2 \pi R l^2 k_x}{a_T^2 \rho F}\bar{u}_{01}'^{j(k)}$;

24. $\bar{u}_1''^{j+1(k)} = \bar{u}_1^{0 j(k)} + \left(2 - 2\dfrac{\tau^2}{h^2} - \dfrac{2\tau^2 \pi R l^2 k_x}{a_T^2 \rho F}\right)\bar{u}_1''^{j(k)} + \dfrac{\tau^2}{h^2}\bar{u}_2''^{j(k)} -$

$- \bar{u}_1''^{j-1(k)} + \dfrac{2\tau^2 \pi R l^2 k_x}{a_T^2 \rho F}\bar{u}_{01}''^{j(k)}$;

25. $i = i + 1$;

26. $\bar{u}_i'^{j+1} = \dfrac{\tau^2}{h^2}\bar{u}_{i-1}'^{j} + \left(2 - 2\dfrac{\tau^2}{h^2} - \dfrac{2\tau^2 \pi R l^2 k_x}{a_T^2 \rho F}\right)\bar{u}_i'^{j} + \dfrac{\tau^2}{h^2}\bar{u}_{i+1}'^{j} -$

$- \bar{u}_i'^{j-1} + \dfrac{2\tau^2 \pi R l^2 k_x}{a_T^2 \rho F}\bar{u}_{0i}'^{j}$;

27. $\bar{u}_i''^{j+1} = \dfrac{\tau^2}{h^2}\bar{u}_{i-1}''^{j} + \left(2 - 2\dfrac{\tau^2}{h^2} - \dfrac{2\tau^2 \pi R l^2 k_x}{a_T^2 \rho F}\right)\bar{u}_i''^{j} + \dfrac{\tau^2}{h^2}\bar{u}_{i+1}''^{j} -$

$- \bar{u}_i''^{j-1} + \dfrac{2\tau^2 \pi R l^2 k_x}{a_T^2 \rho F}\bar{u}_{0i}''^{j}$;

28. $i \le N - 2$ if the condition is fulfilled turn to item 25, otherwise to item 29;

29. $i = N - 1$;

30. $\bar{u}_{N-1}'^{j+1(k)} = \dfrac{\tau^2}{h^2}\bar{u}_{N-2}'^{j(k)} + \left(2 - 2\dfrac{\tau^2}{h^2} - \dfrac{2\tau^2 \pi R l^2 k_x}{a_T^2 \rho F}\right)\bar{u}_{N-1}'^{j(k)} + \bar{u}_1^{0 j(k)} -$

$- \bar{u}_{N-1}'^{j-1(k)} + \dfrac{2\tau^2 \pi R l^2 k_x}{a_T^2 \rho F}\bar{u}_{0N-1}'^{j(k)}$;

31. $\bar{u}_{N-1}''^{j+1} = \dfrac{\tau^2}{h^2}\bar{u}_{N-2}''^{j(k)} + \left(2 - 2\dfrac{\tau^2}{h^2} - \dfrac{2\tau^2 \pi R l^2 k_x}{a_T^2 \rho F}\right)\bar{u}_{N-1}''^{j(k)} - \bar{u}_{N-1}''^{j-1(k)} +$

$+ \dfrac{2\tau^2 \pi R l^2 k_x}{a_T^2 \rho F}\bar{u}_{0N-1}^{j(k)}$;

32. $j \le Z - 1$ if the condition is fulfilled turn to item20, otherwise to item 33;

33. $i = 1, 0 \le j \le Z - 1$;

34. $\left|\bar{u}_i^{0 j(k)} - \bar{u}_i^{0 j(k-1)}\right| \le \varepsilon$ if the condition is fulfilled turn to item 2, otherwise to item 35;

35. $1 \le j \le Z - 1$;

36. $i = 0$;

37. $\sigma_0'^{j(k)} = E\dfrac{R}{l}\dfrac{1}{2h}\left(-3\bar{u}_0'^{j(k)} + 4\bar{u}_1'^{j(k)} - \bar{u}_2'^{j(k)}\right)$;

38. $\sigma_0''^{j(k)} = E\dfrac{R}{l}\dfrac{1}{2h}\left(-3\bar{u}_0''^{j(k)} + 4\bar{u}_1''^{j(k)} - \bar{u}_2''^{j(k)}\right)$;

39. $1 \le i \le N - 1$;

40. $\sigma_i'^{j(k)} = E\dfrac{R}{l}\dfrac{1}{2h}\left(\bar{u}_{i+1}'^{j(k)} - \bar{u}_{i-1}'^{j(k)}\right)$;

41. $\sigma_i''^{j(k)} = E\dfrac{R}{l}\dfrac{1}{2h}\left(\bar{u}_{i+1}''^{j(k)} - \bar{u}_{i-1}''^{j(k)}\right)$;

42. $i = N$;

43. $\sigma_N'^{j(k)} = E\dfrac{R}{l}\dfrac{1}{2h}\left(3\bar{u}_N'^{j(k)} - 4\bar{u}_{N-1}'^{j(k)} + \bar{u}_{N-2}'^{j(k)}\right)$;

44. $\sigma_N''^{j(k)} = E\dfrac{R}{l}\dfrac{1}{2h}\left(3\bar{u}_N''^{j(k)} - 4\bar{u}_{N-1}''^{j(k)} + \bar{u}_{N-2}''^{j(k)}\right)$;

45. The end.

Problem. Consider cast-iron underground pipeline with fixed ends. This problem is solved on the basis of an algorithm of computer realization.

Mechanical and geometrical parameters of underground pipeline and soil are taken in the following form:

$E = 1{,}15 \cdot 10^5$ MPa.; $\rho = 7{,}2 \cdot 10^3$ kg/m³; $F = \dfrac{\pi\left(D_H^2 - D_B^2\right)}{4}$ m²;

$D_H = 0{,}4$ m.; $D_B = 0{,}39$ m; $l = 10$ m; $k_x = 1 \cdot 10^4$ kN/m³.

For the shaft (cylinder):

$E = 2{,}5 \cdot 10^4$ MPa.; $\rho = 2 \cdot 10^3$ kg/m³; $D_{Huz} = 1{,}2$ m.; $D_{Buz} = 1{,}1$ m.;

$F_1 = \dfrac{\pi\left(D_{Huz}^2 - D_{Buz}^2\right)}{4}H_{uz}$ m³; $H_{uz} = 1$ m; $k_x = 1 \cdot 10^4$ kN/m³;

$u_0 = a_0 \sin \omega t$; $a_0 = 0{,}002$ m; $\omega = \dfrac{2\pi}{T}$; $T = 0{,}3$ s.

Fig. 1a shows the change in node displacement in time under sinusoid impulse loading of the pipeline of the length $l = 10$ m., fig. 1b — the change in pipeline displacements along the length of the pipeline at given time.

Fig. 2a shows the change in stresses in pipelines in time, fig. 2b — the change in stresses along the length of the pipeline at given time. If reason from fig. 2a and 2b with decreased length of the pipelines the stresses appearing in pipelines are increasing. In discussed problems the values of maximum displacements of the pipelines are achieved near the assembly and equal to assembly displacement.

We have substantiated that the Building Code KMK 2.01.03–96, functioning on the territory of the Republic of Uzbekistan, has a number of shortcomings and demands revision with consideration of research results of recent years in seismic engineering.

The Building Code is too bulky and overloaded with ratios and schemes; this makes the work of designers very complicated. So, it is necessary to work out the recommendations and proposals on mentioned studies, their development being the further directions of our research. These studies are aimed to be included into a new version of Republican Building Code KMK in seismic-resistant construction.
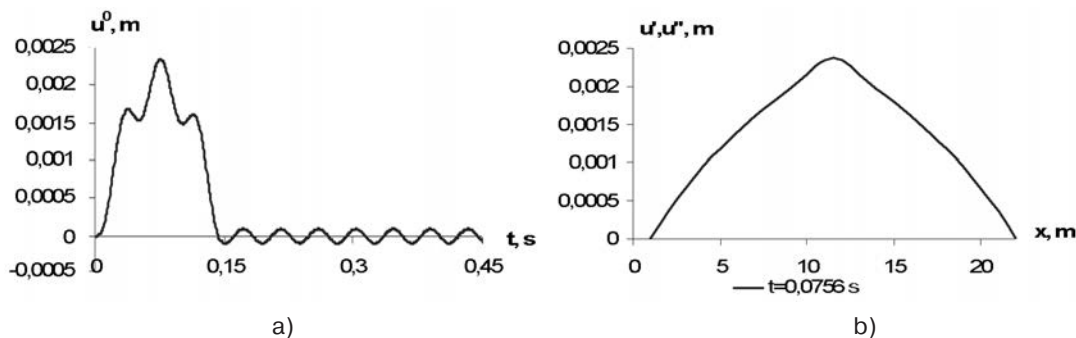
Fig. 1. a) — The change in assembly displacement in time under sinusoid impulse loading ($l = 10$ m.);
b) — The change in the displacements of a pipeline at given time in x coordinate axis
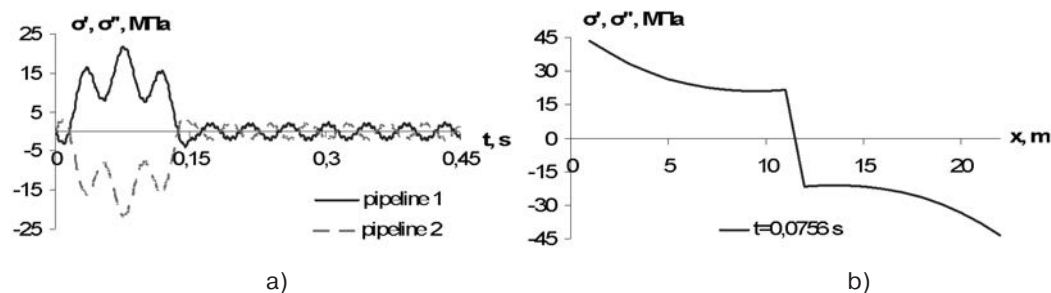
Fig. 2. a) — The change in stresses in pipelines near the assembly in time under sinusoid impulse loading;
b) — The change in stresses on pipelines at given time along the axis of a pipeline ($l = 10$ m.)

So, discussed earlier bases of dynamic theory of seismic stability of underground structures did not lose their urgency and importance, but gained with time further development and at present are on a new more progressive stage of their improvement.

Conclusions

- An algorithm and applied program package developed on current stage allow us to determine the stress-strain state of a complex system of underground pipelines under seismic effects (for linear problems) depending on all parameters: Mach number (ratio of velocities of longitudinal waves in soil and pipeline), attachment parameters, characteristics of a complex assembly (geometry of an assembly and soil density in an assembly), depth of bedding, intensity of seismic effect, etc.

- Developed software allow us to carry out strength analysis of underground pipelines under seismic effects and to realize system approach to the determination of the aftermath of earthquakes on stress-strain state of the pipeline and to plan engineering measures to provide safe and reliable operation of underground pipelines in dangerous (from the point of view of seismicity) zones.

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Calculation of cylindrical shells of tower type, reinforced along the generatrix by circular panels

Abstract: a simplified method of calculation of tower-type structures in the form of a cylinder shell, reinforced along the generatrix by circular panels based on limiting states of the first and second groups is proposed in the paper.

Keywords: cylinder shell, reinforcing panel, tower-shaped structures, strength, stress, reduced characteristics.

According to the Building Code (Building Norms and Rules 2.03.05–97) "Steel Structures. Norms of Design" [1], the calculation of tower-type structures in the form of thin-walled shells should be conducted based on the first limiting state, and in some cases on the first and second limiting states.

When the first limiting state is considered, the tower-type structure is tested on strength and stability; the calculation is done in elastic stage of work of the steel.

For the towers of various purposes the calculation based on the second limiting state is done in each individual case; this is specified in design tasks. Usually this calculation is necessary for modern antenna assemblies, where total maximum deviations, occurring as a result of structure deformation from force effects in operation process should not exceed the value of $(1/100 - 1/200) H$, where H — is a height of examined point of the structure.

It is known that one of the ways to improve the efficiency of a construction of tower-type structures is an optimization of their parameters. For latticed towers the methods of optimization of the parameters (tower profile, tangent of tilt angles of the crossbars, etc.) with consideration of load variations are widely used at present in design and projecting.

The application of solid walled towers at present is restricted by the lack of research results. Therefore, a number of recommendations are given in this paper as to the setting-up of cross section of the tower in the form of cylinder shell, reinforced along the generatrix by circular panels, and to the calculation on the basis of available at present experience of projecting of such structures.

It is proposed to conduct the setting-up of the cross section of the shell reinforced by panels in the following succession:

1. It is given by the diameter of a basic shell d within the range from 2500 to 7000 mm., satisfying the terms resulting from the first (in strength) and second limiting states, and considering functional purpose of the tower and the ways to transport its dispatching makes. It is given by the thickness of reinforcing panels of the shell h, $h' = (0.5 - 1)h$, of S width, measured along the arc of the guiding (it is recommended to take $S = (40-50)h$ according to the terms of ensuring a local stability of the panel of basic shell) and a lifting arrow $f = (10-12)h$ (Fig.1).
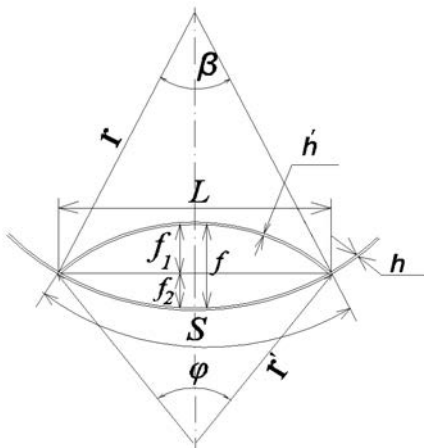
Fig. 1. A fragment of shell section, reinforced by a panel

The number of reinforced panels is determined as equal to $\pi \cdot \dfrac{d}{2S}$. Further, all necessary for subsequent calculations geometrical dimensions and characteristics of acquired section are measured based on the following formulae:

$$\left.\begin{array}{c}
\beta = \dfrac{S}{r}; \\[2mm]
L = 2(r-h)\sin\dfrac{\beta}{2}; \\[2mm]
f_2 = (r-h)\left(1 - \cos\dfrac{\beta}{2}\right); \\[2mm]
f_1 = f - f_2; \\[2mm]
r' - h' = (L^2 + 4f_1^2)/8f_1 \\[2mm]
\varphi = 2\arcsin\dfrac{L}{2(r'-h')}
\end{array}\right\} \quad (1)$$

here: β — is in radians, φ — in degrees.

Using the following dependences [2], geometrical characteristics and the position of the center of gravity of reinforced panel related to the center of gravity of tower section are determined (Fig. 2).
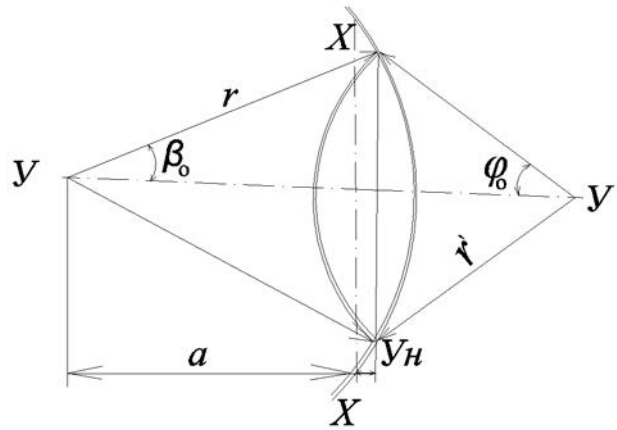
Fig. 2. A fragment of shell section reinforced by a panel

$$\left.\begin{array}{c}
Y_{\text{н}} = \dfrac{2r'-h'}{2}\cdot\left(\dfrac{\sin\varphi_0}{\varphi_0} - \cos\varphi_0\right) + \dfrac{h'\cos\varphi_0}{2}; \\[2mm]
a = (r-h)\cdot\cos\beta_0 - Y_{\text{н}}; \\[2mm]
J_x = \dfrac{h'(2r'-h')^3}{16}\cdot\left(\varphi - \dfrac{4\sin^2\varphi_0}{\varphi_0}\right); \\[2mm]
J_y = \dfrac{h'(2r'-h')^3}{16}\cdot\alpha; \\[2mm]
\alpha = 2\varphi_0 - \sin 2\varphi_0; \quad \varphi = 2\varphi_0 + \sin 2\varphi_0.
\end{array}\right\} \quad (2)$$

Further, the moments of inertia, resistance and cross section area of the entire tower are calculated.

2. An accumulation of static loads from own mass of the tower structure and technological equipment, wind load depending on the construction site location is done; dynamic characteristics are defined and inertia forces are calculated under tower oscillations caused by wind velocity pulsations. Total design forces from static loads and inertia forces in design combinations are determined.

3. Strength design of the tower is done by the following formula:

$$\sigma = \dfrac{N}{F} + \dfrac{M}{W} \leq mR, \quad (3)$$

where: R — is a design strength of material;

m — a coefficient of operation conditions, equal to 0.9 for basic elements of the tower;

M, N — design efforts, acting on the tower structure.

4. Stability estimation of the tower in the form of cylinder shell, reinforced by the panels is done in the following succession [3]:

– reduced rigid parameters of shell cross section are determined according to the following formulae:

$$B_1 = Eh_1; \quad D_1 = D\left(1 - \frac{S}{a_1}\right) + Ei_1, \qquad (4)$$

where: $h_1 = h\left(1 - \dfrac{S}{a_1}\right) + \dfrac{F_1}{a_1}$ — is a reduced thickness of shell cross section;

$D = \dfrac{Eh^3}{12 - (1 - v^2)}$ — a cylinder rigidity of un-reinforced shell;

h — a section thickness of basic shell;

v — a Poisson ratio for a steel;

a_1 — the distance between the axes of symmetry of reinforced panels;

S — an arc length of basic shell, enclosed between reinforced panels;

$i_1 = \dfrac{J_1}{\alpha_1}$ — a linear moment of inertia of reinforced panel in relation to the center of gravity of combined section of the panel and the shell;

F_1 — a total area of cross section of the reinforced panel and enclosed part of the shell.

– reduced rigid parameters of longitudinal sections of the shell are defined by:

$$B_2 = Eh_2; \quad D_2 = D\left[1 + \frac{\phi_1}{\phi_2}\left(1 - \frac{S}{a_1}\right)\right], \qquad (5)$$

where: $h_2 = \dfrac{h}{1 - v^2}\left[1 + \dfrac{\delta 1}{\delta 2\left(1 - \dfrac{S}{a_1}\right)}\right]$ — is a reduced thickness of lon-

gitudinal section of the shell.

Here δ_1 and φ_1 — are the displacements and rotation angle of basic shell on the part of reinforced panel under the effect of unit force towards the tangential to the contour of a middle surface and unit moment in circular direction;

δ_2 and φ_2 — are the displacements and rotation angle for reinforced shell (of closed combined section) of the same force and moment.

Reinforced cylinder panels combined with basic shell enclose a comparatively large area F (Fig.3). Because of it they considerably increase the rigidity of the shell on torsion. Reduced rigidity on torsion is determined by:

$$D_{12} = D(1 - v)\left(1 - \frac{S}{a_1}\right) + D_{12}^* \qquad (6)$$

where: D_{12}^* — is a linear, related to the length a_1, rigidity on torsion of a closed contour.
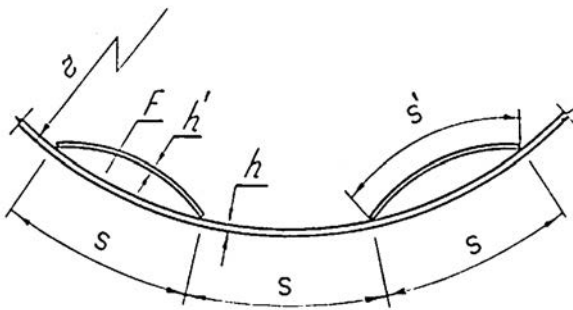
Fig. 3. A fragment of shell section reinforced by cylinder panels

To determine the value of D_{12}^* first, by Bredt's formula at the effect of torsional moment $M_{\kappa p}$ on the edge we would calculate the value of:

$$q_{kp} = \frac{M_{KP}}{2F}. \qquad (7)$$

Relative angle of rotation $\dfrac{d\theta}{dX}$ is determined according to Moor's formula:

$$\frac{d\theta}{dX} = \oint \frac{q_{kp}\bar{q}}{Gh_*} dS = \frac{M_{kp}l}{4F^2 Gh_*}, \qquad (8)$$

where: $\bar{q} = \dfrac{1}{2F}; l = S + S'$ — is a perimeter of a combined section;

$h_* = h\dfrac{S'h'}{a_1}$ — some mean value of shell thickness;

S' — an arc length of reinforcing panel;

E, G — are modulus of elasticity and shear of shell material. Hence:

$$M_{KP} = \frac{4F^2 Gh_*}{l} \cdot \frac{d\theta}{dX}. \qquad (9)$$

On the other hand:

$$M_{12} = D_{12}^* \frac{d\theta}{dX} = \frac{M_{kp}}{a_1}. \qquad (10)$$

So:

$$D_{12}^* = \frac{4F^2 Gh_*}{a_1 l}. \qquad (11)$$

It is seen from (11) that the rigidity of the shell on torsion is increasing with an increase of the area which is enclosed by reinforced panel and basic shell.

– then, a critical stresses of total strength loss are calculated under out-of-center compression at the value of N_0^* by the following dependence and then, the results are compared with actual stresses [4]:

$$\sigma_1^* = \frac{N_0^*}{h_1}\left(1 + \frac{2e}{r}\cos\beta\right). \qquad (12)$$

According to N_1^{**} critical stresses are defined; they correspond to stability loss of the panel restrained at longitudinal edges under compressive forces:

$$\sigma_1^{**} = \frac{N_1^{**}}{h}; \qquad (13)$$

– with dependence (13) critical stresses σ_1^{**}, are calculated; they correspond to stability loss of the panel restrained at longitudinal edges under compressive forces, taking into consideration panel coefficient K_n:

$$K_n = \frac{\sigma_1^{**}}{\sigma_1^{B}} \qquad (14)$$

where: $\sigma_1^{B} = 0,605E\dfrac{h}{r}$;

– critical stresses of a restrained panel of basic shell are determined with the effect of initial imperfections:

$$\sigma_1 = K_n \cdot C \cdot E \frac{h}{r} \geq mR, \qquad (15)$$

where: C — is a coefficient accounting the effect of initial imperfections, taken from Building Code 2.03.05–97.

5. If fitted section of basic shell and reinforcing panels does not meet the conditions of strength and stability, an alteration of acquired tower parameters is done and calculations are repeated.

6. After final fitting of the tower section, a bearing capacity is determined by formula (16).

The value of bending moment, corresponding to the exhaustion of bearing capacity of the shell, is measured by the summing up the products of cross section areas, participating in taking the load, by corresponding stresses, defined graphically by distribution diagram and by the distance to the center of gravity of shell section:

$$M_{max} = \sum_i^n \sigma_{i0} \cdot f_{io} \cdot y_{io} + \sum_i^n \sigma_i' \cdot f_i' \cdot y_i', \qquad (16)$$

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where: σ_{io} – is a stress for i th part of the shell continuing to take the load; f_{io} — a cross section area of i th part of the shell without stability loss; y_{i0} — the distance from the center of gravity of i th part to the center of gravity of shell section; $\sigma_i^{'}, f_i^{'}, y_i^{'}$ — the same, respectively, for reinforcing panels.

Calculations on strength and stability of tower-type structures in the form of cylinder shell reinforced along generatrix by circular panels developed according to proposed methods, give satisfactory results and may be applied in design and projecting of similar structures.

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Analysis of the modes of the power consumption the enterprises for the purpose of detection of advantages of use of the differentiated tariff for the electric power

Abstract: In article results of the analysis of the hour, daily, monthly, quarter and annual modes of an expense of the electric power the textile enterprise "Fergana Turon Textile" are given. Tool measurements for definition of the hour mode of electricity consumption the enterprise are carried out. Data on a power consumption of the enterprise for 2012–2014 years are obtained and analysed, and defined dynamics of change of the monthly, quarter and annual modes of a power consumption. Analyses have shown electricity consumption growth the enterprise in recent years.

Keywords: textile industry, electric energy, mode of the power consumption.

The textile industry of Uzbekistan is one of the developing directions of the country. Rational use of the electric power at such industrial enterprises, first of all, depends on his effective use during the work of separate industrial systems and technological installations. Characteristics of technological process of textile production is: its multigradualness, various power consumption of processing equipment, a large number of the factors influencing him, the width of the range of raw materials, semi-finished products and finished goods.

Therefore the power consumption on each this production, being difficult function of many variables, can sharply change at the same values of total amount of products. These factors complicate the accounting of an expense of the electric power that leads to his uncontrolled expenditure. Communications with it, to actual tasks saving and rational use of electric energy in the textile industry is.

The purpose of this article is carrying out the analysis of the hour, daily, monthly and quarter and annual modes of a power consumption of the textile enterprise LLC "Fergana Turon Textile". This enterprise is engaged in production of knitted products.

Today in the textile industry of our republic the main are cotton, silk and sewing and knitted branches. The most power-intensive types of production in the textile industry — cotton and silk fabrics for which production more than 68 % of the electric power [1] used in branch are spent (table 1).

Table 1. – Consumption of electric power in the textile industry

Type of fabric	Share of consumption of the electric power, %
Cotton	42.5
Silk	25.7
Others	31.8

The main consumers of the electric power in the textile industry are electric equipments which are used in technological process of production (combing cars, pneumospinning cars, reeling cars, weaving looms, cars of periodic action, the automated flowing lines and others), ventilation and lighting (table 2) [2].

Table 2. – Main consumers of the electric power

Consumer	Share of the general consumption of electric power, %
Technological process	63.0
Ventilation	13.9
Lighting	14.3
Auxiliary needs	8.8

In results of research of a power consumption for 2015 LLC "Fergana Turon Textile" is defined that the electric power makes the main share, i. e. about 50–55 % of the general energy consumption the enterprise.

Also carried out analysis of financial expenses of the enterprise for energy resources in 2015 has shown that more than a half of all expenses is the share of the electric power.

Authors have conducted tool examinations by means of the modern device by the AR-5 electro analyzer for the purpose of definition of the sentry electricity consumption within a week. Apparently from figure 1, electricity consumption distribution unevenly. Change of hour electric power in a week made from 1081 kW. on 1258 kW. Average power in a week made 1172 kW. Electricity consumption in night time generally is less days than day than time days. The minimum electricity consumption was observed from 04:00 for 09:00 hour of time days. From 11:00 for 20:00 hour of time days the maximum electricity consumption was observed.
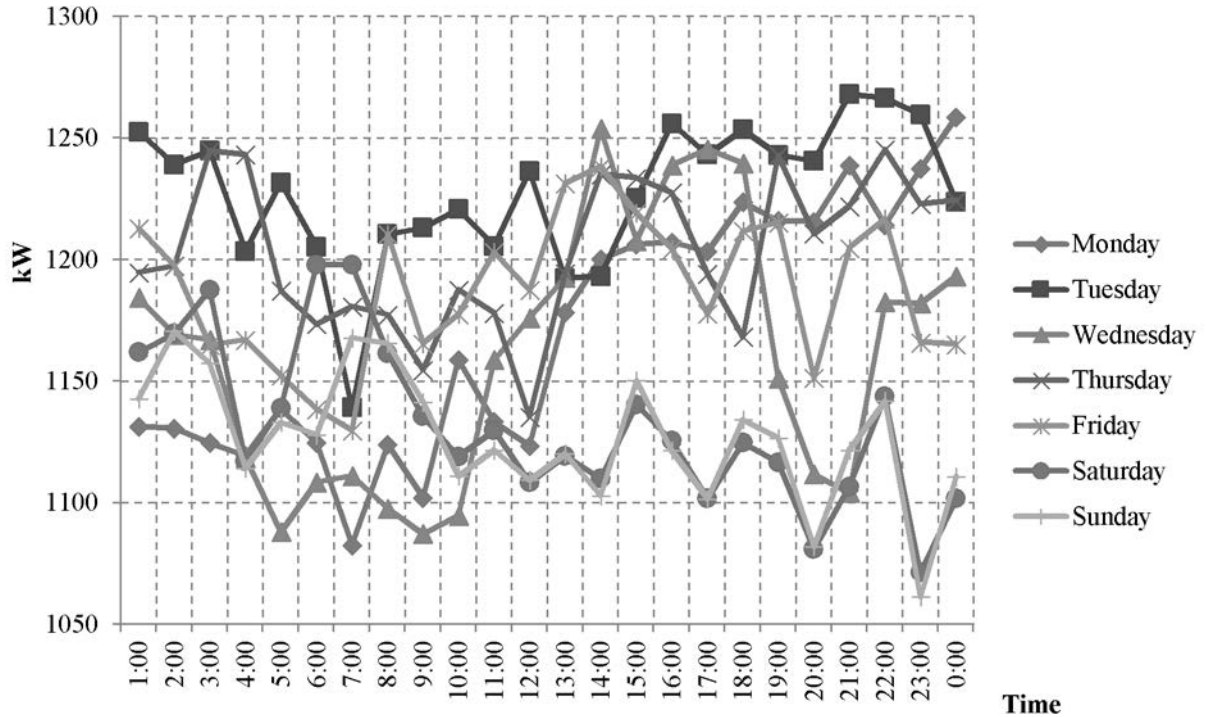
Fig. 1. Dynamics of change of the hour mode of a electric power consumption of the textile enterprise

The daily mode of electricity consumption by the enterprise is given in figure 2. The maximum electricity consumption was on Tuesday (29 469 kW·h), and minimum — on Sunday (27 038 kW·h). The average power consumption in a week was 28147 kW·h. Change of a daily power consumption in a week was observed ranging from 591 kW·h to 2 431 kW·h.

and maximum — 2030 083 kW·h. On average the enterprise it was consumed by 1 388 823 kW·h electric power in one month. Change of monthly power consumption within three years was observed ranging from 148 193 kW·h. to 1 817 204 kW·h. The main electricity consumption the enterprise falls on the summer period.
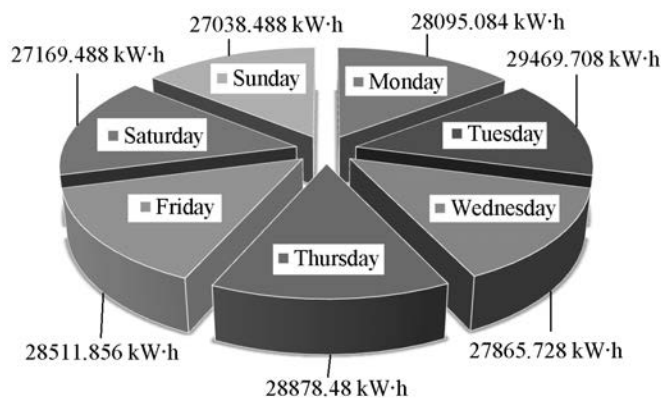
Fig. 2. Daily mode of a power consumption of the textile enterprise

Fig. 3. Dynamics of change of the monthly mode of a power consumption of the textile enterprise

Necessary data on a power consumption of the textile enterprise for 2012–2014 are obtained and defined dynamics of change of the monthly, quarter and annual modes of power consumption.

Dynamics of change of the monthly mode of a power consumption of the textile enterprise is given in figure 3. The minimum monthly power consumption in three years has made 212 879 kW·h,

Dynamics of change of the quarter mode of a power consumption of the textile enterprise is given in figure 4. Distribution of electricity consumption on quarters unevenly. The minimum quarter

power consumption in three years I have made 2 216 166 kW·h., and maximum — 5 444 309 kW·h. On average the enterprise it was consumed by 4 166 469 kW·h. the electric power in one quarter. Change of a quarter power consumption within three years was observed ranging from 211 937 kW·h. to 3 228 143 kW·h. The main electricity consumption the enterprise is the share on the second and third quarters of year. Every year on the fourth quarter the enterprise spends the minimum electric power.
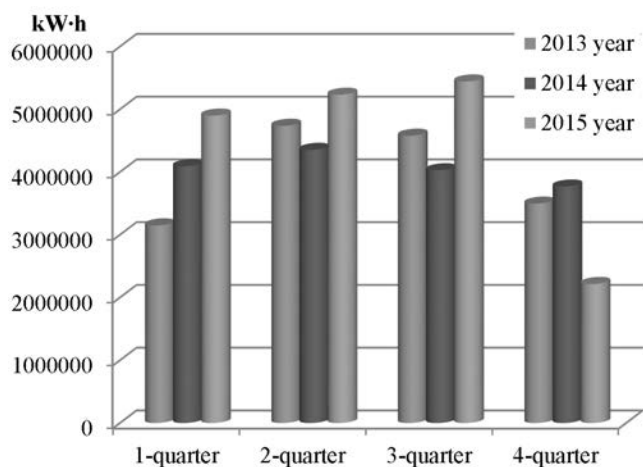
Fig. 4. Dynamics of change of the quarter mode of a power consumption of the textile enterprise

Dynamics of change of the annual mode of a power consumption of the textile enterprise is given in figure 5. The minimum annual power consumption in three years I have made 15 962 583 kW·h. (in 2013), and maximum — 17 792 181 kW·h. (in 2015). On average the enterprise it was consumed by 16 665 875 kW·h. electric power in a year. Apparently on drawings, in recent years the enterprise observes electricity consumption growth.
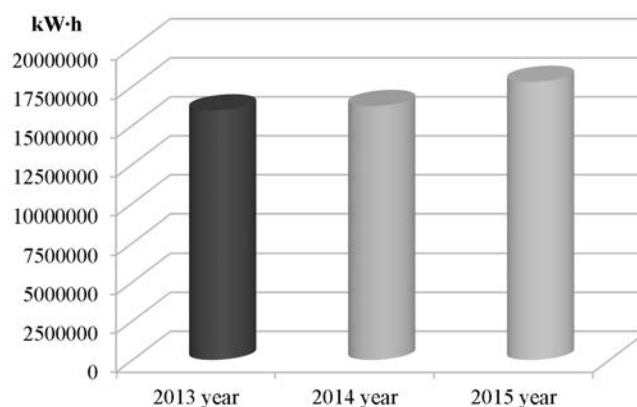
Fig. 5. Dynamics of change of the annual mode of a power consumption of the textile enterprise

Conclusions:

1. The carried-out tool measurements, have shown uneven electricity consumption in the hour mode. Also was defined that electricity consumption in night time of day is more than day than time days.

2. The daily allowance of the mode of electricity consumption the enterprise averaged 28 147 kW·h.

3. Dynamics of change of the monthly mode of a power consumption of the enterprise has shown that the main electricity consumption falls on the summer period.

4. The main electricity consumption the enterprise is the share on the second and third quarters of year. Every year the enterprise spends the minimum electric power on the fourth quarter.

5. In recent years the enterprise observes growth of electricity consumption.

6. It is necessary to look for possibilities of the differentiated tariff on the electric power, for the purpose of minimization of financial expenses on energy resources.

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Effectiveness of using by repairable disked extractor and spindles

Abstract: In the article the results of the theoretical research are provided which are about determining of the effectiveness of using by repairable disked extractor and spindles.

Keywords: horizontal spindly cotton picker machine, disked extractors, spindles, harvest.

The developed disked extractors and spindles were installed to horizontal spindly cotton picker machines and they were analyzed as a example in Yangiyul MTP AJ.

Since 2006 Yangiyul OSC branches in Tashkent and Syrdarya exploit on the contract basis 5 "Case-2022" machines imported from USA. Analyzing maintenance and other expenses during 2010 machine harvesting season on 1 hectare annual revenue and the terms of the aforementioned expenses covering is derived with the help of the equation below:

$$T_{CT} = \frac{P}{E} = \frac{10150}{42785} 0.089 \, year, \qquad (1)$$

where: T_{CT} — is expenses reserve recovery time-frame, year;

P — Net profit of the company, year;

E — Overall expenses during a cotton harvesting season, sum.

HSM modernization will increase the annual expense-profit as before because of extreme wear-and-tear disked extractors with elastic cogs were replaced by new ones. It was made certain that the disked extractors equipped with replaceable cogs in "Case-2022" machines should be made of simple St 3 steel instead colored aluminum as in the US, as it will ensure considerable economical and technical benefits [1; 2].

Net profit made out of this can is calculated with the formula below:

$$S_{JT(M)} = C_{upm} \cdot \frac{\Delta x}{100} = 18000 \cdot \frac{5}{100} = 900 \ sum, \qquad (2)$$

where: $S_{JT(M)}$ — the expenses of current repair of modernized reparable disked extractor during the technical service;

C_{upm} — the average price of a conventional disked extractor, sum;

Δx — division part, %.

As it was previously mentioned annually during the "Case-2022" works the extremely worn-off spindles are being discarded instead of repaired. In that case, the past net profit is calculated as such:

$$E_y = [(C_a - C_T)N_0]A;$$
$$E_y = (18000 - 900)40 \cdot 850 = 1453500 \ sum, \qquad (3)$$

where: E_y — annual revenue, sum; C_a and C_T — expenses for a new disked extractor and for the repair of worn-off one.

Additional expenditure coverage term is calculated thus:

$$T_{KM} = \frac{250000}{1453500} = 0.0172 \ year, \qquad (4)$$

where: A = 714 pieces — total number of machines working in national agriculture, pieces.

Owing to RDE usage the Yangiyul motor-tractor degree of profitability will increase up to 51.6 percent.

$$P = \frac{\sum C_{uf}}{E_y} \cdot 100\% = \frac{10150 + 280036}{112785 + 900 \cdot 36} \cdot 100\% = 51.6\%, \qquad (5)$$

where: C_{uf} — general production expenditures, sum.

Thus, usage of RDE increases competitive ability of HSM by boosting their functional and technological efficiency.

Lightened spindle usage prevents unripe cotton balls from damaging, and falling down on the soil. An opportunity emerged in our republic to create a new variant of HSM that technologically enables an efficient use of automatic cleaning system that prevents hard pieces of soil or pebbles from jamming in the harvester inlet chamber.

Repaired product total cost calculation

Total repair cost includes product preparation, sale and other procedure expenses.

Total cost is calculated thus:

$$C_p = C_c + C_{OX} + C_{IP}, \ sum \qquad (6)$$

where: C_c — repaired product total workshop cost, sums;

C_{ox} and C_{ip} — overall economical and internal production expenses, sums.

$$C_p = 3965146.8 + 75075 + 40402.2 = 4080624 \ sum.$$

Facilities reconstruction project implementation economic benefit:

$$E_{ye} = E_y - E_N(C_{cisx} - C_{ppr})N_{gisx} / N_g, \ sum \qquad (7)$$

where: E_N — economic efficiency of additional capital expenses, ($E_N = 0.17$).

$$E_{ye} = 5755007.7 - 0.17(5320003 - 3.0) = 4850611.3 \ sum.$$

Technical and economical parameters calculation results are given in the table 1.

Table 1. – Modernized disked extractors restoration department main technical and economical parameters

№	Title	Measuring unit	Readings
1	Main product assets	Sum	5 320 003
2	Annual program	Conditioned repair	8
3	Production space	sq. M	67
4	Number of workers	Worker	3
5	Conditional repair cost	Sum	4 080 624
6	Total product	Sum	48 000 000
7	Profit	Sum	15 355 000
8	Work efficiency	Sum/worker	16 000 000
9	Production space usage	Sum/sq.m	716 417.9
10	Profitability	%	47
11	Estimated annual revenue	Sum	4 850 611.3
12	Recovery period for additional capital investments	Year	0.9

Conclusions:

1. The use of reparable disked extractors increase the Yangiyul MTF profitability by 51.6%.
2. Reparable disked extractor polymer-aided restoration area: the workers amount (3 persons) on the spot was approved, as well as production space — 66 sq. m, electricity consumption for illumination — 2315 kW., water consumption — 28140 cubic meters.
3. Restoration (repair) department main technical and economical parameters were assessed; repair department profitability rate was established as 47%, and estimated annual revenue — 4.85 million sums.

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Seismic subsidence deformation of moisturised loess

Abstract: The results of experimental studies the influence of seismic subsidence on deformation of loess at different accelerations are being described by the author. The methods of laboratory and field studies on soil's seismic subsidence are provided. The factors affecting the seismic subsidence of the soil deformation are identified.

Keywords: Loess, seismic subsidence, porosity, comparative deformation, module subsidence, vibro — compression curvilinear, acceleration of fluctuation.

Additional subsidence of loess occurring under vibration is called "seismic subsidence" and its record is important especially when assessing the stability of structures in seismic regions.

The seismic subsidence of moisturised loess may have a catastrophic effect on the stability of the structure in specific cases.

The seismic subsidence natural soil can be estimated using the natural porosity coefficient β in the form of:

$$\beta = \frac{n_{np} - n}{n},\qquad(1)$$

where n_{np} — the natural porosity of the soil; n — the porosity of the sample.

When $n_{np} = n$ the coefficient is $\beta = 0$ and the soil will be in equilibrium state. In case of $\beta > 0$ the soil is considered to be unstable seismically in the greater extent rather than β. In case of $\beta < 0$ the soil is characterized by insufficient density and has a tendency under certain conditions when it is shaken to de compaction.
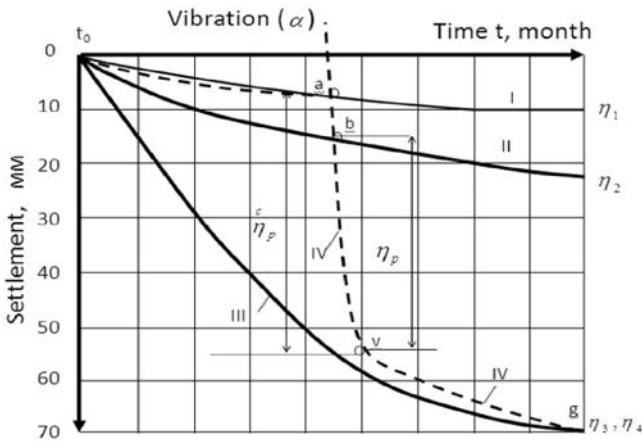
Fig. 1. Typical curve seismic subsidence
of construction on loess soils

Fig. 1 shows the different possible cases of subsidence of loess soils structures on the same initial porosity. The curve pattern I corresponds to the construction of buildings on the thickness of the dry loess moisture about 4–9 %. In this condition, the soil is characterized by high strength and low compressibility, and the total subsidence of construction with insignificant.

The curve pattern II corresponds to the construction of buildings on loess thickness with high humidity (about 18–23 %). Due to the higher level of moisture, the sustainability of soil decreases, while increasing its compressibility. The settlement η_2 increases and that often lead to cracks in buildings.

The curve III corresponds to the condition when the thickness of loess is exposed to dynamic stress while moistening with water. In this case, the soil humidity reaches its maximum, the sustainability reached its minimum and compressibility increases dramatically.

It is obvious that the sludge structure in these conditions significantly greater than in the first two cases.

The curve IV describes the condition of dry forests. In this case the soil sustainability remains stable in the range of $t_0 - t_c$. The moment t_c corresponds to the start soil's tremor and further subsidence of construction will be characterized by three stages (branches): Oa, ab and Br. In the first stage (a branch of Oa) IV curve coincides with the curve 1 (dry loess). In the third stage (branch vg) IV curve is slightly above the curve III (soaked loess). The sharp jump of subsidence at the beginning of the second stage (branch ab) explains to the influence of vibration on the soil's deformation. The magnitude of this jump determines the seismic subsidence of the construction.

Thus, the seismic subsidence structure in this case is associated with a transition of soaked loess from step I in stage III under fluctuating. When seismic subsidence occurs, usually there are cracks and distortions in erections; sometimes they can completely collapse. To ensure the smooth operation of facilities, in such circumstances, actions which need a good amount of financial expenditures are often used with proper design and use of special methods of construction.

It should be noted that in the project being examined, the loess which due to any reason was soaked during the construction activities is considers to be of minimum reliability. And the loess which occurs in natural conditions below the soil water is more reliable.

The quantity of seismic loess (η_p^c) based on other conditions depends on the thickness of the layer that lies above the subsoil water level. With increasing capacity of thickness, the quantity η_p^c increases in almost same proportion. It is also natural that the quantity is determined by the greater or lesser capacity of the rocks composing this thickness, causes the seismic subsidence phenomenon.

Seismic subsidence of loess, as well as the compressibility of the soil is more easier and graphically depicted by the comparative deformation e. In terms of this quantity in parts per mille, we will operate with seismic subsidence module e_p, which corresponds to the sediment in millimetres of meter layer of loaded soil under a tremor acceleration a_c.

The degree of seismic subsidence is different for varieties of loess, as well as others from the type of clay and determined by their composition and condition.

We will use the term of seismic subsidence module e_p^c as per the analogy of accepted subsidence which features the relative soil compaction under the influence of tremor in the form of:

$$e_p^c = \frac{\nabla h}{h},\qquad(2)$$

where: ∇h — absolute value of compaction of the sample under tremor; h — first height of the soil sample, compressed in the compression by p.

Module seismic subsidence is a dimensionless quantity. In practice, it may be used in its absolute value or its expression in

percentage (%) or, as per the recommendations of N. N. Maslov in pro mille (mm/m) [1].

The last method is especially useful. In this form it is called as a module of seismic subsidence and is indicated as e_p^c. The index p indicates the quantity of static load p, which is attached to the soil, and c index meets the conditions of seismicity of seismic subsidence module definition.

Under this condition, the module e_p^c of seismic subsidence reflects the amount of deformation, i. e. the amount of compression in millimeters of soil in the 1.0 meter high column in case of tremor under its load p.

Here the formula (2) will have following from:

$$e_p^c = 1000 \frac{\nabla h}{h}. \qquad (3)$$

The indicator e_p^c has a specific engineering meaning and is very simple calculations.

Seismic subsidence of soil under dynamic loading is studied in compression conditions and vibro compression curves are based on the results of experiments (fig. 2).
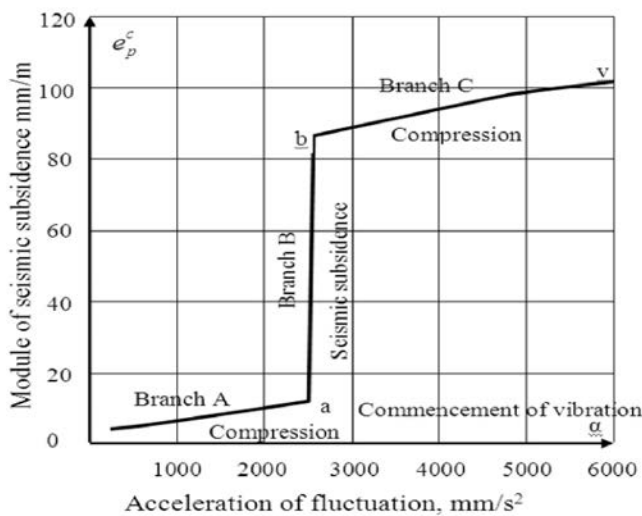
Fig. 2. Vibro consolidation of moisturized loess under seismic influence

Unlike conventional compression tests these experiments are implemented without vibration of soil the initial stage of the load. This stage is usually characterized by low soil compaction value (branch A). Furthermore the sample is subjected to vibration. The soil under this vibration gives a sharp drawdown (branch B). Then the deformations of the sample after the vibration (branch C) are observed.

Important exponents loess seismic subsidence are the porosity and moisture (table 1). The lower the natural porosity, the more they are sealed under tremor, therefore, seismic subsidence of the construction will be higher.

Table 1. – Seismic subsidence deformation of loess with differ porosity

Degree of soil's deformation	Porosity, %	Module of seismic subsidence, mm/m
Not deformed	35–40	0
Hardly deformed	40–45	10
Deformed	45–50	50
Strongly deformed	50–55	100
Dramatically deformed	> 55	> 100

Field experiments should be conducted for the greater reliability of loess' seismic subsidence. At the same time observing more experienced subsidence under the stamp (plate) with varying degrees of vibration of soaked soil is continued. Stamp 50×50 or 100×100 cm. is established on a layer of sand in the pit. Pit is filled with sand to prevent bulging of the soil beneath the stamp.

After rainfall attenuation the water is supplied through pipes to the bottom of the pit in the sandy layer for soaking the loess strata. Next dynamic load is put on the stamp and its drafting observed. The stamp gives a sharp slump in case of seismic subsidence phenomenon.

To control the before and after the experiment, the samples are taken out of the stamp and initial of n_0 and final porosity n_1 modules are determined. The seismic subsidence module is determined via following [2]:

$$e_p^c = \frac{\lambda}{1.1D}, \qquad (4)$$

where: λ — sediment stamp, mm., which occurred after water supply into experienced pit and dynamic load applications; D — side of square stamp m.

Control is being carried out with the formula:

$$e_c = 1000 \frac{n_0 - n_1}{1 - n_1}, \qquad (5)$$

where: e_c — module of seismic subsidence soils mm. per meter of thickness; n_0 — initial porosity of the soil; n_1 — soil porosity after seismic subsidence.

The following are the results of experimental researches conducted to study the factors affecting the module of seismic subsidence at different vibration effects.

The role of gradation of the soil as per the module of seismic subsidence is seen from the graph illustrated in fig. 3, where the results of experiments with different contents of particles per size are reflected.
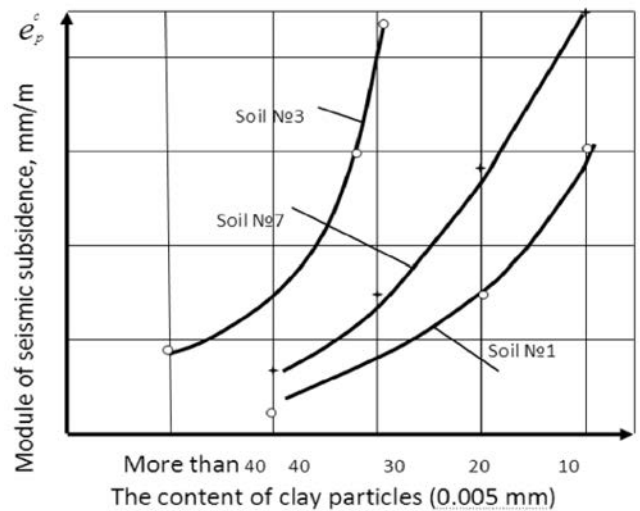
Fig. 3. Dependence of module seismic subsidence of loess on the content of clay particles

The analysis of such kind of experiments showed that the homogeneous soil is in unfavourable condition in dynamic proportion heterogeneity. On the other hand the content in the soil clay particles results in a reduction of loess deformation due to the emergence of internal consistency between the grains.

The series of experiments to determine the effect of soil porosity (n) the quantity of seismic subsidence module (e_p^c) were conducted on loess soils, taken from different depths of the strata. Thus, the module of seismic subsidence e_p^c with average porosity of the upper layer (1–3 m.) $n = 48\%$ tremor with acceleration of $\alpha = 3000$ mm/s² exceeds 118 mm/m, which should be considered more than significant value.

The nature of the possible dependence of the seismic subsidence module (e_p^c) on the porosity of the Tashkent loess at a

constant intensity fluctuations is seen on fig. 4. As we can see, here is a very weak dependence $e_p^c = f(n)$, although at relatively low values of the a_c. The picture changes with increasing acceleration of the vibration motion.
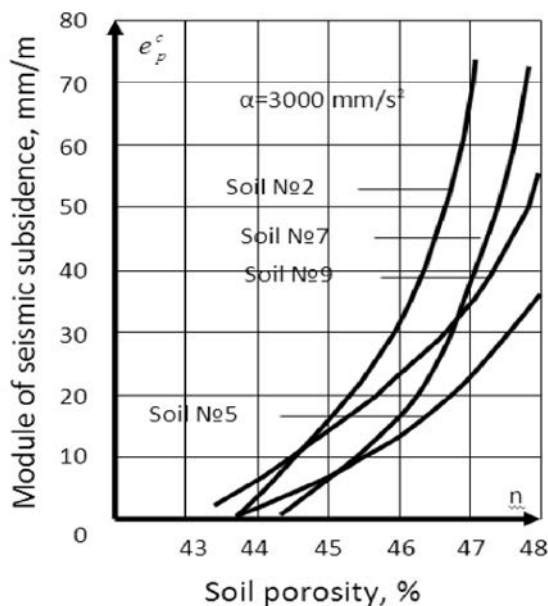
Fig. 4. Changes of seismic subsidence module depending on porosity of soil under continuous acceleration of fluctuations
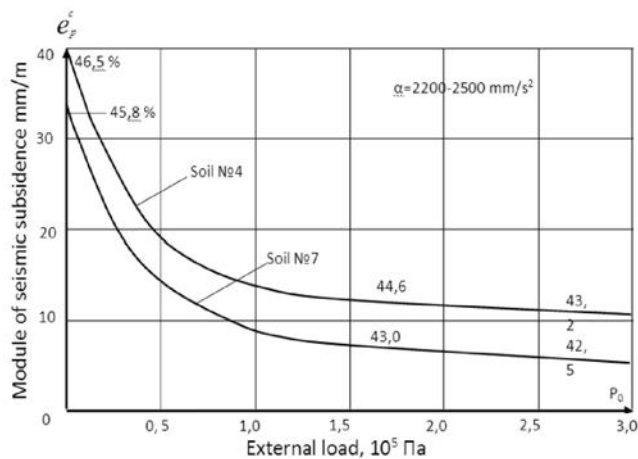
Fig. 5. Dependence of seismic subsidence module on external load under fluctuations with acceleration 2200–2500 mm/s²

Fig. 5 illustrates a graph of seismic subsidence module (e_p^c) dependence on external load of sample which shows a sharp decrease of module (e_p^c) in unit values with increasing load. Also intensive decrease e_p^c is considered in the initial stages of the external load application. So, for the loess of upper horizon (1–3 m.) with

a porosity $n = 47.8\,\%$ through increasing the load on the soil of $0.5 \cdot 10^5$ Pa. to $2.5 \cdot 10^5$ Pa. the quantity of seismic subsidence module decreases from 112 mm/m.

We can therefore conclude that the role of the load during the deformation of the soil is not only favourable, but also highly effective, particularly when designing anti seismic subsidence events.

Influence of intensity and nature of the dynamic load in the speed of seismic subsidence deformation (seismic subsidence module) of loess also was the object of research. Experiments conducted for this purpose on different loess provided the opportunity to establish directly proportional dependence of loess seismic subsidence from the fluctuations' intensity.

So,

$\alpha = 500$ mm/s²; $e_p^c = 4{,}0$ mm/m;
$\alpha = 1000$ mm/s²; $e_p^c = 8{,}8$ mm/m;
$\alpha = 1500$ mm/s²; $e_p^c = 20{,}0$ mm/m;
$\alpha = 2500$ mm/s²; $e_p^c = 30{,}0$ mm/m.

As an example, the fig. 6 shows a schedule in form of dependence $e_p^c = f(\alpha)$, which means that speed of deformation of soil's seismic subsidence increases with the increment of intensity of the measured acceleration [3] of the vibration motion.
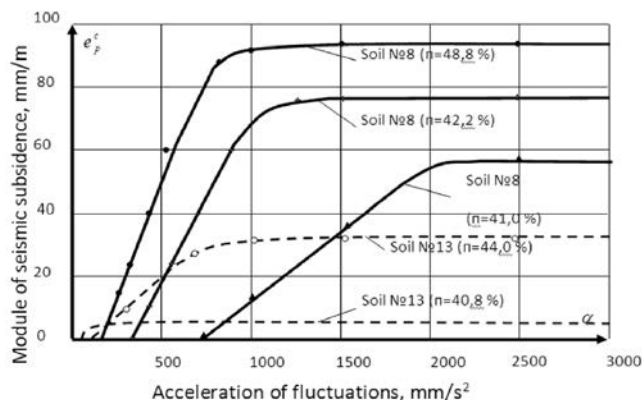
Fig. 6. Dependence of $e_p^c = f(a)$ on loess soils of various compactness

The last one is important in assessing the stability of the soil subjected to seismic influences. It was noted that such dependence $e_p^c = f(\alpha)$ is observed up to so-called limit of acceleration for concrete soil, above which the seismic subsidence of soil deformation becomes progressively increased. The increase of soil deformation with increment of acceleration of fluctuations occurs due to the intense vibrations of the destruction of the structural links (primarily power connectivity between the particles) of soil under vibrations.

During processing the results of researches showed the increment of the module of soil's seismic subsidence under fluctuation of the soil with high frequency that is vital for regions characterized by high-frequency earthquakes.

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Depth location of the foundations in seismic areas

Abstract: Despite prevailing opinion on the independence the depth location of the foundation structures from seismic area the author brings up the idea to increase the earthquake resistance of buildings to the extent of embedment of the foundation. As a result of conducted studies, the formula for determining the depth of the foundation, taking into account the intensity of earthquakes was proposed. It is noted that the use of the proposed formula helps to ensure the stability of any construction erected in seismic regions.

Keywords: soil, seismic subsidence, dynamic load, depth location, the foundation base, soil adhesion, fictitious depth, limited load.

Stability of constructions erected in seismic region, mostly depends on the strength of the soil which form the bases, their ability to withstand the vibrational motion during earthquakes. But the construction practice shows that even the implementation of this requirement does not always guarantee the seismic stability of buildings and the normal conditions of operation [1].

These mandatory normal operating conditions of operations and facilities are frequently violated during their seismic subsidence too due to deformation of weak soil differences in the thickness of the base under the influence of dynamic forces. Particularly, quite often such situations occur upon availability of such soils as moisturized loess and loess-like types in the thickness of erections' base.

For a number of reasons the seismic subsidence of constructions (non-homogeneity of foundation base and characteristics of constituent soils, uneven dynamic load and dissemination of pressure in the soil thickness, etc.) is always in uneven. In particular cases, it is measured in tens of centimetres (sometimes more than 1.0 meters) upon availability of the base with little resistant deposits loess structure [2].

In such cases there is a danger of inclination (tilt) and the warping of the building and its separate elements, as well as derangement of the constructions' sustainability where cracks and breaks occur as a result of the activation over voltage appeared due to deformation. Consequently, in most casesone of the most reliable methods addressing sustainability of foundation soils is the right selection of the depth location of construction's foundation.

The practice of constructions' operations in seismic areas shows that the deepening the buildings' foundations, i. e., the inception of erections' foot to a certain depth from the surface of the thickness will be the simplest and most effective measure to reduce the expected seismic subsidence deformation as a result of the vibrational motion of the base.

The solution to this problem in the interpretation of the author is provided in following manner [2].

Referring to fig.1, which shows a conditional diagram of construction, which was built on the surface of the soil.
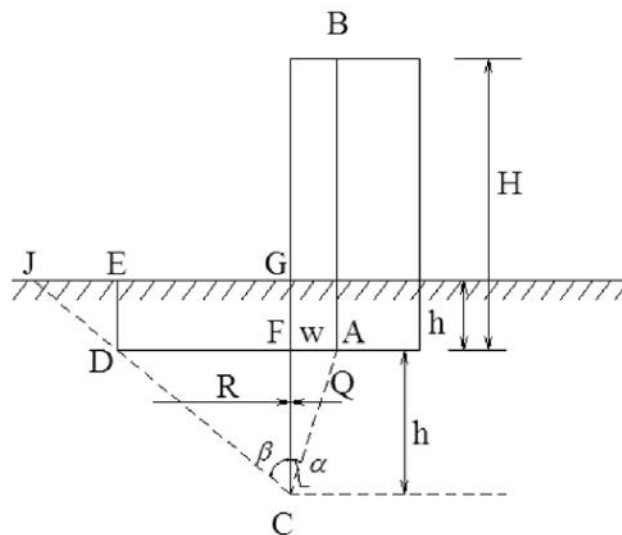
Fig. 1. Design diagram

In this case, the estimated load on p_p soil in the level of foundation base, taking into account the seismic influence is determined by:

$$p_p = p_0(1 + k_c e^{i\omega t}) - \gamma h_3, \qquad (1)$$

where: p_0 — pressure of construction's weigh; k_c — seismic coefficient; γ — density of the soil; h_3 — depth location of foundation.

With regard to current case, the calculation of the foundation's depth location is leads to the following considerations:

$$p_h = \gamma z' = \gamma(z + h_3), \qquad (2)$$

where: z –dept location considered horizon's bedding is below the level of the actual application of load p_0 to the soil, i.e, below the foot of the foundation.

Let us assume that at a depth h from the surface of the soil there is a foot of construction's foundation with an F area which transmits the pressure p_0 to the soil. It is required to identify the depth of h foundation, where oscillating foundation will give deformation (seismic subsidence). We shall replace the construction with the pillar

structure of soil, with h height which has the same F foot area and p_0 weight. Consequently, the pressure transmitting by soil column to the base will be the same this building transmits, which is provided in the following manner considering the inertia forces:

$$HF\gamma = p_0(1 + k_c e^{i\omega t}). \tag{3}$$

Let us assume that the prism split off the soil's column on the surface AB with the sole base F_1, and as a result of the destruction of the soil under its base AF it tends to sink into the soil.

The destruction of the stability of the soil under the foundation is represented in the form of a prism AFC (prism collapse), tending to slide down BY AC surface. The prism FCD (resistance prism) will prevent this shift and loaded GFDE soil layer, with height h. Obvious, the collapse prism will put pressure on FC area to the resistance prism through some force Q.

Let's assume that the efforts required to shear resistance prism and lying layer of soil on it is equal to R and Q force is directed normally to the surface FC. The size of angle β is determined by assuming that R is the minimum.

Hence, the condition of soil dynamic stability will be determined as per following:

$$R > Q. \tag{4}$$

Obviously pressure Q will be active and the pressure R passive. The angles of inclination α and β are defined as:

$$\alpha = 45^0 - \frac{\phi}{2}; \tag{5}$$

$$\beta = 45^0 + \frac{\phi}{2}. \tag{6}$$

Q и R quantity in accordance with the equations and theory of soil's pressure on retaining wall will be defined as:
for active pressure:

$$Q = (\frac{1}{2}\gamma z^2 + \gamma Hz)tg^2(45^0 - \frac{\phi}{2}), \tag{7}$$

for passive one:

$$R = (\frac{1}{2}\gamma z^2 + \gamma hz)tg^2(45^0 + \frac{\phi}{2}). \tag{8}$$

Placing the values (7) and (8) to the condition of limiting equilibrium (4), after appropriate conversion we shall obtain:

$$\gamma h = p_0(1 + k_c e^{i\omega t})\frac{tg^2(45^0 - \frac{\phi}{2})}{tg^2(45^0 + \frac{\phi}{2})}. \tag{9}$$

In current formula, p_0 as noted above means the pressure of structures equal to the h height of the soil prism pressing with its weight same pressure to the base.

Considering that:

$$\frac{1}{tg^2(45^0 + \frac{\phi}{2})} = \frac{1}{ctg(45^0 - \frac{\phi}{2})} = tg^2(45^0 - \frac{\phi}{2}), \tag{10}$$

expression (9) to the desired dept location h of foundation H can be represented as:

$$H = \frac{p_0(1 + k_c e^{i\omega t})}{\gamma tg^4(45^0 - \frac{\phi}{2})}. \tag{11}$$

It should be noted that the formula (11) was derived without considering the clutch in the soil of the base. This indicator straight

of a soils is easily calculated using famous method in soil mechanics by considering it as the force of friction in the soil to the pressure of a particular fictitious column of the soil with height h_c and compactness γ, i. e. [3]:

$$h_c = \frac{c}{\gamma tg\phi}, \tag{12}$$

where: h_c — fictitious depth, defined by fig. 2.
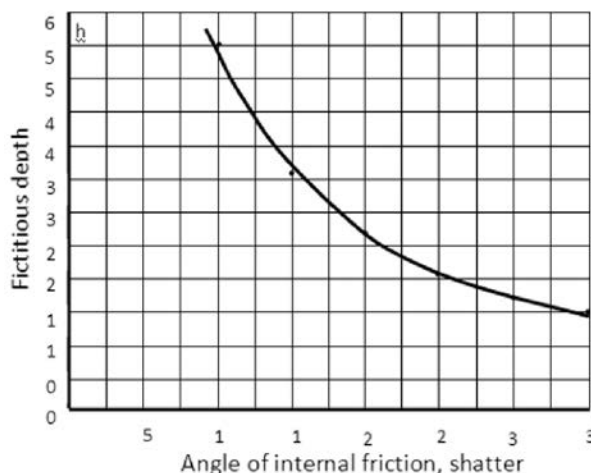
Fig. 2. Schedule to define fictitious depth location of foundation h_c at the value of adhesion $c = 0.1 \cdot 10^5$

Considering (12) the formula (11) will be rewritten in final version:

$$H = \frac{p_0(1 + k_c e^{i\omega t})}{\gamma tg^4(45^0 - \frac{\phi}{2})} + \frac{c}{\gamma tg\phi}. \tag{13}$$

Table 1. – Seismic subsidence of loess soil in various depth locations of foundation

№	Foundation depth H, m.	Maximumloadat the sole of foundation p_{np} 10^5 Pa.	Seismic subsidence, mm.
1	1.0	0.33	57
2	2.0	0.48	48
3	3.0	0.63	39
4	4.0	0.78	31
5	5.0	0.93	27
6	6.0	1.08	22
7	7.0	1.23	18
8	8.0	1.38	16
9	9.0	1.53	14

The formula (13) has notability properties. Upon considering it thoroughly we can note that the quantity H is located in direct proportion dependence on p_0.

For more evidence of the role of the foundation depth location in ensuring the seismic stability of buildings, the seismic subsidence for particular building under various layers of the foundation was calculated. The results of these calculations are summarized in table 1, which implies a significant role of the foundation depth location in the seismic resistance of constructions.

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Dependence to determine reduction of the strength of concrete and sectional area of armature in time

Abstract: The main purpose of calculation of the degree of salt corrosion of concrete and reinforcement is to assess their effect on the load capacity and life span. As a result of the work developed the method of estimation of influence of salt corrosion of the concrete work and fittings. Depending on the definition proposed for reducing the strength of the concrete reinforcement, and the cross sectional area over time during operation.

Keywords: Corrosion, concrete, reinforcement, salt corrosion, strength, main beam, Plate external console.

There are numerous studies $[1; 2; 3]$, where developed various proposals to determine the depth of corrosion by the chemical composition of hazardous reagents composition of the concrete salts, and other factors. In $[1; 2; 3]$ is considered as the basis ensuring of the thickness of the protective layer of concrete is sufficient for reliable corrosion protection of concrete and reinforcement.

It should be noted that the results of these works are difficult to take into account in practical calculations of the effect of salt corrosion work of superstructures.

This fact requires the development of methods of calculation of resource of superstructures based on the analysis of long-term experimental data available measuring factors directly taken into account in the calculations.

One of such possible areas is to evaluate the effect of salt corrosion through the strength of the concrete and reduce the cross-sectional area of reinforcement. For this purpose, treated during many years of experimental data and obtained in recent years as a result of examination and testing of existing reinforced concrete superstructures $[4; 5; 6; 7; 8]$. Totally processed results of 32 measurements of the strength of concrete and corrosion of reinforcement in the span of highway overpass in the city of Tashkent.

From Table 1 shows that the strength of concrete slabs external console subject to influence salt corrosion with increasing age decreases substantially. After 43 years of the actual operation of the concrete strength of 20 MPa., which is 50 % below the designed 40 MPa. salt penetration was achieved while almost the entire plate thickness.

Table 1. – The results of the test concrete superstructures

The location of the beams	Place strength measurements	Time from start of operation, years			
		20	26	32	43
extreme	Plate external console	35	30	24	20
	The edge of the main beam	38	35	35	32
average	Slab	38	40	36	36
	The edge of the main beam	40	40	39	36
extreme	Plateexternalconsole	34	28	22	21
	The edge of the main beam	40	40	36	36
average	Slab	35	33	22	22
	The edge of the main beam	40	40	38	36

Figure 1 shows the variation in time on the strength of the concrete test results. Also given data to evaluate the effect of salt corrosion of concrete to reduce its strength.

Reducing of the strength of the concrete in the rib of the main beam is much lower than in the slab of the carriageway. To describe in time reduce of the strength of concrete process proposed by the dependence of the exponential type:

$$R_{bT} = R_b be^{-\alpha T},\qquad(1)$$

where: R_b — design strength; b, a — parameters characterizing the rate of decline in strength over time; T — time from the start of operation, respectively.

In (1) parameters b and α are determined on the basis of the known dependencies of processing of experimental data:

$$b_0 = e^{\overline{\ln R} - \alpha T};\qquad(2)$$

$$\alpha = \frac{\sum_{t=1}^{N}(\overline{T} - T_i)(\ln\overline{R} - \ln R_i)}{\sum_{t}^{N}(\overline{T} - T_i)};\qquad(3)$$

$$\overline{R} = \frac{\sum_{i=1}^{N}R_i}{N};\qquad(4)$$

$$\overline{T} = \frac{\sum_{i=1}^{N}Ti}{N};\qquad(5)$$

$$\overline{nR} = \frac{\sum_{i=1}^{N}nR_i}{N},\qquad(6)$$

where $\overline{T}$ — the average value of the time; $\overline{R}$ — the average value of strength.

According to available data the results obtained:

$$R_{bT} = 0,9R_b \cdot e^{-0,01T}.\qquad(7)$$
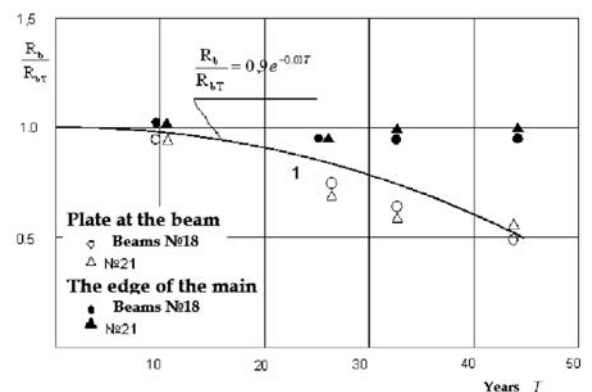
Fig. 1. Reducing of strength of concrete in salt corrosion

As can be seen from Fig. 1 dependence (7) correctly describes the change in the strength of concrete in time.

To determine the degree of influence of salt corrosion on the reinforcement of the slab in the area of the largest opening surface cracks were removed corroded reinforcement (fig. 2). Actual measurements of the diameter of the valve after cleaning the surface of the reinforcement from corrosion products. At the same time we measured the diameter of a corroded valve after opening of the protective layer of concrete without extracting them.
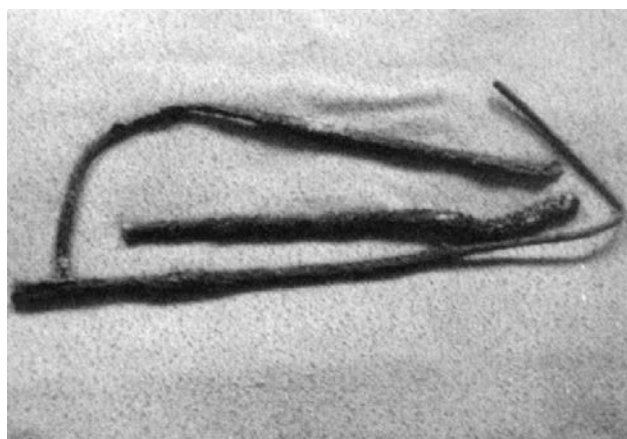
Fig. 2. Corrosion of reinforcement, extracted from the carriageway slab in various years
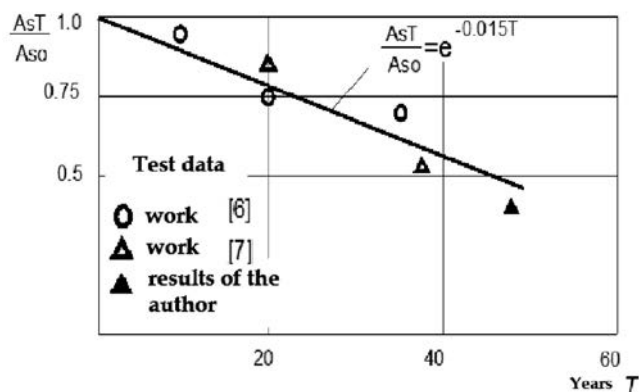
Fig. 3. Reducing armature's cross-sectional area as a fraction of the original: A_{S0} — initial area of reinforcement (armature); A_{ST} — sectional area of the armature after corrosion

Table 2. – The results of measuring the diameters of the valve during the operation superstructures in the conditions of salt corrosion are stored

Measuring number	Change of rebar diameter, mm.				Notes
	1986 y.	1996 y.	2000 y.	2008 y.	
1	11.8	9.6	6.7	6.2	Measurements without removing the reinforcement (armature)
2	–	8.5	–	5.9	Measurements with removing the reinforcement (armature)

As shown in Table 2 under the actual diameter of salt corrosion of reinforcement after 43 years of operation decreased almost 2-times. Fig. 3 shows a graph of cross-sectional area reduction valve during salt corrosion

Reducing the cross-sectional area of reinforcement in time dependence can be described by:

$$A_{sT} = A_{S0}\, e^{0.015\,T}, \qquad (8)$$

where A_{S0} — initial area of reinforcement; T — time in years from the start of operation.

As a result of the work developed the method of estimation of influence of salt corrosion of the concrete work and fittings. Depending on the definition proposed for reducing the strength of the concrete reinforcement, and the cross sectional area over time during operation.

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Energy-efficient chizel-cultivator

Abstract: In article are brought the results of the studies on development of the technological scheme of the work and schemes of the accommodation worker organ energy-efficient chisel-cultivator.

Keywords: chisel-cultivator, worker organs, blocked cutting, hemi blocked cutting, unlocked cutting, rip perish paw, double-sided reversible ogival paw, unilateral ogival paw, tractional resistance, consumption fuel.

Among complex agricultural practices, directed on reception high harvest agricultural cultures, cultivation of ground plays the paramount role. Only under the high quality of the cultivation optimum conditions in ground for reception friendly plant lings, growing of the plants and accumulations of the harvest. Beside from this, qualitative cultivation of ground creates the prosperous circumstances for functioning (working) the sowing machines, promotes increasing to capacity of the labour, spare fuel, water and safety of the farm machinery.

At the same time it's necessary to note that cultivation of ground is the most energy-consuming operation in agricultural production. So, under the cultivation of cotton plant from the total expenses of the energy 50–60 % accounts for share of the processing of ground [1]. So reduction energy-intensity of machines and tools, applicable when processing of ground, is an important problem.

The quality and energy-intensity processing of ground first of all depends on perfection of the technological process of the work, designs ground-cultivated machines and tools, parameter their worker organ.

Chisel-cultivator CHK-3.0 and CHKU-4 in our Republic are the main instrument when preparation of ground to sowing of the cotton plant and other cultures. However because of imperfection of the technological process of the work and designs they have high energy-intensity and as a result low capacity. Considering be foregoing us organized studies, directed on development energy-efficient technological process of the work chisel-cultivator for the aim increasing of capacity of the labour and reductions of the consumption combustible-lubricants and other expenses.

It's known [2; 3] that worker organs soil-cultivated machines and tools depending on sites on frame and the forms worker to surfaces interact with ground in condition blocked, hemi blocked and unlocked cuttings.

When functioning in condition of the blocked cutting worker organ interact with layer, bounding with two sides by monolith of ground.

When functioning in condition hemi blocked cuttings a worker organ interacts with layer, bounding on the one hand flufferish (the previous worker organ by) by ground or open furrow, but with the other monolith of ground.

When functioning in condition of the unlocked cutting layer, processed by worker organ, border two sides flufferish by ground or opened furrow.

It's known [3–5] that when functioning in condition of the unlocked cutting tractional resistance worker of the organ in 1.5–2.5 times less, than when functioning (working) in condition blocked and hemi blocked cuttings. So for reduction energy-intensity processing of ground beside soil-cultivated machines number worker organ, interacting with in condition blocked and hemi blocked cuttings, must be possible less, but number worker organ, interacting in

condition of the unlocked cutting, as large as possible. Proceeding these is designed technological scheme of the work and scheme of the accommodation worker organ energy-efficient chisel-cultivator [6], submitted for drawing.
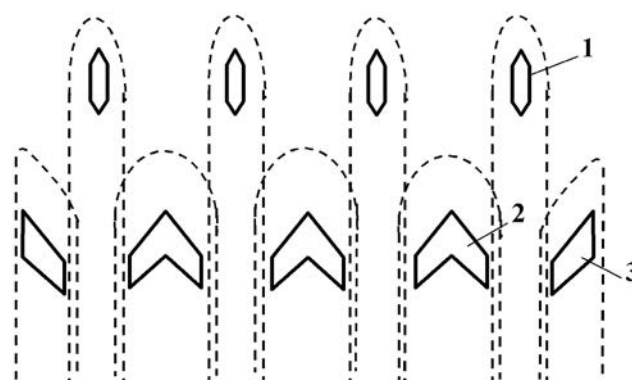
Fig. 1. Technological scheme of the work and scheme of the accomodation worker organ of energy-efficient chisel-cultivator: 1 — ripperish paw; 2 — revelsible ogival paw; 3 — unilateral ogival paw

Beside designed chisel-cultivator worker organs are allocated on frame in two rows. Herewith, the worker organs first row interact with monolith of ground, i. e. work in condition of the blocked cutting, but worker organs second row interact with layer, bordering flufferish by worker organs first row by ground, i. e. work in condition of the unlocked cutting.

The main purpose worker organ of the first row creation lateral flufferish zones that worker organs second row interacted with ground in condition of the unlocked cutting. So they are executed in the manner of flat dihedral wedge, i. e. in the manner of narrow ripperish of the paws. Since herewith first ground is deformed toward its day surface i. e. aside open surface, and secondly decreases the volume deformed in condition of the blocked cutting of ground. These factors bring about reduction of the expenses of energy.

The worker organs second row are executed in the manner of dihedral (the intermediate worker organs) and unilateral (the extreme worker organs) trihedral wedge i. e. in the manner of double-sided and unilateral ogival paws and due to this they deform the processed layers aside flufferish (the workers organ first row) of the zones, i. e. they work in condition of the unlocked cutting. As a result fall energy-consumption on processing of ground since destruction layer ground, processed by workers organ second row, occurs in places first of all, where durability their minimum — along line of the least relationships.

Called on test have shown that energy-efficient chisel-cultivator in contrast with existing (CHK-3.0, CHKU-4) has in 1.33–1.39 times tractional resistance less and as a result consumption fuel on processing 1 ga. area decreases on 3.3–3.4 kg.

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Heating systems for the control of liquid level

Abstract: This article discusses the prospects of the application of heat gauges for the control of liquid level, it is proposed to develop the design of the heat of the water level transducer and provides static characteristic.

Keywords: transmitter, reliability, efficiency, heating systems, design, drive, equipment, fault.

Level measurement — a fairly common measurement process in hydropower, irrigation and drainage, oil refining, petrochemical, chemical, and other industries. Sometimes the results of measuring the level of judging the volume amount of the substance contained in the tanks (tanks, cisterns, tanks, etc.). For this purpose, a constant or measured capacitance (height) cross section (e. g., cans dimensional volumetric flow units), no special calibration table assigning to each current value of the level value of the tank volume.

Level gauges — absolutely necessary equipment in modern industry and technology. there are so many of today gauges, with different features, for a variety of materials, the level of which must be measured and controlled. And the most significant difference between the different gauges — this technology and how they work, which is also dependent on the use of instruments, their quality, cost and availability. Known liquid level gauges do not fully meet modern standards for simplicity, reliability, accuracy, efficiency and technological design [1]. Therefore research and development of highly reliable liquid level gauges is a very urgent task. Among the water level transducers still not investigated and implemented are thermal converters, which have a number of good qualities (sensitivity, simplicity of design, and others). And corresponding structural refinement can be successfully applied in practice.

Thermal control method is one of the main types of non-destructive testing in liquids. Due to ease of manufacture, the signal processing speed and noise immunity of the pre-emptive use in monitoring and control systems received thermal transducers liquid level.

Figure 1 is a schematic structural diagram of a liquid heat level gauge [2].
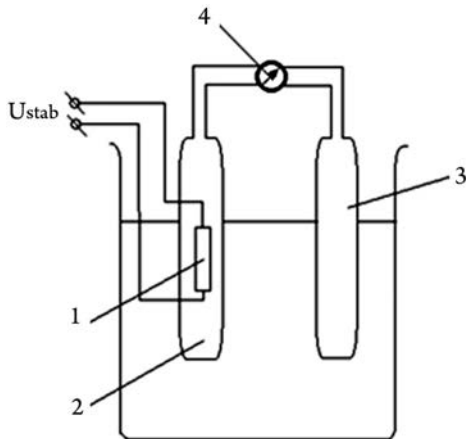
Fig. 1. Schematic diagram of the heat gauge constructive liquid level gauge

The liquid level which is measured immersed heated heating element 1 cylinder 2 and comparative cylinder 3. The inner cylinder cavity filled with the same working fluid (liquid or gas).

The heating element 1 is powered by an external source of stabilized voltage. As a secondary device used manometer 4, which chamber capillary tubes are connected to the internal cavities of cylinders 2 and 3.

At a constant liquid level and switched on the heating element in the cylinders is set for some of the working fluid pressure is determined by the capacity of the heater, the volume of fluid in the cylinder, as well as the properties of the working fluid filling the cylinders.

When changing the liquid level change conditions of heat transfer and consequently the temperature and pressure inside the cylinder. The differential pressure in a heated and Comparative cylinders proportional to the level of liquid and measured differential pressure gauge 4, which is calibrated in terms of the level.

Using the appropriate Differential pressure relay elements can operate in alarm mode, and automatic control.
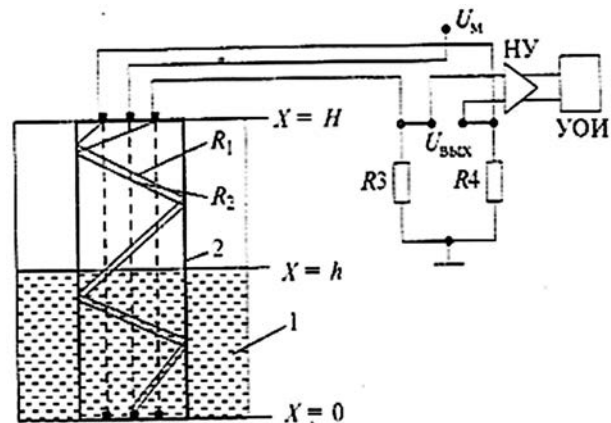
Fig. 2. Scheme of the heat level converter design

The authors have developed a thermal water level inverter [3]. Example of the heat level converter design is shown in Fig. 2. The basic construction elements are two copper wires, a resistance R_1 and a diameter of an order of magnitude less than the diameter of the other wire having a resistance R_2. Wires with resistance R_1 serves as a primary sensing element, and a resistance R_2 — compensation. These wires are wound with a certain pitch on the dielectric frame 2 having a shape of a plate or a cylinder, which is distributed along the entire measured liquid level 1. Resistance R_1 and R_2 fixed resistors R3 and R4 are included in the adjacent shoulders of the measuring bridge

circuit to which the output is usually connected normalizing amplifier NA and display device information DDI.

The output voltage of a bridge measuring circuit can be represented as:

$$U_{\text{вых}} = U_{\text{м}} \frac{K}{(K+1)^2} \varepsilon, \qquad (1)$$

where: ε — relative change in resistance R_1 shoulder;

$K = R_3/R_4$ — bridge coefficient symmetry;

$U_{\text{м}}$ — voltage bridge circuit.

Values of ε is determined from the formula:

$$\varepsilon = \left| \frac{1 + \dfrac{q\alpha_0}{g_{\text{ж}} - q\alpha_0}}{1 + \dfrac{q\alpha_0}{g_{\text{г}} - q\alpha_0}} - 1 \right| \frac{h}{H}, \qquad (2)$$

where: q — heat flux; H — level full range of level changes; h — the current level; $g_{\text{ж}}$, $g_{\text{г}}$ — respectively the heat transfer coefficients of the wire in a liquid medium and gas; α_0 — temperature coefficient of resistance of the wire material.

Analysis of the expression (1), (2) and the graph in Fig. 3. Show that for small values of ε static characteristic linear enough.

Studies have also shown that the development level of thermal converters for hydraulic systems, it is advisable to perform them on the basis of the basic modular structure (see. Fig. 2), represents the dielectric nonconductor cylindrical rod, the entire length is a definite step wound copper wire with resistance R_1 and R_2 heat level converter. This design is placed in a perforated protective cover [4].
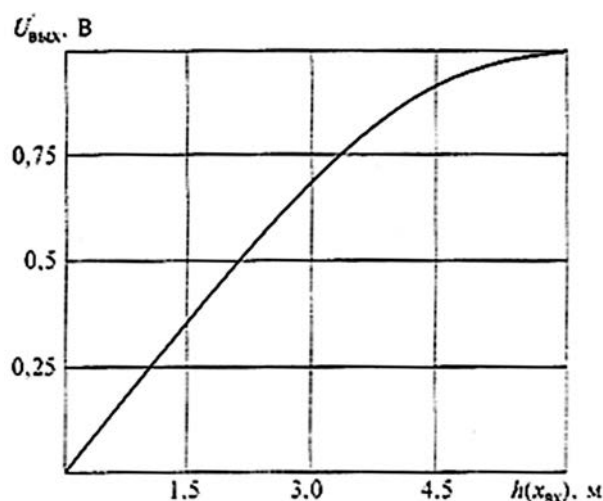
Fig. 3. Static characteristic heat level converter

The developed design of the thermal water level converter has been tested during the monitoring and control of water level in the vertical drainage wells [5]. Maximum measurement depth reached 6 m; error of not more than 0.5 % of the upper limit; power consumption 10 W.; the water temperature is 5 °C – 25 °C.

It should be noted that the proposed liquid level gauge has a simple structure, fabrication of the device does not require high material costs. A distinctive feature of the transmitter is reliability, for its operation does not require special training of the staff.

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The method of determining the energy-efficiency of career excavators of the mining industry

Abstract: The composition of electrical equipment is determined, taking into account the efficiency of the constituting participating in the execution of each operation a complete cycle of operation (pressure, lifting, turn taking into account the reverse and move) for career excavators. A method of calculating the power consumption of career excavator calculation and analytical methods based on given values of the efficiency of each component of the electrical equipment and machinery in general is developed with the known value of their efficiency and power consumption of the actuating mechanism (pressure, lifting, turn taking into account the reverse and move). Calculation-experimental method is based on measurement results of

electrical energy consumption of each component of the operations of a single cycle of operation excavator or the total consumption of electrical energy for a certain period of time (hours).

Keywords: excavator, power consumption, specific norm, calculation and experimental method.

Introduction

The careers of the mining industry the main technological equipment are the drilling rigs and excavators, from which the power-consuming equipment are single-bucket excavators and the effectiveness of the use of their depends essentially the work of the mining enterprise. Excavator career tracked (ECT) is a full-circle electric a direct shovel on crawlers. It is intended for excavation and loading in transport of the heavy rock previously loosened by the explosion. Career excavators ECT are issued with ladles from 4 up to 46 m^3. To the main mechanisms include those that are directly involved in the process of excavating the ground: lifting, turning, pressure.

The main indicator of work of excavators is their power consumption and reliability. Development of the power equipment and decrease in consumption of active energy compared with traditional systems devoted the works [1–4].

The full cycle of work of a excavator includes following technological operations: digging, lifting laden bucket, platform turn to the place of an unloading or lifting of laden bucket with simultaneous turn of a platform to an unloading place, opening bucket — unloading and returning, turn of the empty bucket in the face, in addition, through a certain time interval moving — a move excavator.

One of the main energy indicators of any installation, including mining excavators is the specific power consumption (consumption of electrical energy for one full cycle of operation of the excavator by one meter of a cube mass of ore).

Methods of Research

The specific consumption of electrical energy can be calculated by two methods: calculation-analytical and calculation-experimental.

The calculation-analytical method — is based on the definition of productivity of a excavator and consumption of electrical energy theoretically. Under the productivity of the excavator is understood as volume of the rock, separated from the array and an excavator moved by a predetermined distance determined by its operating parameters in a unit time. On the productivity of the machine is affect by such factors as the mining and geological, constructive, technological, climatic, organizational [4].

Theoretical productivity of an excavator is quantity of rock mass (in tons or cubic meters) which can be recycled in unit of time. Hour, shift, days, month or year is accepted to a time unit. Thus the resistivity of rocks digging K_r accepts the maximum allowable under the passport of the machine; coefficients of filling of bucket K_f and loosening of rocks K_l — equal to one; angle of rotation on unloading in career of the excavator — 90°, height digging of bucket — at the level of an axis of the pressure of shaft of the stick H; the speed of working of movement shall be established by nominal (on the passport).

Theoretic productivity of the career excavator on the crumbling mass is determined (in cubic meters per hour) by the formula [4]

$$Q_T = 3600 \cdot \frac{E}{T_c},\qquad (1)$$

where E — capacity installed on an excavator of bucket (standard or changeable), m^3;

T_c — duration of a cycle of work of the machine (indicated in the technical characteristic of an excavator for angle of turn of boom on unloading, equal 90°), sek.

For the angles of turn distinct from 90°, cycle time is multiplied by the reduced correction coefficient K_c (table 1) [2].

Table1. – Correction coefficient with considering angle of turn of the excavator

Angle of rotation of the excavator on unloading, degree	45	60	75	90	120	150	180
Correction coefficient, K_c	0.79	0.86	0.93	1.00	1.14	1.26	1.40

The size of the angle of turn on unloading — depends on the schemes of movement of transport, servicing an excavator in career.

Productivity of the excavator with considering noted coefficients on loose mass is determined (in cubic meters per hour) by the formula [4].

$$Q_{Tech} = Q_T \cdot \frac{K_f}{K_l} \cdot \frac{T_o}{(T_o + T_a)},\quad (2)$$

where K_f — coefficient of filling of bucket, equal to the ratio the volume of loosened rock mass in a bucket to passport capacity of a bucket; Maximum $K_f = 1.2$; K_l — coefficient loosening of rock mass, characterized by the ratio of the volume of a ground in the loosened condition to the volume of the same ground in the dense body (entirely); T_o — duration of continuous operation of the excavator from one place of standing within an hour; for the approximated calculations can be accepted $T_o = 45–50$ min.; T_a — duration of advancing of the excavator as removing the face within an hour, equal to $T_a = 10–15$ min.

The total consumption of electricity for the full cycle of operation of the excavator is defined as the sum of the five components in accordance with the following structure (thus is accepted, that within a cycle of excavation of drives of the working equipment of the excavator are loaded on full capacity).

$$\sum W_{ECT} = W_{pressure} + W_{lifting} + W_{turn\,(B-1)} + W_{turn\,(B-2)} + W_{move}, \quad (3)$$

where $W_{pressure}$ — the electric power consumption on creation of pressure; $W_{lifting}$ — the electric power consumption on lifting;

$W_{turn\,(B-1)}$ — the electric power consumption on turn of a platform with the filled bucket; $W_{turn\,(B-2)}$ — the electric power consumption on the reverse turn of the platform with the empty bucket; W_{move} — the electric power consumption on moving of the excavator.

The specific consumption of electrical energy of the ECT on production 1m^3 ores will be:

$$N_{ECT} = \frac{\sum W_{ECT}}{Q_T},\qquad (4)$$

where Q— Theoretic productivity of the excavator per unit time.

Knowing the total power consumption of each component of a unified cycle of pressure mechanisms, lifting, turning the laden bucket, turn of the emptied bucket, moving, can be determined necessary electrical energy (energy consumption) for one cycle of the excavator work. In figure 1 the scheme of electric equipment and working mechanisms taking into account the efficiency of each component is presented. The excavator is powered three-phase AC voltage from a career network of electric supply.

Knowing the needs of the mechanical power for each component, that is the necessary power for realization of the pressure, lifting, turning to the laden and emptied bucket, the mechanism of moving of the excavator, it is possible to calculate the power requirement for each component. Knowing the efficiency of each component, will determine the total efficiency for operation of a pressure, lifting, turning and moving.
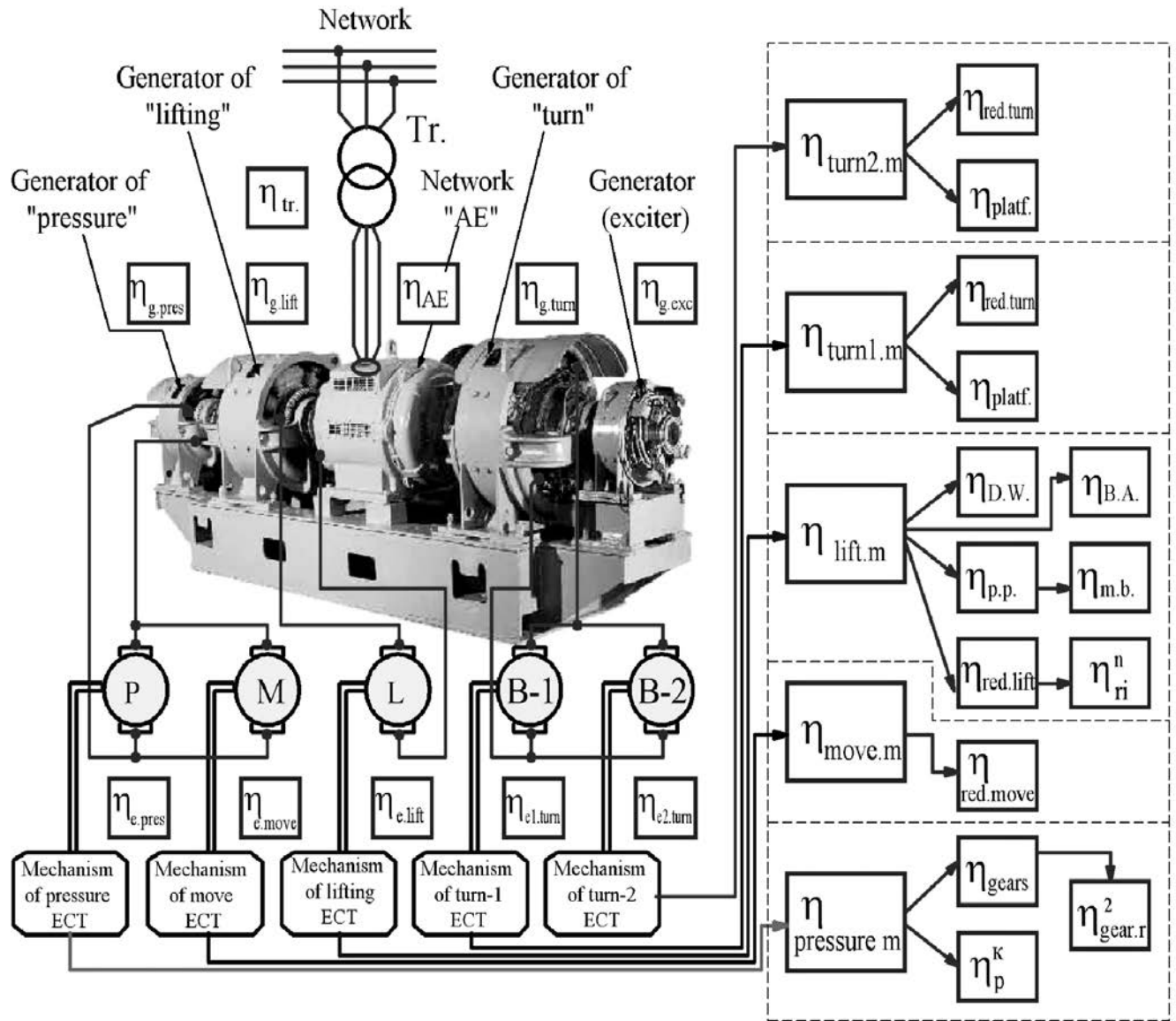
Fig. 1. Structural scheme of electric equipment and working mechanisms of the excavator ECT-5A for systems AE-G-M (asynchronous engine- generator-motor DC), taking into account of efficiency of each component of executive mechanisms.

Total efficiency for each operation of component of the cycle will be:

1. Efficiency of pressure

$$\eta_{pressure} = \eta_{trans.} \cdot \eta_{AE} \cdot \eta_{gen.pres.} \cdot \eta_{D.pres.} \cdot \eta_{mech.pres.}, \quad (5)$$

2. Efficiency of lift:

$$\eta_{lift} = \eta_{trans.} \cdot \eta_{AE} \cdot \eta_{gen.lift} \cdot \eta_{D.lift} \cdot \eta_{mech.lift}, \quad (6)$$

3. Efficiency of turn B-1:

$$\eta_{turn\ (B-1)} = \eta_{trans.} \cdot \eta_{AE} \cdot \eta_{gen.turn} \cdot \eta_{D.turn} \cdot \eta_{mech.turn}, \quad (7)$$

4. Efficiency of turn B-2:

$$\eta_{turn\ (B-2)} = \eta_{trans.} \cdot \eta_{AE} \cdot \eta_{gen.turn} \cdot \eta_{D.turn} \cdot \eta_{mech.turn}, \quad (8)$$

5. Efficiency of move:

$$\eta_{move} = \eta_{trans.} \cdot \eta_{AE} \cdot \eta_{gen.move} \cdot \eta_{D.move} \cdot \eta_{mech.move}, \quad (9)$$

The total power consumption on an entrance of the transformer for each component of the cycle will be equal:

$$P_{pressure} = \frac{P_{mech.pres.}}{\eta_{pressure}}, \quad P_{lift} = \frac{P_{mech.lift}}{\eta_{lift}}, \quad P_{turn\ (B-1)} = \frac{P_{mech.ture}}{\eta_{turn\ (B-1)}},$$

$$P_{turn\ (B-2)} = \frac{P_{mech.ture}}{\eta_{turn\ (B-2)}}, \quad P_{move} = \frac{P_{mech.move}}{\eta_{move}}. \quad (10)$$

Knowing the power of each component, we shall determine the amount of the consumed electric power:

$$\sum W_{ECT} = P_{pressure} \cdot t_1 + P_{lift} \cdot t_2 + P_{turn\ (B-1)} \cdot t_3 + P_{turn\ (B-2)} \cdot t_4, \quad (11)$$

where t_1, t_2, t_3, t_4 — accordingly time necessary for performance of operation of pressure, lifting, turning of platform with the filled bucket, turn of reverse motion of a platform with an empty bucket.

The specific norm of the consumption of electrical energy without taking into account component of the mechanism of a move will be:

$$N_{ЭКГ} = \frac{\sum W_{ECT}}{Q_{ECT}} = \frac{W_{pressure} + W_{lift} + W_{turn\ (B-1)} + W_{turn\ (B-2)}}{Q_{ECT}}, \quad (12)$$

where Q_{ECT} — the volume of excavation for the estimated time m³.

Experimental part

The calculation-experimental method is based on results of measurements of the consumption of electrical energy of each component of operation of a uniform cycle of work of the excavator or the total consumption of electrical energy for the certain period of time (hours or days).

On figures 2–7 are shown in the form of oscillograms daily measurements of indicators of the consumption of electrical energy, the schedule of voltage, current and power factor taking into account the coefficient of current transformer k = 300/5 = 60 and voltage k = 110000/100 = 1100.
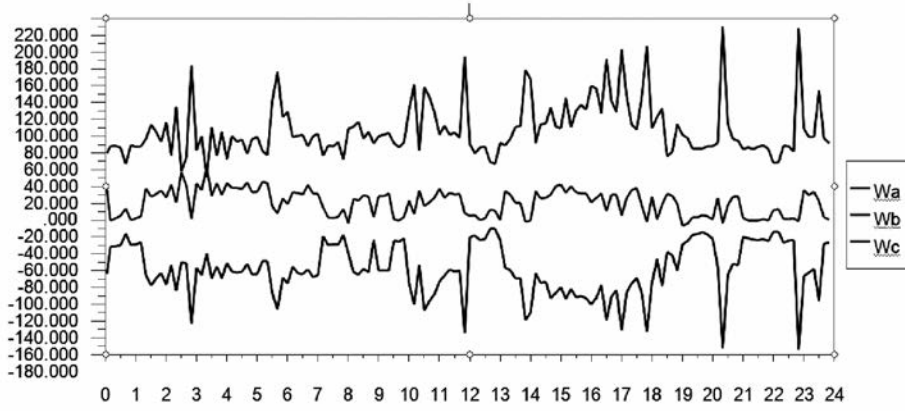
Fig. 2. The daily schedule of active powers on phases of the ECT-5A taking into account coefficient of the transformer of current and voltage
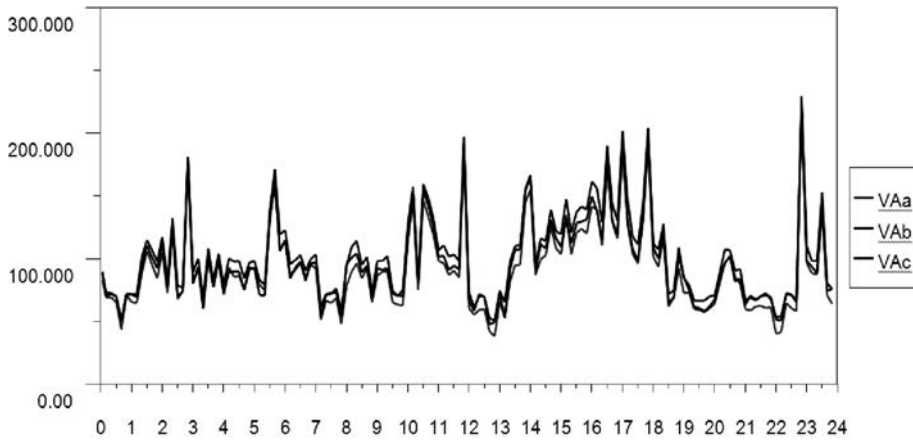
Fig. 3. The daily schedule of full powers on phases of the ECT-5A taking into account coefficient of the transformer of current and voltage
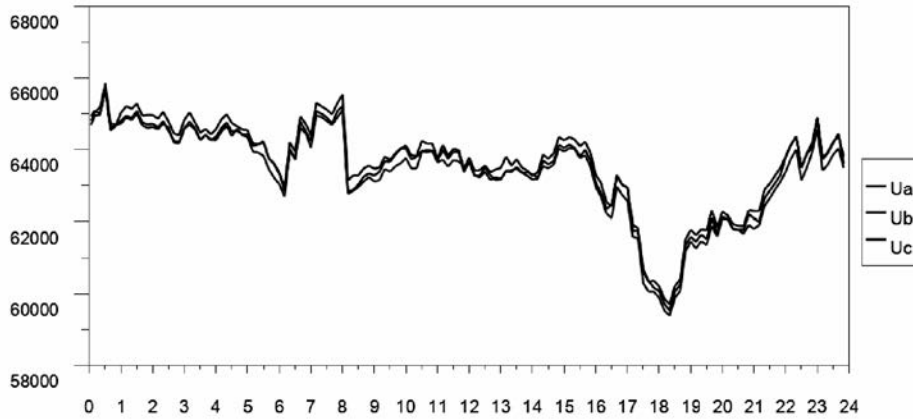
Fig. 4. The daily schedule of voltage on phases of the ECT-5A
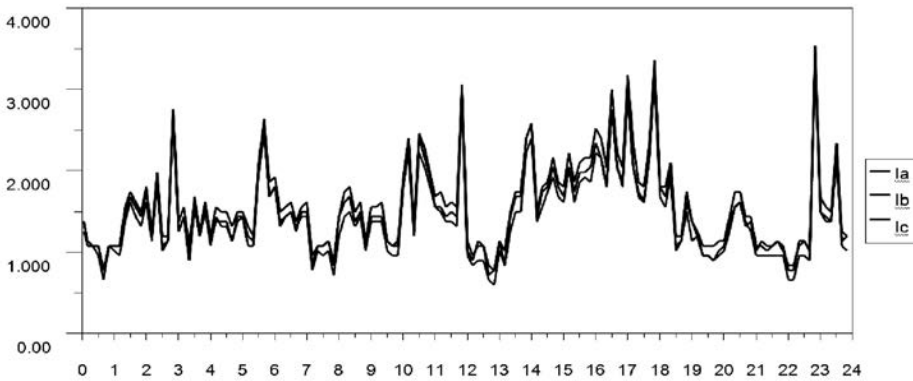
Fig. 5. The daily schedule of currents on phases of the ECT-5A taking into account coefficient of the transformer of current and voltage
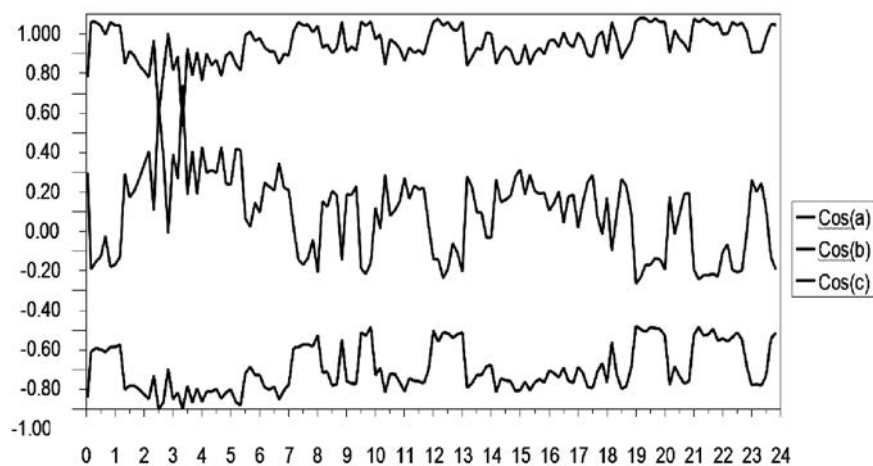
Fig. 6. The daily schedule of frequency of network of the ECT-5A
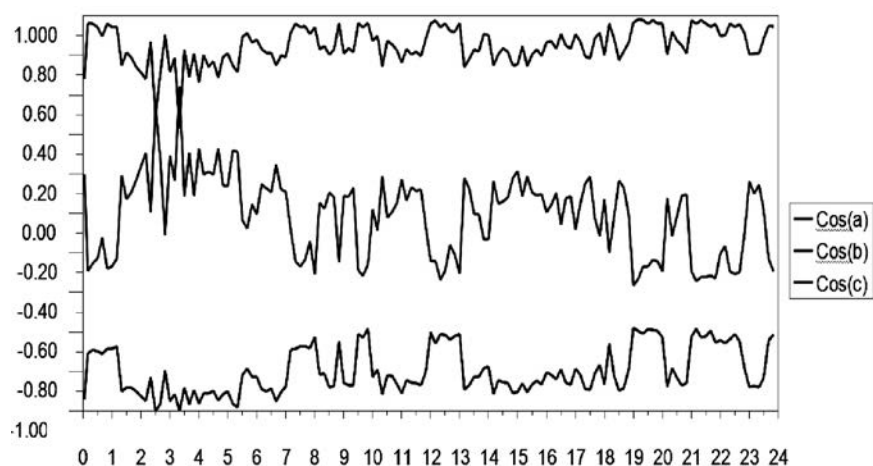
Fig. 7. The daily schedule of power factors on phases of the ECT-5A

Results and Discussion

Thus, as shown experimental data of each cycle, the consumption of electrical energy has a large spread by results of measurements, on what influences range of the factors marked earlier.

The basic unaccounted parameters at definition of the consumption of electrical energy are load factor on power and coefficient of utilization of the equipment in time, as well as organizational and other unaccounted factors.

As shown experimental data, power consumption of excavators cannot be defined for one cycle of the work because of non-uniformity of indicators of schedules — it is necessary to consider a period of time, at least, daily.

Conclusions

1. The composition of electrical equipment is determined, taking into account the efficiency of the constituting participating in the execution of each operation a complete cycle of operation (pressure, lifting, turn taking into account the reverse and move) for career excavators.

2. A method of calculating the power consumption of career excavator calculation and analytical methods based on given values of the efficiency of each component of the electrical equipment and machinery in general is developed with the known value of their efficiency and power consumption of the actuating mechanism (pressure, lifting, turn taking into account the reverse and move). The method is suitable as for systems of the electric drive thyristor converter — DC motor and for system frequency converter — asynchronous motor with the squirrel-cage rotor in view of deletion of the electrical equipment, not participating at performance of works of a full cycle.

3. Calculation-experimental method is based on measurement results of electrical energy consumption of each component of the operations of a single cycle of operation excavator or the total consumption of electrical energy for a certain period of time (hours). Thus, as shown experimental data, since the consumption of electric energy has a great dispersion by results of measurements in order to reduce the influence of a number of undesirable factors, for the period of time it is expedient to accept day.

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System Engineering development in the context of Information Systems design

Abstract: The scientific approach to the design of complex systems in the context of System Engineering.
Keywords: Systems, System Engineering, General System Theory.

Introduction

A system is a complex of tightly connected elements with the properties of integration and consistency as defined in General Systems Theory [1]. System — a group of independent but interrelated elements comprising a unified whole [7]. The principle of selection of elements for the system is based primarily on the strength of the connection between the entities. If it's necessary to explore the existing object, the model of the object is constructed using standard techniques: the selection of entities, the study of the relationships between them, and, if the link is significant, entities and relationships are included into the system domain. Otherwise, an entity or relationship is excluded from the system boundaries and is not investigated. Afterwards, the constructed model can be studied as a system using known methods of system analysis.

All systems are divided into natural and artificial. Natural systems, strictly speaking, are not systems themselves. Artificial systems, on the contrary, are systems by definition, i. e. they are created as systems from the very beginning [4; 5].

Systems Engineering (SE) is a theory within the framework of General Systems Theory as meta-theory [3]. System engineering is the theoretical basis for the information systems design. Information systems are a network (a set), consisting of the following types of elements: infrastructure, regulation and staff roles. The main difficulty in the information systems (IS) design is the transition from the system purposes to its elemental composition. At this stage of IS design theoretical methods based on concepts of general systems theory and systems approach come to help: a research of goal-setting principles, analysis and synthesis of objects (elements), included into the system, the design of macro- and micro-level subsystems. These theoretical methods are used in the design technology UMASD (Universal Methodic of Automatized System Development) [6].

Analysis and synthesis of system elements

To understand the context, we present the basic terms and concepts.

Information system (IS) — a system that includes the information infrastructure, personnel, and rules under which personnel interact within the system.

Business process — a certain sequence of functions controlled by a single owner using resources in their activities in accordance with certain rules.

Life cycle — a series of stages of information system from its ideas to implementation to its cancellation. We define main stages as follows:

- Identification of system requirements, goal setting;
- System Design;
- Engineering Design;
- Implementation;
- Maintenance of the System.

Lars Skittner in his fundamental survey of existing systems studies enumerates similar stages in Systems Engineering: system analysis (definition of the system, definition of the wider systems, definition of the objectives, information collection), system design (forecasting, model building and simulation, optimization, control), implementation, operation [2].

Since complex systems generally consist of elements of different nature, one of the main difficulties in their analysis is the interaction between elements of different nature. In practice, these difficulties are overcome by the introduction of special rules people working within the system are guided by. However, difficulties still remain (human factor, documentation errors, emergency situations, etc.). We know that there is the first paradox of hierarchy, formulated by Sadovski: for a complete description of the element as a "system element" there must be a full description of the system which in turn cannot be described in full until each element is described [3].

How to solve the problem of designing the relations of a different nature, how to solve the system paradox?

We have proposed a formal model that allows minimizing the impact of the aforementioned risks by means of iterative applications of analysis and synthesis procedures. First, the designer builds purpose tree (system analysis), then selects elemental composition, which implements certain functions (business processes), allowing to accomplish the goals set and are based on existing tables of elements correspondence to system functions (synthesis).

Formally, the process of analysis-synthesis is as follows:

$b = \{c, r, f\}$, b — a specific business process is defined as a triple of c — the process owner, r — resources, and f — functions of the process;

$b \in B$, where B — the set of business processes;

$r \in R$, where R — the set of resources, including human;

$C \in R$, process owner is out of process, but in an enterprise;

$f \in F$, where f — any function from the set of functions F.

$f = \{i, o\}$, we can represent the function as a black box at this stage, therefore function can be described just in terms of input and output parameters, $i \in I$ and $o \in O$.

Thus, in the functional context:

$$b_j = \Sigma f_{kj}, \text{ for } k = \{1, 2, \dots n_j\}, j = \{1, 2, \dots m\},$$

where f_{kj} is not necessarily unique within the same process or in different processes. For example, the statement (signed) documents leader in all business processes are executed the same, but before signing the document may take a variety of a negotiation and the signing document can go to various departments (divisions). Actually the same "signature" means an authorized person approving signature on a paper document.

As already noted, the functions f_{kj} may or may not be unique or similar in nature.

The first stage of system analysis is to obtain the matrix of functions. After receiving the full matrix of functions, the designer must perform the synthesis in order to identify similar algorithms and most essential functions, which can be done by processing the minimum number of elements. Note that this is two-dimensional matrix. This allows releasing a simple program to aid in the analysis. Note

that we progressed from a network structure (i. e. multi-dimensional) system to a two-dimensional array of elements and functions.

How this synthesis should be conducted?

The designer compares lists of functions based on their input/output: if o = F (i) then designer compares x → y relation. According to the results of comparison, functions are transferred to the resulting matrix, with identical or similar functions transferred just once. The matrix obtained at this first stage of synthesis must be analyzed again to ensure the compliance to the requirements of a business processes. This analysis identifies the functions that need to be duplicated due to a particular point of execution in business processes, the amount of resources, etc.

At the following stages it is necessary to analyze the resulting functional matrix to find system critical elements that will be involved in carrying out these functions. In order to reduce the influence of Sadowski's hierarchical paradox, it is also necessary to perform the synthesis of the elements of the future system after analyzing the function matrix (see Figure 1). To simplify the synthesis of the system elements, designers can use standard tables of elements correspondence, their relations and functions, executed by these elements.

At this stage, designers often mistakenly substitute business process functions with the functions of the elements which are "candidates" for being included to the system. In order to avoid such verbal mistakes, the correspondence table must have very precise and detailed description of system elements' functions and business process functions. Such detailed description is rather inconvenient to work with, even impossible in case of large systems.
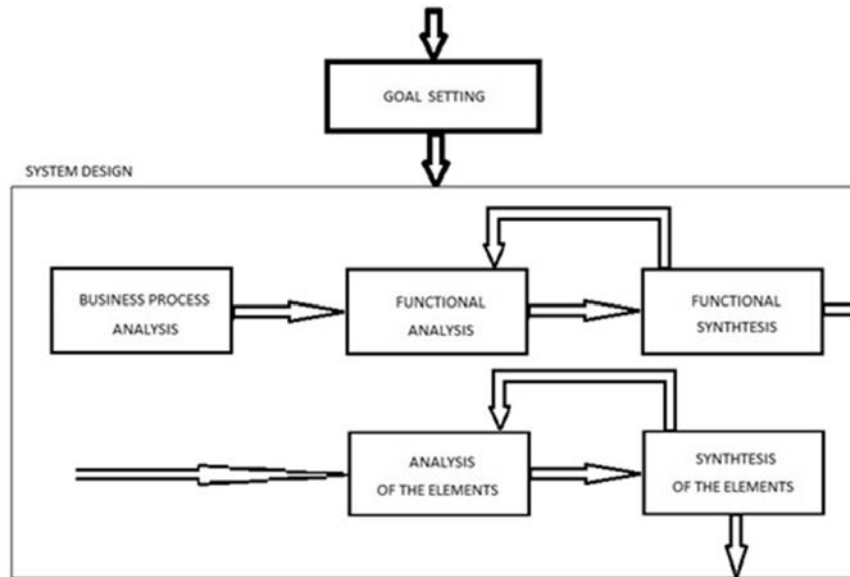
Fig. 1. System Design

Therefore, each element and function is assigned a unique identifier, which allows further automation of the analysis and synthesis steps of the elements of future system.

The article volume does not allow us to present proper argumentation in full here. The idea is that the use of formal models during the design stage allows the designer to disregard non-essential features of elements of the system.

Conclusions

We understand that the complete solution of the hierarchy paradox theoretically impossible. However, some techniques may be used to reduce the negative impact of this paradox in the projected system.

Mankind has accumulated extensive experience in the systems research. Today General Systems Theory provides the researcher with the system approach to a study of complex systems around us. Despite the fact that a coherent theory has not been created yet, many scientists believe that any theory included in the General Theory of Systems should be built within its context. Identifying common patterns in a particular theory will in the future enable the synthesis such patterns for the whole General Theory of Systems. In contrast to the existing theoretical inter- scientific) problems in physics, cosmology, etc., in General Theory of Systems there is an opportunity to generalize theoretical experience among different disciplines. This happens because GTS is a relatively young discipline, not bearing the burden of mistakes, as in physics or mechanics.

In our opinion, the formal techniques of iterative processes of analysis and synthesis allow solving a major problem not only in the SE, but can be used in other system theories as well, such as in Cybernetics, in theory of functional systems, in theories of social systems, in behavioral systems, in control systems, etc.

For example, consider a small social system, such as an enterprise. Employees working in the enterprise themselves are not the entities of the system. They come in their roles, are described in the job instructions. Since the enterprise is a complex system, which includes elements of diverse nature, it is necessary to create a business model which would include the essential elements and relationships between them. It is difficult to select the essential elements since different people may have different ways to perform the same professional duties. It is also difficult to determine the composition of the elements (roles) carrying out the company management. To begin with, the goals of an enterprise can't be within the system. Artificial system is not a goal in itself; it is used to achieve external goal criteria. Therefore, "managerial" entities can act both as elements of the system and as external entities.

To reduce the complexity of problems like that one can apply formal approach described above. Indeed, formal methods can only work if an experience in the design of such systems has already been accumulated, since the task of generating the constituent elements by their functional sign requires compliance tables "feature-element".

Given example demonstrates how methods from one theory within GTS may be applied to the problems in other theories. Therefore, a researcher working on a particular theory actually makes a contribution to the development of GTS, in compliance with what Sadowski was writing about [3].

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Synthesis of the Fourier representation of daily changes in ambient temperature on the basis of empirical data

Abstract: A way of representing the daily changes in temperature in the lower layers of the earth's atmosphere is offered in the paper. On the basis of known dimensionless empirical data on temperature changes, the primary form of the Fourier series is constructed. To match the extreme points and the values of the final temperature in the form of the Fourier series with the newly obtained experimental data, the boundaries of links are displaced and linear deformation of curves is performed. The method can be generalized for the three- and multilink conversions of various periodic functions.

Keywords: daily temperature change, Fourier representation, approximation, empirical data.

The ambient temperature is involved in mathematical modeling and solution of many practical problems. Its adequate mathematical expression contributes obtaining the exact solutions of the problems, and make better decisions on technological processes.

At large distances from the surface of the earth the temperature has a certain static pattern [1, 233]. In certain depth (10 m. or more), the temperature of the soil, if it is not anomalous zone, has a constant value, which increases with increasing depth according to a temperature gradient of the terrain. Despite this, in practice, all geographical latitudes of the Earth have their own variable average annual temperature conditions.

Thus, at the lower boundary layer of the atmosphere and in the upper layers of the earth there are significant changes in temperature. These temperature changes are primarily related to daily and annual positions of the earth relative to the sun, the latitude and the location of the area relative to global sea level and weather conditions.

Daily changes in temperature can be noticed in shallow depths (0.2–1.0 m.) of earth's surface, and the effect of the annual change is felt up to a depth of 10 m., and in some places up to 40 m. We cannot talk regarding the temperature of the lower layer of the atmosphere such strictly, because it is "turbulent "and, in general, it depends on prehistoric processes, solar radiation and other factors. Therefore, experts prefer to use the average parameters of the atmospheric temperature.

In this work we focus on the daily temperature change in the lower parts of the atmosphere regarding to medium latitudes. The latitudes, where Uzbekistan is located ($37^0 11' - 45^0 36'$) is peculiar to the subtropical (the southern regions) and continental (northern and middle areas) climates. Significant diurnal temperature fluctuations, peculiar to continental climate is noticeable from year to year due to the drying process of Aral Sea.

In this paper, we use empirical data from [1, 238] (Fig. 1).
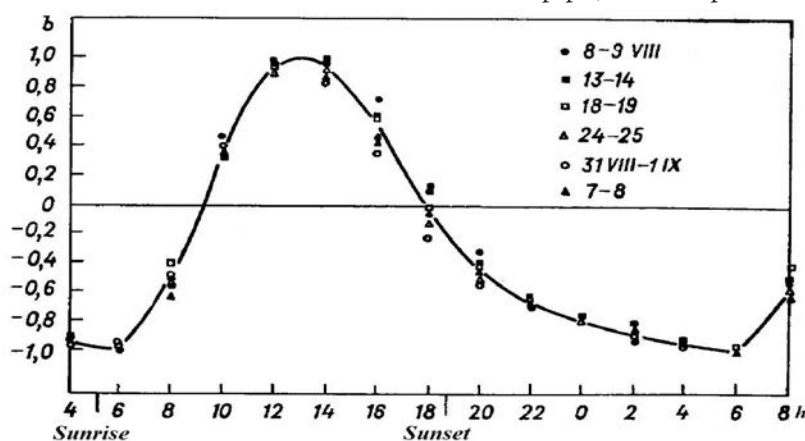
Fig. 1. Diurnal variation of surface soil temperature in a dimensionless form [1, 238]

As can be seen from the figure, the curve of the daily changes in temperature consists of three specific units. With sunrise the temperature starts to rise, depending on the increase in the height of the sun and reduce the length of the path of the sun rays through the atmospheric layer. It reaches its peak in the afternoon, when the path of sunrays through the atmospheric layer begins to grow and the height of the sun decreases. Further, the temperature falls with certain intensity. With the onset of the dark part of the day the temperature continues to decrease, but more slowly than in the second unit. In the morning, the temperature begins to rise again, etc.

The data in the figure refer to the end of summer and beginning of autumn. They summarize the results of a series of field observations, which are presented in the segment $[-1; +1]$. The graph represents the variation of temperature, but not the real interval. Moreover, in the summer the light part of day is longer, and in the winter — it is shorter than the period given in the graph above. Accordingly, in the mathematical representation of the daily changes in temperature we must take into account maximum and minimum temperatures during the day and the time to achieve them. This allows our calculation results to get closer to results of natural observations. In this connection we propose five-step algorithm for presenting the daily changes in temperature, when the maximum and minimum temperature and the time of their occurrence are only known.

In the first stage we construct the Fourier representation of the data of Fig. 1 with a best approximation. At the second step we make a correction to the obtained polynomial. For this purpose, firstly we calculate the value of the function through every 1/360 of the day and select the largest and smallest values of the function. With their help, the displacement of graph up or down is made so that the null value comes in the middle of the ordinate (hereinafter this step is called «centering») values. Next, we make compression or stretching of the graphs on the ordinate so that the interval occupies the interval $[-1; +1]$ (call it «calibrating»). In the third stage, the parameters of the affine transformation of trigonometric polynomial are determined. In the fourth stage, according to the set highest and lowest temperature and time of their occurrence by means of an affine transformation of the result of the second stage the other trigonometric polynomial is built. And in the fifth stage, «centering» and «calibrating» is carried out again for the built approximation polynomial and the transition from dimensionless temperature to dimensional is done.

Step 1. To construct the Fourier representation of the data of Fig. 1 we use the method of least squares, the essence of which is to minimize the value of $[2, 56-59]$:

$$M = \int_a^b \left[f(t) - \varphi(t) \right]^2 dt,$$

here a, b — the borders of periodic function $f(t)$; $\varphi(t)$ — the unknown approximating function.

In our case, the unknown function is a trigonometric polynomial:

$$\varphi(t) = \frac{c_0}{2} + c_1 \cos t + c_2 \sin t + c_3 \cos 2t +$$
$$+ c_4 \sin 2t + \ldots + c_{2n-1} \cos nt + c_{2n} \sin nt.$$

A necessary condition for achieving to extreme value of M is $\frac{1}{2}\frac{\partial M}{\partial c_k} = 0$, and it is reduced to the form:

$$\sum_{i=0}^{2n} c_i \int_a^b \varphi_i(t)\varphi_k(t)dt - \int_a^b f(t)\varphi_k(t)dt = 0,$$

when $k = 0 \ldots 2n$.

In this case, the basic functions are:
$$\varphi_0(t) = 1, \ \varphi_1(t) = \cos t, \ \varphi_2(t) = \sin t, \ldots,$$
$$\varphi_{2n-1}(t) = \cos nt, \ \varphi_{2n}(t) = \sin nt.$$

When basic functions are orthogonal (eg, Chebyshev polynomials, trigonometric polynomials, and others.) the first integral has a specific value:

$$\int_a^b \varphi_i(t)\varphi_k(t)dt = \begin{cases} 0 \ \text{when} \ i \neq k, \\ \|\varphi_k(t)\|^2 \ \text{when} \ i = k. \end{cases}$$

Accordingly, the condition for a minimum of M takes the form:

$$c_i \|\varphi_k(t)\|^2 - \int_a^b f(t)\varphi_k(t)dt = 0 \ (k = 0\ldots 2n).$$

If we present a trigonometric polynomial in the form of:

$$\varphi(t) = \frac{a_0}{2} + \sum_{k=1}^n \left(a_k \cos \frac{2\pi kt}{\Pi} + b_k \sin \frac{2\pi kt}{\Pi} \right),$$

(here $\Pi = b - a$ — the smallest positive period of the process) and we use trapezoid formula for calculating the values of the integrals, we obtain well-known Bessel formulas:

$$a_k = \frac{1}{n}\sum_{j=0}^{2n-1} y_j \cos\frac{kj\pi}{n} \ \ (k = 0\ldots n-1),$$

$$b_k = \frac{1}{n}\sum_{j=0}^{2n-1} y_j \sin\frac{kj\pi}{n} \ \ (k = 1\ldots n),$$

here $y_k = f(t_k)$ — the parameter measured in equidistant $2n$ points of period.

In this case, we get an interpolation formula, i. e., the graph of this function passes through the specified points $(t_k, \ y_k)$.

In $[3, 571-573]$ it is proposes a method for determining the best approximation to $f(x)$ with the first $2r+1$ terms of the expansion, when $2r+1 < 2n$ and $2r$ — when $r = n$ ($b_r = 0$).

If approximating function is searched in the form of a trigonometric polynomial of rth order:

$$T_r(t) = \frac{a_0}{2} + \sum_{k=1}^r \left(a_k \cos \frac{2\pi kt}{\Pi} + b_k \sin \frac{2\pi kt}{\Pi} \right),$$

then the coefficients are determined by the formulas:

$$a_k = \frac{1}{n}\sum_{j=0}^{2n-1} y_j \cos\frac{2k\pi t_j}{\Pi} \ \ (k = 0\ldots r-1 \ (r)),$$

$$b_k = \frac{1}{n}\sum_{j=0}^{2n-1} y_j \sin\frac{2k\pi t_j}{\Pi} \ \ (k = 1\ldots r).$$

The sum of the squares of the deviations of the measured data from the calculated values is:

$$S_r = \sum_{k=0}^{2n-1}\left[y_k - \frac{a_0}{2} - \sum_{j=1}^r\left(a_j \cos\frac{2\pi kt_j}{\Pi} + b_j \sin\frac{2\pi kt_j}{\Pi}\right)\right]^2 =$$
$$= \sum_{k=0}^{2n-1}\left(y_k - \frac{a_0}{2}\right)^2 - n\sum_{j=1}^r\left(a_j^2 + b_j^2\right).$$

The order of the best approximation is accepted as m_0, when $r = m_0, m_0+1, m_0+2,\ldots$ the error dispersion σ_r^2 almost stops to decrease:

$$\sigma^2 \approx \frac{S_{m_0}}{2n - 2m_0 - 1} \approx \frac{S_{m_0+1}}{2n - 2m_0 - 3} \approx \ldots$$

Taking into account the features of the further use of approximation results hereinafter the countdown begins at 12 o'clock local time.

Approximation of the set in 24 points of data showed that for various orders of approximation the sum of squared deviations is $S_1 = 2.360103$, $S_2 = 0.090390$, $S_3 = 0.040544$, $S_4 = 0.004916$, $S_5 = 0.003824$, $S_6 = 0,002012$, $S_7 = 0.002010$, $S_{10} = 0.001053$, $S_{15} = 0.000409$, $S_{20} = 0.000137$, $S_{23} = 0.000003$. At the same time corresponding dispersion of errors values are $\sigma_1^2 = 0.052447$, $\sigma_2^2 = 0.002102$, $\sigma_3^2 = 0.000989$, $\sigma_4^2 = 0.000126$, $\sigma_5^2 = 0.000103$, $\sigma_6^2 = 0.000057$, $\sigma_7^2 = 0.000061$, $\sigma_{10}^2 = 0.000039$, $\sigma_{15}^2 = 0.000024$, $\sigma_{20}^2 = 0.000020$, $\sigma_{23}^2 = 0.000003$.

According to these data, it is assumed that the best approximation is achieved in case of $m_0 = 6$ when computational accuracy is about 10^{-3}.

Step 2 consists of "centering" and "calibrating" of the obtained function.

After some small period of time, for example after $\Pi/360$, we calculate the values of the function $T_r(t)$ to find the highest and lowest values $(T_{max},\ T_{min})$ and corresponding coordinates them $(t_{max},\ t_{min})$. The shift of the center of the graph is equal to $(T_{max}+T_{min})/2$. To return the center of the graph to the zero value (centering), we introduce a correction to the zero coefficient:

$$\tilde{a}_0 = a_0 - 2(T_{max}+T_{min})/2 = a_0 - (T_{max}+T_{min}).$$

Range of changes of resulting function, instead of 2 is equal to $T_{max}-T_{min}$. Accordingly, the coefficients are to be multiplied by $2/(T_{max}-T_{min})$ (calibrating). In this regard, the new coefficients of trigonometric polynomial are: $a'_0 = \dfrac{2}{T_{max}-T_{min}}\tilde{a}_0$; $a'_k = \dfrac{2}{T_{max}-T_{min}}a_k$

when $k=1..r-1\ (r)$ and $b'_k = \dfrac{2}{T_{max}-T_{min}}b_k$ when $k=1...r$.

Thus, the result of the second stage is a trigonometric polynomial function whose graph is shown in Fig. 1:

$$T'_r(t) = \frac{a'_0}{2} + \sum_{k=1}^{r}\left(a'_k\cos\frac{2\pi k t}{\Pi} + b'_k\sin\frac{2\pi k t}{\Pi}\right).$$

Step 3: Let us prepare the material for the construction of the function with the highest and lowest values according to the time of their occurrence, and some empirical data $\left(\bar{t}_{min};\ \bar{T}_{min}\right)$ and $\left(\bar{t}_{max};\ \bar{T}_{max}\right)$.

The newly formed function differs from the graph of the function in that, the points t_{min} and t_{max} occupy new places $\bar{t}_{min}$, $\bar{t}_{max}$ by shifting. The values of Euler integrals computed at three time intervals $[0;\ \bar{t}_{max}]$, $[\bar{t}_{max};\ \bar{t}_{min}]$, $[\bar{t}_{min};\ \Pi]$ are required to determine the values of the Fourier series coefficients. To pass to two segments, we change the reference point, which is permissible in the integration of periodic functions over the period. Taking $\bar{t}_{min}$ as the origin, the integration can be carried out in two segments: $[t_{min};\ t_{max}]$, $[t_{max};\ t_{min}+\Pi]$.

Let us ensure the correspondence of the displacement parameters on the horizontal axis.

If the approximation function is in the form of:

$$\bar{T}_q(t) = \frac{\bar{a}_0}{2} + \sum_{k=1}^{q}\left(\bar{a}_k\cos\frac{2\pi k t}{\Pi} + \bar{b}_k\sin\frac{2\pi k t}{\Pi}\right),$$

(here the value of q does not depend on n, and r), and the approximated function — $T_c(\bar{t})$, then the values of the coefficients, according to Euler, can be found by the formulas $[3, 549]$:

$$\bar{a}_k = \frac{2}{\Pi}\int_{\bar{t}_{min}}^{\Pi+\bar{t}_{min}} T_c(\bar{t})\cos\frac{2k\pi\bar{t}}{\Pi}\,d\bar{t} \quad \text{when } k=0...q,$$

$$\bar{b}_k = \frac{2}{\Pi}\int_{\bar{t}_{min}}^{\Pi+\bar{t}_{min}} T_c(\bar{t})\sin\frac{2k\pi\bar{t}}{\Pi}\,d\bar{t} \quad \text{when } k=1...q.$$

In our case:

$$T_c(\bar{t}) = \begin{cases} T'_c(t') & \text{when } \bar{t}\in[\bar{t}_{max},\ \bar{t}_{min}], \\ T'_c(t'') & \text{when } \bar{t}\in[\bar{t}_{max},\ \Pi+\bar{t}_{min}]. \end{cases}$$

Therefore, the expansion coefficients are calculated by formulas:

$$\bar{a}_k = \frac{2}{\Pi}\left[\int_{\bar{t}_{min}}^{\bar{t}_{max}} T'_c(t')\cos\frac{2k\pi\bar{t}}{\Pi}\,d\bar{t} + \int_{\bar{t}_{max}}^{\Pi+\bar{t}_{min}} T'_c(t'')\cos\frac{2k\pi\bar{t}}{\Pi}\,d\bar{t}\right],$$

when $k=0...q$,

$$\bar{b}_k = \frac{2}{\Pi}\left[\int_{\bar{t}_{min}}^{\bar{t}_{max}} T'_c(t')\sin\frac{2k\pi\bar{t}}{\Pi}\,d\bar{t} + \int_{\bar{t}_{max}}^{\Pi+\bar{t}_{min}} T'_c(t'')\sin\frac{2k\pi\bar{t}}{\Pi}\,d\bar{t}\right],$$

when $k=1...q$.

To establish the connection between t' and $\bar{t}$, we make correspondences: $t_{min}\leftrightarrow\bar{t}_{min}$, $t'\leftrightarrow\bar{t}$ and $t_{max}\leftrightarrow\bar{t}_{max}$. In the interval of $[\bar{t}_{min},\ \bar{t}_{max}]$ affine transformation of the variable is carried out according to the linear relationship:

$$\frac{\bar{t}-\bar{t}_{min}}{\bar{t}_{max}-\bar{t}_{min}} = \frac{t'-t_{min}}{t_{max}-t_{min}}.$$

From this, we find that $t'=\alpha'\bar{t}+\beta'$, where:

$$\alpha' = \frac{t_{max}-t_{min}}{\bar{t}_{max}-\bar{t}_{min}}, \quad \beta' = t_{min}-\alpha'\bar{t}_{min}.$$

A similar transformation for the second period $[\bar{t}_{max},\ \Pi+\bar{t}_{min}]$ leads us to $t''=\alpha''\bar{t}+\beta''$, where :

$$\alpha'' = \frac{\Pi+t_{min}-t_{max}}{\Pi+\bar{t}_{min}-\bar{t}_{max}}, \quad \beta'' = t_{max}-\alpha''\bar{t}_{max}.$$

In connection with these changes of variables in the interval $[\bar{t}_{min},\ \bar{t}_{max}]$ the function must be taken in the form of $T'_r(\alpha'\bar{t}+\beta')$, and in the interval of $[\bar{t}_{max},\ \Pi+\bar{t}_{min}]$ — in the form of $T'_r(\alpha''\bar{t}+\beta'')$.

Step 4. According to a replacement, we calculate the values of the integrals, which represent the function, depending on the new coordinates in the interval of $[\bar{t}_{min},\ \bar{t}_{max}]$:

$$T'_c(t') = \frac{a'_0}{2} + \sum_{j=1}^{r}\left[a'_j\cos\frac{2\pi j}{\Pi}(\alpha'\bar{t}+\beta') + b'_j\sin\frac{2\pi j}{\Pi}(\alpha'\bar{t}+\beta')\right];$$

and in the interval $[\bar{t}_{max},\ \Pi+\bar{t}_{min}]$ the function is:

$$T'_c(t'') = \frac{a'_0}{2} + \sum_{j=1}^{r}\left[a'_j\cos\frac{2\pi j}{\Pi}(\alpha''\bar{t}+\beta'') + b'_j\sin\frac{2\pi j}{\Pi}(\alpha''\bar{t}+\beta'')\right].$$

Let us present the results of integration:

$$\bar{a}_0 = a_0 + \frac{2}{\pi}\sum_{j=1}^{q}\left\{\frac{1}{j\alpha'}\sin\frac{j\pi}{\Pi}\alpha'(\bar{t}_{max}-\bar{t}_{min})\times\right.$$

$$\times\left[a'_j\cos\frac{j\pi}{\Pi}(\alpha'(\bar{t}_{min}+\bar{t}_{max})+2\beta') + b'_j\sin\frac{2j\pi}{\Pi}(\alpha'(\bar{t}_{min}+\bar{t}_{max})+2\beta')\right]+$$

$$+\frac{1}{j\alpha''}\sin\frac{j\pi}{\Pi}\alpha''(\Pi+\bar{t}_{min}-\bar{t}_{max})\left[a'_j\cos\frac{j\pi}{\Pi}(\alpha''(\Pi+\bar{t}_{min}+\bar{t}_{max})+2\beta'')+\right.$$

$$\left.\left.+b'_j\sin\frac{2j\pi}{\Pi}(\alpha''(\Pi+\bar{t}_{min}+\bar{t}_{max})+2\beta'')\right]\right\}.$$

Similarly, the coefficients of cosines $\bar{a}_k$ at $k=1...q$ are calculated by:

$$\bar{a}_{k(1..q)} = \frac{1}{\pi}\sum_{j=1}^{q}\left\{\frac{1}{j\alpha'+k}\sin\frac{\pi}{\Pi}(j\alpha'+k)(\bar{t}_{max}-\bar{t}_{min})\times\right.$$

$$\times\left\{a'_j\cos\frac{\pi}{\Pi}\left[(j\alpha'+k)(\bar{t}_{max}+\bar{t}_{min})+2\beta'j\right]+\right.$$

$$\left.+b'_j\sin\frac{\pi}{\Pi}\left[(j\alpha'+k)(\bar{t}_{max}+\bar{t}_{min})+2\beta'j\right]\right\}+$$

$$+\frac{1}{j\alpha'-k}\sin\frac{\pi}{\Pi}(j\alpha'+k)(\bar{t}_{max}-\bar{t}_{min})\times$$

$$\times\left\{a'_j\cos\frac{\pi}{\Pi}\left[(j\alpha'-k)(\bar{t}_{max}+\bar{t}_{min})+2\beta'j\right]+\right.$$

$$\left.+b'_j\sin\frac{\pi}{\Pi}\left[(j\alpha'-k)(\bar{t}_{max}+\bar{t}_{min})+2\beta'j\right]\right\}+$$

$$+\frac{1}{j\alpha''+k}\sin\frac{\pi}{\Pi}(j\alpha''+k)(\Pi+\bar{t}_{max}-\bar{t}_{min})\times$$

$$\times\left\{a'_j\cos\frac{\pi}{\Pi}\left[(j\alpha''+k)(\Pi+\bar{t}_{max}+\bar{t}_{min})+2\beta''j\right]+\right.$$

$$\left.+b'_j\sin\frac{\pi}{\Pi}\left[(j\alpha''+k)(\Pi+\bar{t}_{max}+\bar{t}_{min})+2\beta''j\right]\right\}+$$

$$+\frac{1}{j\alpha''-k}\sin\frac{\pi}{\Pi}(j\alpha''-k)(\Pi+\bar{t}_{max}-\bar{t}_{min})\times$$

$$\times\left\{a'_j\cos\frac{\pi}{\Pi}\left[(j\alpha''-k)(\Pi+\bar{t}_{max}+\bar{t}_{min})+2\beta''j\right]+\right.$$

$$\left.\left.+b'_j\sin\frac{\pi}{\Pi}\left[(j\alpha''-k)(\Pi+\bar{t}_{max}+\bar{t}_{min})+2\beta''j\right]\right\}\right\}.$$

Also, the values of $\bar{b}_k$ coefficients at $k = 1..q$ are calculated as follows:

$$\bar{b}_{k(=1..q)} = \frac{1}{\pi}\sum_{j=1}^{q}\left\{\frac{1}{j\alpha'+k}\sin\frac{\pi}{\Pi}(j\alpha'+k)(\bar{t}_{\max}-\bar{t}_{\min})\times\right.$$

$$\times\left\{a_j'\sin\frac{\pi}{\Pi}\left[(j\alpha'+k)(\bar{t}_{\max}+\bar{t}_{\min})+2\beta'j\right]-\right.$$

$$\left.-b_j'\cos\frac{\pi}{\Pi}\left[(j\alpha'+k)(\bar{t}_{\max}+\bar{t}_{\min})+2\beta'j\right]\right\}+$$

$$+\frac{1}{j\alpha'-k}\sin\frac{\pi}{\Pi}(j\alpha'-k)(\bar{t}_{\max}-\bar{t}_{\min})\times$$

$$\times\left\{-a_j'\sin\frac{\pi}{\Pi}\left[(j\alpha'-k)(\bar{t}_{\max}+\bar{t}_{\min})+2\beta'j\right]+\right.$$

$$\left.+b_j'\cos\frac{\pi}{\Pi}\left[(j\alpha'-k)(\bar{t}_{\max}+\bar{t}_{\min})+2\beta'j\right]\right\}+$$

$$+\frac{1}{j\alpha''+k}\sin\frac{\pi}{\Pi}(j\alpha''+k)(\Pi+\bar{t}_{\max}-\bar{t}_{\min})\times$$

$$\times\left\{a_j'\sin\frac{\pi}{\Pi}\left[(j\alpha''+k)(\Pi+\bar{t}_{\max}+\bar{t}_{\min})+2\beta''j\right]-\right.$$

$$\left.-b_j'\cos\frac{\pi}{\Pi}\left[(j\alpha''+k)(\Pi+\bar{t}_{\max}+\bar{t}_{\min})+2\beta''j\right]\right\}+$$

$$+\frac{1}{j\alpha''-k}\sin\frac{\pi}{\Pi}(j\alpha''-k)(\Pi+\bar{t}_{\max}-\bar{t}_{\min})\times$$

$$\times\left\{-a_j'\sin\frac{\pi}{\Pi}\left[(j\alpha''-k)(\Pi+\bar{t}_{\max}+\bar{t}_{\min})+2\beta''j\right]+\right.$$

$$\left.+b_j'\cos\frac{\pi}{\Pi}\left[(j\alpha''-k)(\Pi+\bar{t}_{\max}+\bar{t}_{\min})+2\beta''j\right]\right\}.$$

Thus, we have found all the coefficients necessary to compute the values of function:

$$\bar{T}_q(t) = \frac{\bar{a}_0}{2}+\sum_{k=1}^{q}\left(\bar{a}_k\cos\frac{2\pi kt}{\Pi}+\bar{b}_k\sin\frac{2\pi kt}{\Pi}\right).$$

Step 5. Again we divide the period $[0;\ \Pi]$ into 360 parts, compute the values of the function $\bar{T}_q(t)$ in each point and define the maximum and minimum values $T_{\min}^{(0)}$, $T_{\max}^{(0)}$. According to these values we make centering: $\bar{a}_0^{(0)} = \bar{a}_0 - (T_{\min}^{(0)}+T_{\max}^{(0)})$. Calibration and transition to dimensional temperature is done simultaneously with the formula:

$$T_{oc}(t) = \bar{T}_{\min}+\frac{\bar{T}_{\max}-\bar{T}_{\min}}{\bar{T}_{\max}^{(0)}-\bar{T}_{\min}^{(0)}}\left[\bar{T}_q'(t)-\bar{T}_{\min}^{(0)}\right],$$

and obtain the final form of the approximating function

$$T_{oc}(t) = \frac{\tilde{a}_0}{2}+\sum_{k=1}^{q}\left(\tilde{a}_k\cos\frac{2\pi kt}{\Pi}+\tilde{b}_k\sin\frac{2\pi kt}{\Pi}\right).$$

Comparison of right-hand sides of the last two equations gives us the coefficient values $\tilde{a}_0 = 2\bar{T}_{\min}+\alpha_0\left(\bar{a}_0-\bar{T}_{\max}-\bar{T}_{\min}-2\bar{T}_{\min}^{(0)}\right)$,

$\tilde{a}_{k(=1..q)} = \alpha_0\bar{a}_k$, $\tilde{b}_{k(=1..q)} = \alpha_0\bar{b}_k$, where we use the notation $\alpha_0 = \left(\bar{T}_{\max}-\bar{T}_{\min}\right)/\left(\bar{T}_{\max}^{(0)}-\bar{T}_{\min}^{(0)}\right)$.

Finding this function was our ultimate goal.

On the basis of the presented material computer software is developed.

Fig. 2. shows some of the results of calculations carried out for various pairs of $\left(\bar{t}_{\min};\ \bar{T}_{\min}\right)$ and $\left(\bar{t}_{\max};\bar{T}_{\max}\right)$. The last graph (solid line) in the figure is constructed according to Fig. 1 at the lowest and highest values of temperatures of 6 °C and 30 °C without moving graphic links on the horizontal axis.
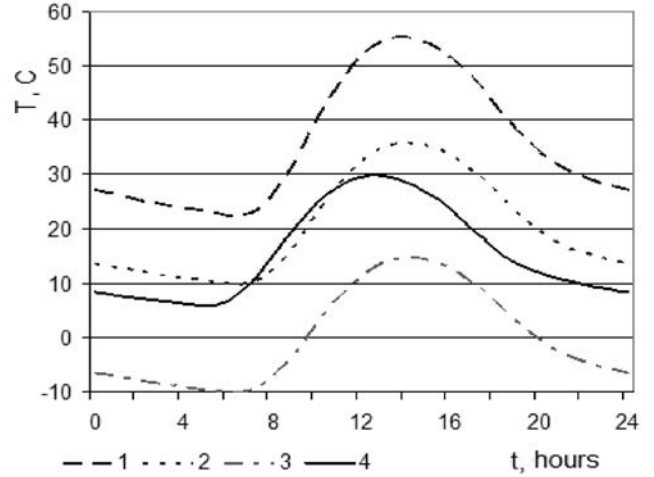
Fig. 2. Typical daily temperature changes obtained by the proposed method for different data of $\left(\bar{t}_{\min};\ \bar{T}_{\min}\right)$ and

$\left(\bar{t}_{\max};\bar{T}_{\max}\right)$: $1-\left(17^c50'00'';22.5^0C\right),\left(2^c20'00'';55.5^0C\right)$;

$2-\left(18^c30'00'';10.0^0C\right),\left(2^c00'00'';36.0^0C\right)$;

$3-\left(19^c30'00'';-10.0^0C\right),\left(1^c00'00'';15.0^0C\right)$;

$4-\left(17^c04'00'';6.0^0C\right),\left(0^c30'00'';30.0^0C\right)$.

Conclusion

A way of representing the daily changes of the ambient temperature in the form of Fourier series on the basis of empirical data is presented in the work. The synthesis of the method is done in 5 steps. The coefficients of the Fourier representation are found. The final form of the function is found and a software tool is developed according to the given mathematical support. The results of the computational experiments are given in the form of graphs.

The study can be continued in the direction of the application of materials for different latitudes.

The material will be used for the development of mathematical models of storage and drying processes of agricultural products.

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Impact of the technological factors on strength of the concrete with new generation chemical additive

Abstract: The article provides the results of the surveys of technological factors for the strength of the concrete with new generation chemical additive.

Keywords: strength, superplasticizer, concrete compound, mineral filler, dispergation, cement.

The use of polycarboxylate (PC) superplasticizers (SP) of new generation based on nanotechnology in the global construction practice is constantly increasing [1]. These SP have hyperplasticizing effect and ensure formation of self-sealing concrete compounds and high-strength concretes for the production of monolith and assemble structures.

Practical use of such concretes will ensure successful implementation of the resource supplying tasks in the construction, increasing of concrete and reinforced concrete structures' quality and reliability.

Polycarboxylate SPs are classified as comp-shaped polymers, which molecules consist of the main chain with the suspended side chains, resembling to a comb [2]. PC SP function is based on the combination of electrostatic and space effect, which is reached with the help of side hydrophobic polyether molecule chains preferably adsorbed on cement hydrosulphoaluminate [3]. Due to this the duration of PC SP plasticization effects is 3–4 times higher compared to sulphomelamine and sulpho-naphtaline formaldehydes or lygnosulphonates. This peculiarity enables to obtain self-sealing flowing concrete with the CS (cone slump) flowability > 20 cm. as well as to preserve it within longer time period, positively affects its processing properties, which is particularly important for construction in hot climate conditions.

New SP mechanism involves adsorption of PC molecules on the cement grains surface charging them negatively. The cement particles surface free from SP is enough for the water access and normal cementing hydration. Consequently, dispergation and penetration effects are ensured, which leads to the solidification acceleration and combined with the significant reduction of water requirement ensures the increasing of concrete strength.

In order to obtain self-sealing high-strength concretes the high-grade cements M500 DO are used together with PC SP [4].

As only Portland cement M400 is produced in Uzbekistan, then the issue of obtaining self-sealing concrete with PC SP additive is important.

With this, the problem of mineral filler type and content impact on the concrete strength is poorly studied.

In order to obtain antifloating flowing concrete and high-strength concrete, its components and content should comply with some

requirements. Coarseness of fine filler should be 0.125 mm (30 %) and 0.063 mm (70 %).

Two fractions of coarse filler are used: 5–10 mm. and 10–20 mm. in particular ratio, which ensures the potential minimal cavitation.

Dispersive filler is also desired [1].

Taking into account these requirements to composition design we performed the research of technological factors impact on the strength

of self-sealing concrete with PC SP additive with hyper-plastifying and solidification acceleration effects. For experimental researches M400 DO and D2 Portland cement, bank sand, broken stone of the fractions of 5–10 and 10–20 mm., basalt filler with the specific surface of ~2,500 cm^2/t are used. Concrete mix CS flowability is 20–23 cm.

During the researches the impact of the following technological factors on normal solidification of concrete was studied: SP doses, cement type and consumption, sand/broken stone ratio. The following concrete grades were taken as basic B 15, B 22.5 and B 30 with cement consumption 292, 370 and 450 kg/m^3; Water/Cement 0.6, 0.55 and 0.5; sand/broken stone 0.57, 0.52 and 0.55 relatively and the CS flowability of — 4–6 cm.

As it is known, compound flowability and strength are determined by SP doses [2]. Thus, primarily the PC SP dosing impact on selfsealing concrete was determined from flowing concrete with the CS flowability of = 20–23 cm., on M400 DO and D20 Portland cement with water/cement = 0.29 and 0.31 and sand/broken stone 0.63. SP dosing rate was within 0.7 to 1.3 % of cementing agent's weight on conversion to 100 % of substance. The flowability was adjusted by gauged water. The data provided on fig.1 show that the change of concrete strength is extreme with the maximal value in case of 1 % SP dose. Reduction of SP additive to 0.7 % and achieving of the required flowability causes the increasing of water/cement from 0.29 to 0.33 and 0.31 to 0.35 for Portland cement M400 DO and D20, which consequently leads to the strength reduction from 76 and 64 MPa to 60 and 51 MPa or for 13 and 14 % relatively (fig.1, exc. 1,2).
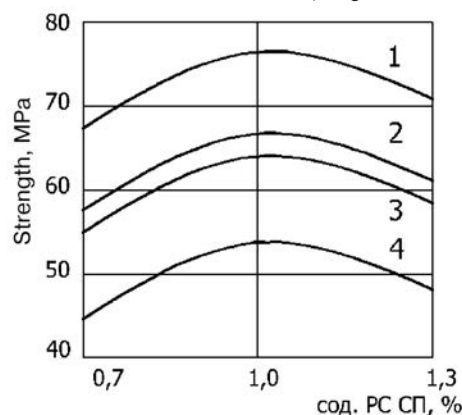
Fig.1 PC SP dosing impact on concrete strength: 1 — concrete on Portland Cement M400 DO; 2 — concrete on Portland Cement M400 DO + 40 % bas. filler; 3 — concrete on Portland Cement M400 D 20; 4 — concrete on Portland Cement M400 D 20 + 30 % bas. filler
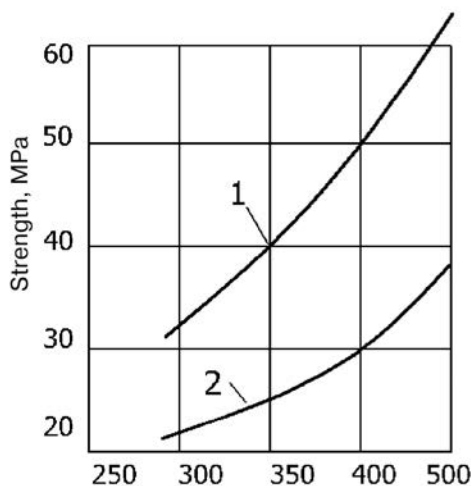
Fig. 2. Impact of cement consumption on the concrete strength with PC SP additive: 1 — concrete on Portland Cement M400 D20 with add. 1 % of PC SP; 2 — the same without additive

When the SP content is increased up to 1.3 %, or 1–2 units, the water requirement is decreased, the concrete strength is reduced for 7 and 8 %, which is probably explained by the thickening of adsorption films of SP water solution around the grains of hydrated cement and some reduction of the cohesion between crystalline hydrate of the cement stone. Lower compression strength values of Portland cement M400 D20 concrete are explained by the increased water requirement caused by the mineral additive (20 % ash) and relatively lower clink content. The behaviour of concrete strength with basalt filler (30 %) is the same as empty concrete, and absolute values of Rc (compression strength) of Portland cement M400 DO concrete and Portland cement M400 D20 concrete are lower for 19 and 25 %. This is explained by the reduction of active clinker.

With this, if Rc of basic concrete of B30 grade on Portland cement M400 DO concrete and Portland cement M400 D20 concrete makes 41 and 38 MPa., then 1 % PC SP exceeds the Rc for 86 and 74 % and with basalt filler the Rc of concrete increases for 46 and 32 % relatively when the cement consumption is reduced for 30 %. In other words, the use of PC SP additive enables to obtain B60 high-strength self-sealing concrete on the typical Portland Cement with DO, and with D20 — increased strength of B40 grade.

The dependence of the impact of cement consumption rate on the concrete strength with PC SP additive is curvilinear (fig. 2)

Rc with the cement content of 292, 370 and 450 kg/m³ is above the standard for 54, 65 and 74 %, which ensures the formation of high-strength concrete.

The highest strength is predetermined by the selection of particular sand/broken stone ratio (fig. 3).
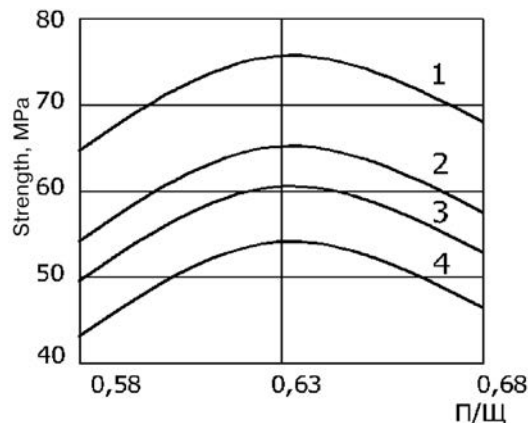
Fig. 3. Dependence of concrete strength from sand/broken stone ratio: 1 — concrete on Portland Cement M400 DO; 2 — concrete on Portland Cement M400 DO + 40 % bas. filler; 3 — concrete on Portland Cement M400 D20; 4 — concrete on Portland Cement M400 D20 + 30 % bas. filler

Dependence of concrete Rc with PC SP additive, and basalt filler is extreme with the maximal value in case of the sand/broken stone ratio of 0.63. The reduction or increasing of sand content in the filler compound increases cavitation which leads to the reduction of concrete Rc.

Due to dispergation effect and penetration effect the PC SP additive (1 %) significantly accelerates the time of concrete solidification under normal conditions. With this the Rc of concrete with PC SP additive in 3, 7 and 14 days of solidification is higher than the standard for 17, 20 and 21 %, which is an important technological effect both for monolith and assemble reinforced concrete structures from the point of view of form reuse and reduction of energy consumption.

Thus, the researches proved the efficiency of practical use of PC SP in concrete technology and ability to obtain low cement-consumable self-sealing concrete compounds, high-strength concrete of B50 and B60 grades on Portland cement M400 DO and increased strength of the grade B40 and B50 on Portland cement M400 D20 with the use of 30 % high-density basalt filler.

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Section 10. Transport

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Problems of export of Uzbekistan's horticultural products

Abstract: The article describes problems arising from the export of horticultural products of Uzbekistan. There are brief propositions on improvement of the supply of the population with fresh horticultural products.

Keywords: fruit, vegetables, export, storability, transportability, export volume, national buyers, auto-refrigerators, international transport, railway transport, inter-model transport.

Fruit and vegetables are one of the most important and indispensable food products. They are called the spring of health for their high food, taste, diet and medicinal qualities. Fruit, vegetable and gourds cultures take special place in the food balance providing the human organism with healthy nutrients. Thus, their production should increase without a change in quality.

«I believe there is no need today to talk about the fact that the main reason determining the annually increasing tension in respect of food program solution is a gap between the outstripping growth rate of the population of the Earth and limited abilities of growth of the production volumes of food stuffs. In simple words, the growth of the volumes of food stuffs production is slower than the growth of population and its needs. One should take into account the fast pace of economic growth of the incomes of the population and respective growth of the food consumption in some Asian countries such as China, India and other. And, of course, with big losses of food stuffs under the scheme "from the field to the table", which, according to FAO, annually accounts for 1.3 billion tons of food stuffs in the world for the amount of about 1 trillion US dollars», — noted the head of the state Islam Karimov [1].

The results of the analysis revealed that the modern volume of vegetable production does not satisfy the need of the population of the Russian Federation in horticultural cultures. According to the scientifically grounded norms of alimentation, 150–160 kg. of vegetables is required per capita per year. In fact, it is around 70 kg. and even less in separate regions. Since the actual need is ensured at the level of 75 % of the norms included in the minimal consumer basket, there is unsatisfied demand for horticultural products from neighbor countries in the Russian Federation. In this regard, as well as because of the economic sanctions imposed by some states against Russia, Uzbekistan remains the main supplier of horticultural products to this country.

Due to high taste qualities, horticultural products of Uzbekistan are in high demand in world market. Thus, there is a need to transport it to significant distances preserving maximum quality.

Preparation for transportation takes special place in the preservation of quality of the shipped products. The scientific studies proved that the product should be sorted, calibrated and pass an advance cooling [2; 3; 4]. All these measures significantly improve the storability and transportability of the product. However, at present, the preparations are not applied. The product is sent for transportation being insufficiently sorted, calibrated and, let alone, preliminarily cooled. Absence of the signs of illness, mechanical damages etc. On fruit and vegetables is a sufficient requirement for loading the vehicle with the product. Biochemical analysis and the check of micro-biological content of the fruit surface are not performed. Sometimes, various products are loaded in same rail car, vehicle despite the absence of the results of the study of the issues of compatibility of different pomology sorts and kinds of fruit and vegetables.

Currently, fruit and vegetables are primarily exported to Russia and Kazakhstan. Herewith, the export is performed by private persons and companies due to the fact that since September 1, 2015, some agricultural products from Uzbekistan can be exported only by rail and air transport. This requirement is specified in the decree № 249 of the Cabinet of ministers of Uzbekistan as of August 28, 2015 «About measures of further improvement of the mechanism of export regulation with regard to fruit and vegetable products, potatoes, gourds and grapes».

The ban on the use of vehicles for the export of fruit and vegetable products, potatoes, gourds and grapes (code TN VED 07–08) is explained by the need to ensure the transparency of customs procedure during the execution of export contracts and prevent illegal transfer of the specified products through the customs boarder of Uzbekistan.

It is reported that vehicles are used to export agricultural products. Many small and mid-size enterprises of Uzbekistan manage to evade the rule implemented in early 2015 about the compulsory sale of 25 % of the currency return from fruit and vegetable export to the state. Moreover, from the 1st of October of same year, the register of unscrupulous exporters and their founders during the export of fruit and vegetable products, potatoes, gourds and grapes

was put into use. Keeping of the register is done by the Ministry of external economic relations, investments and trade of Uzbekistan.

Uzbekistan is a successful exporter of fruit and vegetables exporting over 180 kinds of fresh and processed fruit and vegetable products to 80 countries. Over the last three years the volume of exported products has increased by more than three times. As for the volume of export, the country is in top ten world leading suppliers of apricots, plums, grapes, nuts cabbage and some other fruit and vegetables [1].

In 2015, the volume of production of fruit and vegetable products in the country accounted for 15.5 million tons compared with 14.9 million tons in 2014. According to different estimations, 500 thousand tons of the indicated volume is annually exported to the CIS countries, mainly to Russia and Kazakhstan. According to the data of the State customs committee of Uzbekistan, 35 % of the detected illegal export of agricultural products from Uzbekistan accounts for Kazakhstan.

However, the document alters the decree № 249 of the Cabinet of Ministers of the Republic of Uzbekistan as of August 28, 2015 «About measures of further improvement of the mechanism of export regulation with regard to fruit and vegetable products, potatoes, gourds and grapes». It is certain that till July 1, 2016 the export of fruit and vegetable products, potatoes, gourds and grapes (code TN VED 07–08) with the use of vehicles is permitted to legal entities included in the list approved by the Working group on the solution of the issues related to the rational use of fruit and vegetable products, potatoes, gourds and grapes including legume products on the internal market of the republic as well as effective organization of their supplies for export established by the decree № 1 of the Cabinet of Ministers as of January 4, 2016 «About forecast parameters of production and use of fruit and vegetable products, potatoes, gourds and grapes in 2016».

The above mentioned was required because during the period of ripening of fruit and vegetables the vehicles of private firms and companies from neighbor states enter the territory of the republic to buy products and take them to their countries. Herewith, the national buyers are in the loss because the representatives of border countries enter the territory of Uzbekistan with the currency converted in the market. They purchase the products of high quality and the local buyers are left with the volumes of products of lower quality that were not purchased by foreign buyers.

As it was mentioned above, vehicles are widely used for transportation of fruit and vegetables; the vehicles do not only take part in the supplies of the cargo to a base station, but also participate in international transportations. The realization of national programs on the improvement of roads, taking them to quality parameters of international standards contributing to the accelerated development of transportation of fruit and vegetables by refrigerated vehicles in the international transport services stimulates accelerated development of these transportations.

However, it should be noted that the national vehicles traditionally used to transport fruit and vegetables currently depleted their technical resource and are not permitted by neighbor countries to the territory due to incompliance to international norms on the exhaust gas emission. In the European countries, they switched to norms Euro 4 and 5, and in Uzbekistan the vehicles barely correspond to the norm Euro 3. Foreign vehicles entering the territory of Uzbekistan pass borders under the «TIR» conditions.

Furthermore, the export of this cargo is performed by private companies and people who are not that familiar with the rules of transportation of the indicated cargo, which leads to additional

losses and refusal by the firms of companies to do such business. As a result, this niche is occupied by foreign vehicles of the consumer or supply firms of Russia and Kazakhstan. Railroad transport performs transportation of fruit and vegetables only to the station of Iletsk (supplies to the European part of the Russian Federation) or Monetny dvor (supplies to Ural and Far East), where there is a terminal to process this cargo. The cargo is further transported by Russian vehicles.

In the near future, the Uzbek companies will open a transport logistic center in the Baltic port of Liepāja with the capacity of daily storage of 1.5 thousand tons, through which fresh fruit and vegetables will be delivered to the consumers in the countries of Northern and Western Europe. The head of Uzbekistan Islam Karimov stated this at the opening of an international conference «About the most important reserves of realization of food program in Uzbekistan» in Tashkent. According to him, today, the construction and complete reconstruction of 274 modern refrigerating chambers and warehouses for fruit and vegetable products of the total volume of over 190 thousand tons were finished as of today. One can recollect that transportations on such significant distances can be performed by different types of transport and sometimes with the use of combined, inter-model and multi-model schemes of delivery of cargo to the client.

Transportation of fruit and vegetables is mainly performed by vehicles and railroad transport. Despite the fact that fruit and vegetables refer to the category of perishable cargo, air transport is used unjustifiably less. In this case, it is explained by a high cost of transportation of cargo by this mode of transport. Although it is known that Uzbekistan Airways passenger planes fly at least once a week to major cities of Russia, Kazakhstan, Baltic countries and other from Uzbek cities and their commercial load is used at 60 % at maximum.

Currently, many airports in Uzbekistan expand their connections with foreign airports. Modern, capacious airplanes are used in these directions. If fruit and vegetables are loaded on passenger planes in the form of additional cargo, not all expenses on the performance of the flight are included in the cost of transportation of fruit and vegetables. A new tariff may include the costs related to the cargo loaded on the plane in the form of additional cargo, which will allow reducing the tariffs on fruit and vegetable transportation on passenger flights according to plane direction. However, flexible tariffs on transportation of fruit and vegetables by air are not applied.

Railroad transportation takes special place in transportation of fruit and vegetables, which accounts for up to 90 % of the volume of transportation of this cargo for export. Transportation of fruit and vegetables by this mode of transport is performed by refrigerator and covered train cars, in universal containers. Covered train cars and universal containers are used for a limited period — transitional period — from summer to autumn and from winter to spring. During this period, the temperature of the environment in the northern areas of Kazakhstan and the South of Russia is different from the temperature in Uzbekistan, and, consequently, in the cargo room of the train car by 7–8 degrees.

Most stations in the Uzbek railroad deal with shipping of fruit and vegetable products. Stations may have differences in the structure of shipped cargo, which depends on the development of production of this or that culture in the regions of the republic. There is the following scheme of cargo shipment: vehicle — cargo operation related to the transfer of cargo from one mode of transport to the other — refrigerated train car or universal container at a special rail lane. Then, the container is put on the platform and placed on the acceptance-shipment lane with the train car to form a train. Loaded

train cars remain there until a full train is formed and only then commence the trip.

At inter-state connecting stations, the trains wait for customs control the duration of which often exceeds regulatory norms.

Propositions on the improvement of supply of fresh fruit and vegetable products to the consumer

To achieve a stable position on the world fruit and vegetable market, Uzbekistan should create a state body for export of fruit and vegetables authorized to deal with the problems of supply of quality products to foreign partners, which requires:

– terminals short-term storage and processing of fruit and vegetables on the territory of the republic and beyond;

– organization of storage of fruit and vegetables in refrigerating chambers with regulated gas devices as well as shipment of this product to the consumer maintaining the unity of refrigerating and gas environment;

– acquisition and exploitation of refrigerating containers and organization of circulation of speedy cool container trains between terminals;

– development of transportation technology for fruit and vegetables in refrigerator containers;

– further research of quality parameters of fruit and vegetables and their change in the process of transportation;

– organization of transportation of products depending on their bio-chemical and micro-biological content;

– fixation of a structure of business subjects of the Republic of Uzbekistan in the law specifying their responsibility for the quality of exported fruit and vegetables at world standards level.

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HPLC method for determination of eleutherosides E and B in dry extract of Siberian Ginseng

Abstract: The article presents a modern method for quantitative determination of eleutherosides B and E in dry extract of Siberian Ginseng (*Eleutherococcus senticosus* (*Rupr. Et Maxim.*)). The dry extract of Siberian Ginseng contains eleutherosides B (syringin) and E (syringaresinol-4',4'-O-bis-β-D-glucoside) as the most pharmacologically active compounds. In connection with the above, it is important to develop and validate a method for determining eleutherosides B and E.

Quantification of eleutherosides B and E by HPLC were determined. Chromatography method in parallel with the standard samples eleutherosides B and E was performed. Validation method is presented by the following characteristics: specificity, linearity and limit of quantification.

Keywords: eleutherosides, chromatography, quantitative determination, validation method.

Introduction. Liquid extract of Siberian Ginseng is used in physical and mental fatigue, neurasthenia and psychasthenia, functional exhaustion of the nervous system which is associated with reduced capacity for work, in vegetative neurosis and conditions after surgery. Due to the presence of eleutherosides in the extract, Siberian Ginseng increases physical and mental work capacity, resistance to adverse environmental factors, improves metabolism, shows a small stimulatory gonadotropic and hypoglycemic effect.

The composition of the dry extract of Eleutherococcus identified several eleutherosides different structure — A, B, B_1, C, D, E, F. They belong to different classes of biologically active compounds: eleutheroside A — a steroid; eleutheroside B — a derivative phenylacrylic acid; eleutheroside B_1 — isofraxidin-7-glucoside; eleutherosides D and E — lignans.

The purpose of the study is the development of method of quantitative determination eleutherosides B and E in the dry extract of Siberian Ginseng and its validation.

Experimental

Method of sample preparation. Standard solutions of eleutherosides were prepared by dissolving 5 mg. (accurately weighed) of standard samples (Cromodex, USA) in a volumetric flask of 25 ml. in deionized water and methanol (30/70). Were shaken until dissolved and diluted to volume with the same solvent. The concentration of the resulting solutions was 200 mcg/ml. Further, by diluting the obtained 200 mg/ml solution concentrations of 80 mcg/ml, 40 mcg/ml, 20 mcg/ml, 8 mcg/ml were prepared.

Solution of the dry extract prepared by dissolving an accurate sample of the extract (41.0 mg.) in 1.5 ml. of the same solvent. Further, the solution was stirred for 15 minutes then the resulting solution was filtered through a filter with a pore diameter of 9 microns.

Conditions of chromatography. Quantitative determination on HPLC *Agilent 1200* with *MS 6120* detector, *Agilent Technologies*, USA was performed. The data were processed using the software Chem Station (ver. B.03.01-SR1), *Agilent Technologies*, USA. *Mobile phase:* 0.1 % formic acid in water/acetonitrile (2:98), was prefiltered and degassed on device for filtering under vacuum. *Speed of stream the mobile phase:* 1 ml/min. *Stationary phase:* chromatographic column *Agilent Eclipce XDB-C18* 4.6x50 mm; 1.8 microns at 23 °C. Injected sample volume: 10 µl. *Time of chromatography:* 2 min. *Detecting:* MS detector ionization type: ESI + APCI (at atmospheric pressure electrospray); scan mode: SIM (by the characteristic peak of m/z 785.3 for eleutheroside E and 416.10 for eleutheroside B). *Retention time:* 1.2 for eleutheroside E and 1.4 for eleutheroside B.

Results and Discussion

Validation. Validation of bioanalytical method based on the guidelines prepared by the FDA (*Guidance for Industry: Bioanalytical method validation. U. S. Department of Health and Human Services, Food and Drug Administration, Center for Drug Evolution and Research (CDER). U. S. Government Printing Office: Washington, DC, 2001*) and EMA (*Guideline on validation of bioanalytical methods (draft). European Medicines Agency. Committee for medicinal products for human use: London, 2009*) was performed.

Specificity. 6 samples of pure solvents were analyzed and the sample of standard solution of eleutherosides in a concentration range from 8 mg/ml to 80 mcg/ml. In the chromatograms of the samples of the pure solvents were not observed with a retention time of peaks corresponding to retention time of eleutherosides.

Linearity. 4 samples of solutions of eleutherosides B and E with concentrations: 8 mcg/ml, 20 mcg/ml, 40 mcg/ml, 80 mcg/ml were analyzed. According to the obtained values calibration curve

for eleutheroside B $(r^2 > 0.995)$ was constructed, as is shown on Fig. 1 together with the calibration curve equation.

For eleutheroside E $(r^2 > 0.991)$, as is shown on Fig. 2, together with the calibration curve equation.
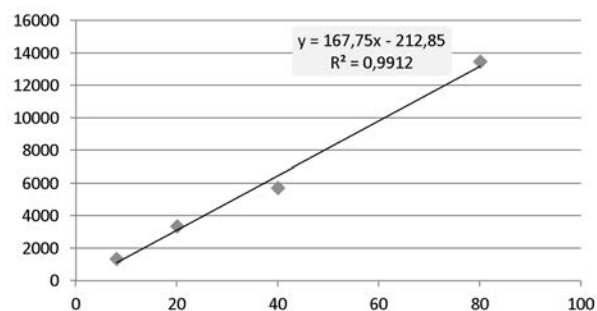
$$y = 246{,}25x + 2338{,}7$$
$$R^2 = 0{,}9954$$

Fig. 1. Calibration graph depending of peak area of concentration eleutheroside B

$$y = 167{,}75x - 212{,}85$$
$$R^2 = 0{,}9912$$

Fig. 2. Calibration graph depending of peak area of concentration eleutheroside E

MSD1 TIC, MS File (C:\CHEM32\1\DATA\ELEUTEROZID\ELEUTEROZID 2014-02-03 17-35-45\1BA-1001.D) ES-API, Pos, SIM, Frag:

Fig. 3. The chromatogram of the extract obtained in the chromatographic conditions for eleutheroside B

MSD1 TIC, MS File (C:\CHEM32\1\DATA\ELEUTEROZID\ELEUTEROZID 2014-02-03 17-35-45\1AE-0501.D) ES-API, Pos, SIM, Frag:
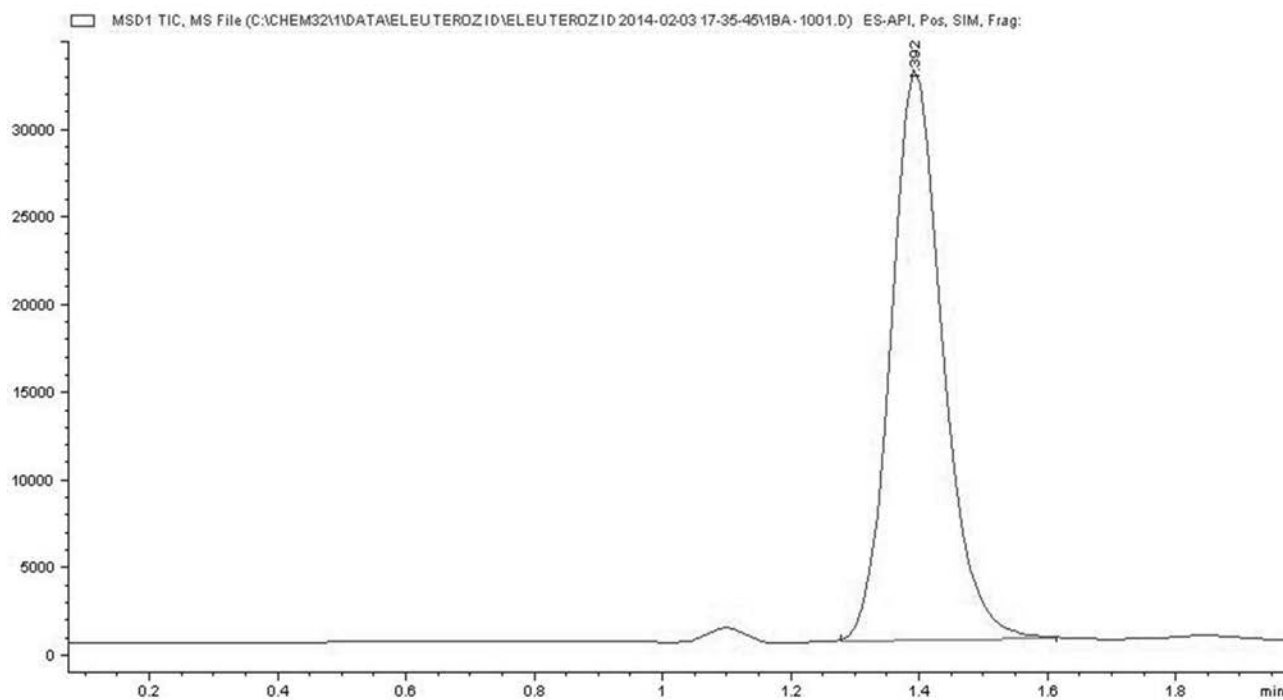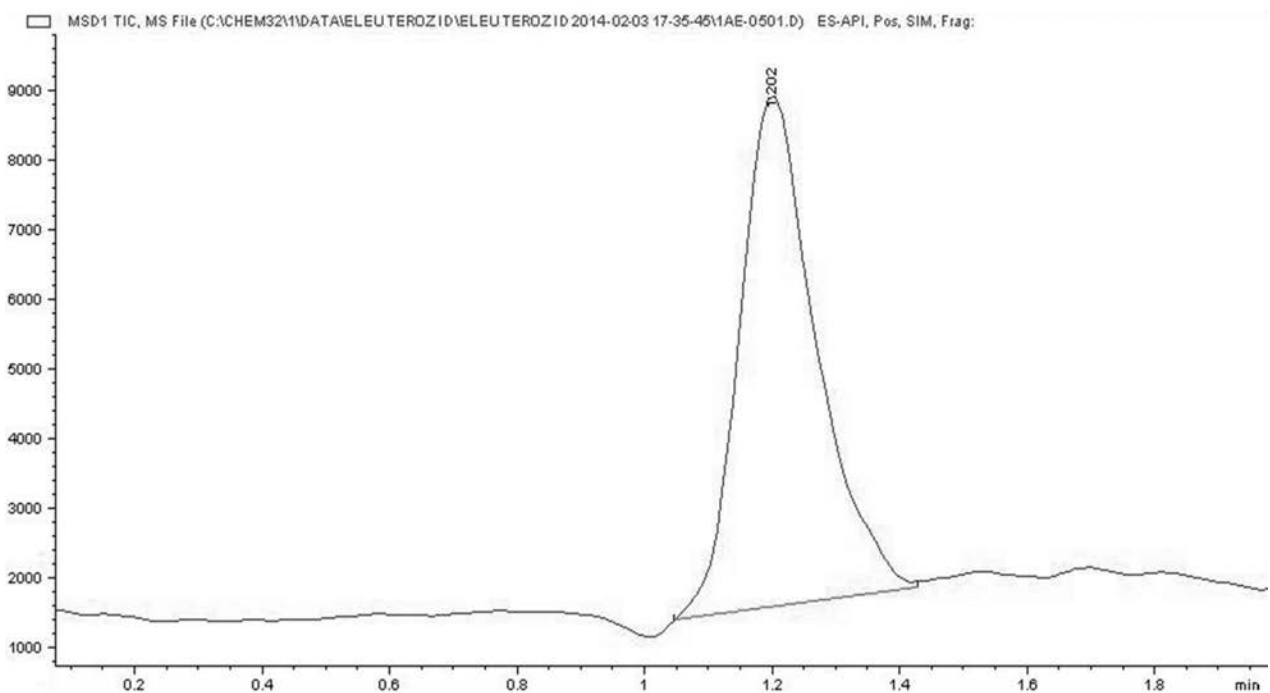
Fig. 4. The chromatogram of the extract obtained in the chromatographic conditions for eleutheroside E

Limit of quantification. According to the methodology on the basis of linearity the limit of quantification (LOQ) was determined. LOQ was 8 mcg/ml.

Determination of eleutherosides B and E in the dry extract. Chromatogram of the extract obtained in the chromatographic conditions for eleutheroside B and E are shown in Fig. 3 and 4 respectively.

The studies revealed that the content eleutheroside B is 0.08 %, eleutheroside E is 0.06 %, thus the total content eleutherosides B and E is — 0.14 %.

Conclusion

Thus we have developed and confirmed method of quantitative determination eleuterosides B and E in a dry extract of Eleutherococcus according to parameters: specificity, linearity and LOQ. Based on studies it can be concluded that in the quantitative content eleutheroside B is 0.08 %, the eleutheroside E is 0.06 % and this fraction equals 0.14 %.

Summary

The method of determination eleuterosides B and E in the dry extract of Eleutherococcus by HPLC was developed. Represented validation techniques according to parameters: specificity, linearity, LOQ.

Quantitative content of eleutherosides in dry extract of Eleutherococcus: eleutheroside B is 0.08 %, eleutheroside E is 0.06 % and total content eleutherosides B and E is 0.14 %.

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Herbicide activity of acetylenic aminoalcohols and their ammonium bases

Abstract: Studied herbicide action of some synthesized acetylenic amino alcohols, hydrochloride, various chlor- and bromoniy compounds based on them, as well as the selectivity of their actions in relation to such important crops as cotton and corn. It was found that the pretreatment of seeds and weeds studied drugs, depending on their chemical structure and dose exhibit various herbicide activity against annual dicotyledonous (shirica) and annual cereals (hen's proso) weeds.

Keywords: Mannich reaction, Favorskiy reaction, Acetylenic amino alcohols, acetylenic hydrochlorides of amino alcohols, chloroniy salts of acetylenic amino alcohols, Bromoniy salts of acetylenic amino alcohols, herbicide activity, cotton, corn, shirica, hen's proso.

Climatical conditions of cotton — zones of Uzbekistan from May to October mounts are very favorable for sprouting seeds of annual weeds such as shirica, hen's proso and some others. The most quantity of weeds have appeared in second half of May when average daily temperature of air is about 25–30°C and in some regions — haier 35°C.

In last time from herbicides supplied by industry to agriculture to using of different compounds obtained on the base of acetylenic alcohols is devoted an important role [1]. One of the peculiarities of these compounds is their low toxicality in relation of warm blooded organisms [2] what has a main role at their using in medicine and agriculture.

Herbicide activity of some acetylenic aminoalcohols, their hydrochlorides, different chlorine- and bromineoniy compounds and selectivity of their action in relation to such important cultures as cotton and corn has been investigated.

For this aim initial acetylenic alcohols were synthesized from acetylene and phormaldehyde, acetone or methyl ethyl keton by reaction Favorsky according to following scheme [3]:

$$H-C\equiv C-H \ + \ RR'C=O \longrightarrow \underset{A}{H-C\equiv C-\underset{\underset{OH}{|}}{\overset{\overset{R}{|}}{C}}-R'}$$

$A_1 = -R = -R' = -H;$
$A_2 = -R = -R' = -CH_3;$
$A_3 = -R = -CH_3, -R' = -C_2H_5$
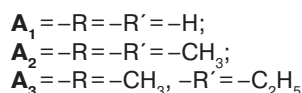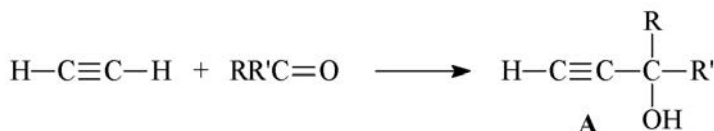
Aminoalcohols were obtained by Mannich reaction that is condensation of acetylenic alcohols (A) and secondary amines (dimethylamine, diethylamine and piperidine) with paraformaldehyde in the presence of Cu_2Cl_2 or $Cu(CH_3COO)_2$ as catalists in medium of dioxane [4]:

$$H-C\equiv C-\underset{\underset{OH}{|}}{\overset{\overset{R}{|}}{C}}-R' \ + \ CH_2O \ + \ H-N(R)_2 \xrightarrow{-H_2O} R'-\underset{\underset{OH}{|}}{\overset{\overset{R}{|}}{C}}-C\equiv C-CH_2-N(R)_2,$$

$$I - VII$$

I = –R = –R' = –CH₃; –N(R)₂= — dimethylamino group;
II = –R = –CH₃; –R' = –C₂H₅; –N(R)₂= — dimethylamino group;
III = –R = –R' = –CH₃; –N(R)₂= — dimethylamino group;
IV = –R = –CH₃; –R' = –C₂H₅; –N(R)₂= — dimethylamino group;
V –R = –R' = –H; –N(R)₂= — pyperydino group;
VI = –R = –R' = –CH₃; –N(R)₂= — pyperydino group;
VII = –R = –CH₃; –R' = –C₂H₅; –N(R)₂= — pyperydino group
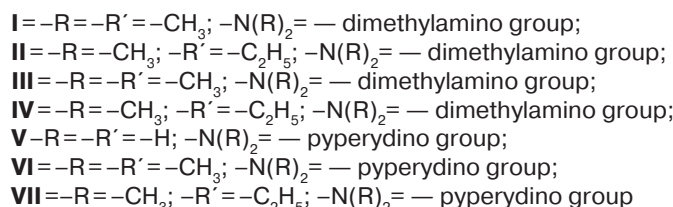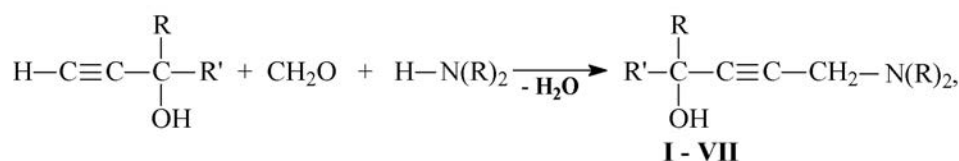
In following by interaction of compounds I–VII with molecular chlorine and bromine and also hydrochloride in medium of diethyl ether or acetone at temperature 20–25°C corresponding dihaloidoniy salts (VIII–XX) and hydrochlorides (XXI–XXVII) of acetylenic aminoalcohols have been obtained [5]:

$$R'-\underset{\underset{OH}{|}}{\overset{\overset{R}{|}}{C}}-C\equiv C-CH_2-N(R)_2 \ + \ L-X \longrightarrow \left[R'-\underset{\underset{OH}{|}}{\overset{\overset{R}{|}}{C}}-C\equiv C-CH_2-\overset{\oplus}{\underset{\underset{X}{|}}{N}}(R)_2 \right]\bullet L^{\ominus},$$

$$I - VII$$

$$VIII-XX$$
$$XXI-XXVII$$

L=X=–Cl (VIII–XIV);
L=X=–Br (XV–XX);
X=–H; L=–Cl (XXI–XXVII) — Hydrochlorids
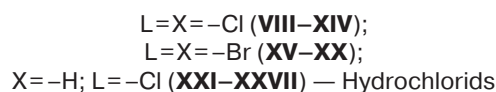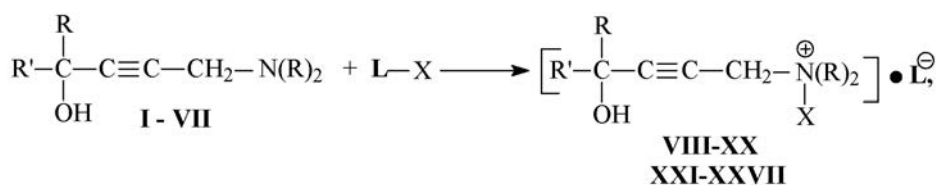
In during of caring out of Mannich reaction simultaneous addition of halogens and hydrogen chloride by –C≡C– bond wasn't observed. All obtained compounds VIII–XXVII are soluble in water but their solubility in organic solvents is low; their structures were determined by such methods as IR–, NMR¹³C spectroscopies.

Herbicide activity of synthesized compounds was investigated in presowing period be course in period of vegetation of plants they have carried out low activity. For testing of the herbicide activity of selected preparates in presowing period seeds of cotton of sort Tashkent-1 and corn of sort VIR-338 and also weed of plants such as shirica and hen's proso by 16 pieces have been used. Seeds were in soil placed which than was treated by choosed compounds in dose 5 kg/h. After 30 day determination of herbicide activity (% to control) and calculation of number of plants remaining didn't damaged in comparison with control were carried out.

From data presented in table 1 it is shown that compounds V, VI, X, XIV and XXI have shown considerable herbicide activity again shirica (from 51.6 to 95.0 %); compounds VII, VIII, XI, XII, XV, XXIII and XXIV — an middle activity (from 26.3 to 36.8 %) and remain compounds have possesed by low activity (less than 25 %). Investigated compounds possesed by low herbicid action on gen's proso. Results of measuring damp green ground mass of plants are presented in table 2. Compounds V, VI, VII, X, XIV, XXI correspondenly have increased the damp green mass of corn on 113.8; 116.3; 122.6; 125.6; 127.1 and 140.3 % and compounds XV, XXI, V, VI, X and XIV correspondenly have increased of damp green mass of cotton on 114.2; 119.9; 120.8; 128.6; 130.6 and 134.4 %. Thus at presowing treatment of seeds by solutions of investigated preparates in dependence on their chemical structure and dose has shown their different herbicide activity relativly to annual dicotyledonous (shirica) and annual cereals (hen's proso) weeds.

Chemical compounds — derivatives of acetylenic aminoalcohols have shown an high selective and herbicid action against weeds plants and at this they didn't damage an cotton and corn.

Table 1. – Herbicide activity of investigated preparates

№ of com-pounds	Preparates	Death of plants, % to control	
		Shirica	Hen's proso
Control		0	0
I.	5- (dimethylamino)-2-methylpent-3-yn-2-ol	4.2	9.0
II.	6- (dimethylamino)-3-methylhex-4-yn-3-ol	20.2	13.3
III.	5- (diethylamino)-2-methylpent-3-yn-2-ol	8.3	10.2
IV.	6- (diethylamino)-3-methylhex-4-yn-3-ol	5.9	2.9
V.	4- (piperidin-1-yl)but-2-yn-1-ol	51.6	26.0
VI.	2-methyl-5- (piperidin-1-yl)pent-3-yn-2-ol	58.3	6.0
VII.	3-methyl-6- (piperidin-1-yl)hex-4-yn-3-ol	34.2	28.3
VIII.	dichloronium salts 5- (dimethylamino)-2-methylpent-3-yn-2-ol	36.8	22.2
IX.	dichloronium salts 6- (dimethylamino)-3-methylhex-4-yn-3-ol	17.3	19.5
X.	dichloronium salts 5- (diethylamino)-2-methylpent-3-yn-2-ol	78.5	30.1
XI.	dichloronium salts 6- (diethylamino)-3-methylhex-4-yn-3-ol	27.8	18.6
XII.	dichloronium salts 4- (piperidin-1-yl)but-2-yn-1-ol	33.9	20.1
XIII.	dichloronium salts 2-methyl-5- (piperidin-1-yl)pent-3-yn-2-ol	22.6	18.0
XIV.	dichloronium salts (S)-3-methyl-6- (piperidin-1-yl)hex-4-yn-3-ol.	95.0	7.1
XV.	dibromonium salts 5- (dimethylamino)-2-methylpent-3-yn-2-ol	27.8	5.6
XVI.	dibromonium salts (S)-6- (dimethylamino)-3-methylhex-4-yn-3-ol	20.5	15.3
XVII.	dibromonium salts (S)-6- (diethylamino)-3-methylhex-4-yn-3-ol	11.8	13.1
XVIII.	dibromonium salts 5- (diethylamino)-2-methylpent-3-yn-2-ol	14.7	12.8
XIX.	dibromonium salts 4- (piperidin-1-yl)but-2-yn-1-ol	16.3	17.9
XX.	dibromonium salts 2-methyl-5- (piperidin-1-yl)pent-3-yn-2-ol	9.3	11.6
XXI.	hydrochloridum 5- (dimethylamino)-2-methylpent-3-yn-2-ol	54.7	39.1
XXII.	hydrochloridum 6- (dimethylamino)-3-methylhex-4-yn-3-ol	23.3	18.8
XXIII.	hydrochloridum 5- (diethylamino)-2-methylpent-3-yn-2-ol	26.3	21.6
XXIV	hydrochloridum 6- (diethylamino)-3-methylhex-4-yn-3-ol	34.5	18.8
XXV.	hydrochloridum 4- (piperidin-1-yl)but-2-yn-1-ol	22.5	29.0
XXVI.	hydrochloridum 2-methyl-5- (piperidin-1-yl)pent-3-yn-2-ol	30.4	9.8
XXVII.	hydrochloridum (S)-3-methyl-6- (piperidin-1-yl)hex-4-yn-3-ol	14.9	4.0

Table 2. – Influence of investigated preparates on damp green ground mass of plants

Preparates	Cotton	Corn	Shirica	Hen's proso	Cotton	Corn	Shirica	Hen's proso
	grams				%			
1	2	3	4	5	6	7	8	9
Control	13.0	35.4	26.4	10.5	100	100	100	100
I.	13.3	35.9	23.6	9.5	102.0	101.3	88.9	90.4
II.	13.3	36.5	23.0	8.4	102.5	103.2	87.2	79.8
III.	13.3	36.6	23.8	9.3	101.9	103.4	90.2	89.0
IV.	13.7	36.8	24.4	8.9	105.4	104.0	92.3	84.4
V.	15.7	41.2	11.2	6.3	120.8	116.3	42.5	60.0
VI.	16.7	43.2	16.1	9.4	128.6	122.1	60.9	90.0
VII.	13.7	40.3	22.3	7.6	105.7	113.8	84.4	72.1
Control	19.3	50.6	40.2	23.1	100	100	100	100
VIII.	20.8	52.3	26.7	17.0	107.9	103.4	66.5	73.7
IX.	20.4	51.6	34.0	18.5	105.7	102.0	84.6	80.3
X.	25.2	64.3	9.4	8.1	130.6	127.1	23.4	35.1
XI.	21.0	51.3	26.1	17.4	109.2	101.1	64.9	75.4
XII.	20.5	50.9	31.6	15.0	106.2	100.5	78.6	65.3
XIII.	20.0	54.0	35.1	17.5	104.0	106.7	87.4	75.6
XIV.	25.9	71.0	3.6	19.8	134.4	140.3	9.0	85.9
XV.	22.0	56.1	27.9	21.6	114.2	110.9	69.5	93.4
XVI.	19.9	54.5	34.3	20.1	103.1	107.8	85.3	87.2
XVII.	20.1	51.0	35.2	21.8	104.2	100.9	87.7	94.3
XVIII.	20.4	54.5	32.5	20.7	105.5	107.8	80.8	89.7
XIX.	19.9	54.0	35.5	19.9	103.1	106.7	88.4	86.0
XX.	19.8	54.7	36.4	20.8	102.9	108.0	90.5	89.9
XXI.	23.1	63.6	11.1	9.0	119.9	125.6	27.6	39.0

1	2	3	4	5	6	7	8	9
XXII.	19.5	52.7	30.9	18.9	100.8	104.2	76.9	82.1
XXIII.	20.3	54.4	29.8	19.5	105.2	107.6	74.0	84.6
XXIV.	21.3	55.1	27.8	17.6	110.6	108.9	69.1	76.2
XXV.	20.7	51.5	36.1	19.5	107.4	101.8	89.9	84.6
XXVI.	21.0	53.6	28.5	20.8	109.5	106.0	70.8	90.0
XXVII.	20.6	53.6	31.6	20.8	106.5	106.7	78.7	90.2

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Section 12. Science of law

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Agreements on transfer of property for use by civil law of the Kyrgyz Republic

Abstract: In the article author deals with agreements on transfer of property for use by the civil law of the Kyrgyz Republic.
Keywords: transfer of property, agreements, civil law, property lease.

In the context of the developing market economy of Kyrgyzstan, any citizen, businessmen, foreigners, arriving in the Kyrgyz Republic as investors and other entities conclude agreements for business activities, organization of production and exchange of goods between the various parties, as well as for other activities, covering many aspects of economic, social and cultural life of the society, based on the laws of the Kyrgyz Republic.

At the functioning of market relations, the legal relationships occur between the persons at civil law as an act based on the free will of the parties and, subsequently, to be executed by the civil law agreement. The term "agreement" in the science of civil law is used in different meanings. Without going into discussions on the category of the agreement [1; 2, 26; 3; 4], it should be noted that this is, first of all, a legal fact, an obligation and a document, a fixed fact of establishment of debt relationship, a kind of transaction, etc. However, the concept behind this term is disclosed in the Civil Code of the Kyrgyz Republic (hereinafter referred to as the Civil Code of the Kyrgyz Republic).

In accordance with Art. 381, Para. 1 of the Civil Code of the Kyrgyz Republic, the agreement refers to consent between two or more persons on the establishment, modification or termination of civil rights and obligations.

The agreement is the basic legal institution of civil law, which uses more than half of the existing civil law. According to M. I. Braginsky, "the main purpose of the agreement is to regulate the human behaviour within the law by reference to the limits of their possible and proper behaviour, as well as the consequences of violations of the relevant requirements" [5], and to our opinion this is the key essence of the civil law agreements.

Among the civil law agreements and the agreements, which are systemic for market economy, there are the agreements on transfer of property for use. They should include the entire complex of agreements such as a property lease (rental) agreement, residential lease agreement, gratuitous use (loan) agreement stipulated by the Civil Code of the Kyrgyz Republic.

The concept of "property lease (rental)" is one of the key aspects in the agreements on transfer of property for use, which requires a particular attention. Therefore, the analysis of legal literature on this issue leads to the conclusion that a similar agreement in the Russian Civil Code is used in reverse order: rental (property lease) agreement. In the analysis of the civil codes of France, Germany, Switzerland, the concept of the rental and the property lease has

slight difference. In particular, in the CIS countries (the Civil Code of the Russian Federation, the Civil Code of the Republic of Kazakhstan, the Civil Code of the Kyrgyz Republic), and in the non-CIS countries (the Civil Code of France, the Civil Code of Germany, the Civil Code of Switzerland) the concepts of "property lease", "lease", "rental", as well as "lender" and "lessor", "lessee" and "tenant" are used as identical concepts. In the Civil Code of the Kyrgyz Republic, the concepts of "property lease" and "rental" are used synonymously.

The property lease agreement is the widespread agreement, the main purpose of which is the effective integration of property into civil circulation without transfer of right of ownership and the meeting of the vital needs by the temporary use of property or the receipt of property benefits by such temporary use. Under this agreement, the tenant also receives a possibility to use the property in respect of which he/she has no possibility or no need to acquire the right of ownership. The property owner receives benefit by transferring the property, which is temporarily unnecessary or designated for this purpose.

According to the Article 542 of the Civil Code of the Kyrgyz Republic, a property lease (rental) agreement is an agreement by which one party (the lessor) undertakes to provide the other party (the lessee) with the property for payment for temporary possession and use or for temporary use. It follows that this agreement is the consensual, commutative, mutual and bilateral civil law agreement.

The parties of the agreement are the lessor (the property owner only, as well as the entities authorized by law or by property owner) and the lessee — any legal person (Article 546 of the Civil Code of the Kyrgyz Republic). The objects of the property lease agreement are the land plots, subsoil plots and other separate natural sites, enterprises and other property complexes, buildings, structures, equipment, vehicles and other items that do not lose their natural properties in the process of their use (nonexpendable items). The other types of property, which are prohibited or restricted for property lease, may be established by law (Para. 1, Art. 543 of the Civil Code of the Kyrgyz Republic).

The essential terms of the property lease agreement, stipulated by the Civil Code of the Kyrgyz Republic, are the condition of scope of agreement and it should specify the data enabling to identify the property to be transferred to the lessee as an object of property lease. In accordance with the Article 545 of the Civil Code of the Kyrgyz Republic, the agreement shall be made in writing; in case of the subsequent transfer of right of ownership of the property to the lessee, it

shall be concluded in form, required for the purchase and sale agreement of such property. The lease period is usually definite. Nevertheless, the period is not an essential term of the agreement; therefore, it is permitted to conclude the agreement for an indefinite period.

However, it should be taken into account that the Civil Code of the Kyrgyz Republic stipulates a certain termination procedure of the agreement, concluded for an indefinite period. Each party has the right to refuse such agreement at any time by notifying the other party three months in advance at the lease of immovable property, and one month in advance at the lease of other property, unless otherwise is specified by the legislative acts or the agreement.

The types of the property lease agreement with some inherent characteristic features, which enable to allocate them separately, are the hire agreement, vehicle rental agreement, enterprise rental agreement, as well as the building or structure rental agreement, finance lease (leasing) agreement, which became available upon the adoption of the new Civil Code of the Kyrgyz Republic.

In accordance with the Civil Code of the Kyrgyz Republic, the hire of residential accommodations as a type of the agreement on transfer of property for use had an independent legal development due to the mandatory participation of the citizens. According to the Article 609 of the Civil Code of the Kyrgyz Republic, a residential lease agreement is an agreement whereby one party, the owner of the residential accommodation or the authorized person (the lessor), undertakes to provide the other party, the citizen (lessee) and the members of his/her family, with a residential accommodation in possession and use for payment. The agreement is consensual, bilateral, compensated, termless; in some cases the agreement may be concluded for a definite period (for example, an office accommodation may be provided for the period of work or a hostel — for the period of study at an educational establishment). The parties to the agreement are the lessor (an owner citizen or a housing management organisation, company, organization), the lessee (a citizen to be provided with the residential accommodation).

The scope of the residential lease agreement, as a rule, is a residential accommodation, an apartment or a duly isolated residential accommodation (apartment in an apartment building, residential unit, a part of an apartment or a residential unit) consisting of one or more rooms for accommodation; it should be comfortable regarding to the conditions of the settlement, comply with the established sanitary and technical requirements. In accordance with the residential lease agreement, the lessee and his/her family members shall use the residential accommodation or apartment only for its intended purpose.

The residential lease agreement shall be made in writing. The necessity of the written form is in the preparation and signing of the residential lease agreement. The parties' failure to comply with the written form of the agreement shall not entail the invalidity of the agreement, however, it shall deprive the parties of the right to refer to the agreement and its terms for testimony in case of dispute, but shall not deprive them of the right to give written and other evidence (Article 178 of the Civil Code of the Kyrgyz Republic).

Another type of the agreement on transfer of property for use is the gratuitous use agreement. In the everyday speech, the gratuitous use agreement as the term "loan" is more often used in relation to the loan agreement and seemingly refers to credit and settlement obligations, but in fact the term "loan" came to mean not a loan, but namely the provision of property for gratuitous use [2, 392], therefore it is named the property gratuitous use agreement in real life.

In accordance with the Article 610 of the Civil Code of the Kyrgyz Republic, a gratuitous use agreement (loan agreement) is an agreement, whereby one party (the lender) undertakes to transfer or transfers an item for gratuitous temporary use to the another party (the borrower), and the latter undertakes to return the same item in the same condition he/she had received it, taking into account normal wear and tear, or in the condition, stipulated by the agreement. The gratuitous use agreement (loan agreement) is gratuitous; it can be consensual (in this case — bilateral), it can be real (in this case — unilateral) agreement.

The gratuitousness of the agreement is that the parties set pure trust relationships. The owner, transferring the authority to use the property to another person under agreement, receives no any financial compensation, equivalent, for it. The very gratuitous nature of relationships between the parties, involving a moral element, as in the donation agreement, makes a unique impact on the rights, obligations and risks of the parties or on the subject composition [4]. In addition, the gratuitous use (loan) agreement on obligation subject is close to the lease and regulates the relationships of obligation on gratuitous use of property. There is a similarity of this agreement with the donation agreement and a difference from the property lease agreement.

In the Soviet legal literature, the loan was even considered as a kind of donation [7], because there was a great similarity between the donation agreement and the loan agreement, since in the first case, the property is transferred to the ownership, and in the second case, the property is transferred for temporary use. As in the property lease agreement, the property (item) is also transferred for temporary use for free, the separate laws of the Civil Code of the Kyrgyz Republic, regulating the relations of property lease, apply to the loan agreement. The gratuitousness of the agreement also explains the increased borrower's responsibility for the safety of the item, associated with the transfer to it of the risk of accidental loss or accidental damage.

The gratuitous use (loan) agreement is used in various fields, in particular, based on sympathy, compassion, memory of moral duty and other feelings usual for a person, educational, charitable and other socially important objectives in the field of culture and art, and other cases. The most important constitutive feature here should be the gratuitousness.

The parties of the gratuitous use (loan) agreement may by any civil law entities, referred to as the lender (both the owner of the item loaned and the persons authorized by him/her, law and the owner) and the borrower (as a general rule, any person in need of the property for use). By subject composition, the legislator makes a unique restriction by Paragraph 2, Article 611 of the Civil Code of the Kyrgyz Republic, which states that a commercial organization has no right to transfer items for gratuitous use to a person, which is its founder, participant, shareholder, director, member of its management or control bodies. The gratuitous use (loan) agreement, concluded in violation of this rule, shall be invalid.

The scope of the gratuitous use (loan) agreement can be the individually defined, any nonexpendable items that are not withdrawn from the civil circulation. The term of agreement, approved by the parties, is an essential condition. If the term is not defined, the agreement shall be considered as concluded for an indefinite period. Besides, at the end of the term, the borrower continues to use the item in the absence of objections from the lender; the agreement shall be considered as renewed for an indefinite period. In the agreement, concluded for an indefinite period, the parties shall be entitled to refuse the agreement by notifying the other party a month in advance, and in case of the agreement with a definite term, only the borrower shall use this right.

Based on the above, one can conclude that the form of the gratuitous use (loan) agreement is determined by the general rules on the form of transactions, stipulated by the Civil Code of the Kyrgyz Republic. However, it should be noted that the Chapter 29 of the Civil Code of the Kyrgyz Republic contains no specific provisions dealing with the form of the gratuitous use (loan) agreement. Nevertheless, according to the Paragraph 3, Article 610, of the Civil Code of the Kyrgyz Republic, a number of rules, specified in Article 543, Article 547, Paragr. 1 and 2, Article 548, Paragr. 2, Article 552, Article 560, Paragr. 2, Article 562, Paragr. 1 and 3 of the Civil Code of the Kyrgyz Republic, shall be applied to the gratuitous use agreement.

Despite the rules of the Civil Code of the Kyrgyz Republic listed above, dealing with the agreements on transfer of property for use, the author's conclusions indicate that the civil law agreements, in general, are not only the major cause of occurrence of obligation, but also the institution, playing a major role in private-law relations of modern society, requiring a clear legislative consolidation.

Thus, the subject of study in this article were the theoretical problems of agreements on transfer of property for use according to the Civil Law of the Kyrgyz Republic. The article contains the scientific analysis and research of the current state of the property lease (rental) agreement, residential lease agreement, gratuitous use (loan) agreement, which attract the attention of scientists to the fullest extent and require not only theoretical understanding, but also practical significance. The author's conclusions shows that the civil law agreements are not only the major cause of occurrence of obligation, but also the institution, playing a major role in private-law relations of modern society, requiring a clear legislative consolidation.

This position is clearly confirmed in the scientific research by M. I. Braginsky, who notes that "the purpose of the agreement is that it serves as a basis for occurrence of obligations" [8]. The agreement on transfer of property for use has the same important role by operating, protecting and ensuring the objectives and goals of the civil law liabilities within the Civil Law of the Kyrgyz Republic.

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Consumer protection in voluntary insurance relations: compared overview

Abstract: In order to protect the consumer, in a voluntary insurance relationship, the Albanian legislator has provided a set of rules and obligations for companies, which operate in the Albanian insurance market. In compiling the new law 12 EU directives were taken into consideration, which were adopted in the area of insurance law.

Keywords: insurance law, approximate legislation, consumer protection.

Protection of the consumer, considered as the weaker party in a business relationship, is an objective that lies at the very center of attention of the regulatory authorities, whether at national or international level. The following article will deal with consumer protection in the insurance field, taking a comparative view between the rules that exist in Albania and those countries that are part of European Union law or, otherwise said, part of the acquis communautaire.

Whether consumer interests are well protected or not, can be seen in several aspects of insurance activities. In this regard, we can say that the Albanian legislation has been sufficiently completed, with law no. 52/2014 "On the insurance and reinsurance", which was recently adopted, although there is still need for improvement. Starting with Article 1, the law stipulates that consumer protection and the creation of favorable conditions is one of the key objectives, sought to be achieved. Thus, Article 1 provides that the law no. 52/2014 regulates the establishment, operation and supervision of insurance, reinsurance and broker companies, so that the insurance market operates in a safe, stable and transparent way, in order to assure protection of consumer rights and interests. The consumer is widely perceived as any person who uses or benefits from the services offered by the insurer or broker.

Changes in domestic legislation in terms of requiring a more effective protection of the rights of clients, can be observed if we compare law no. 52/2014, approved recently with law no. 9267, dated 29.07.2004, "On the insurance, reinsurance and insurance and reinsurance intermediary" that was implemented for a period of ten years, before being repealed by law no. 52/2014. The scope of Law no. 9267 was setting the general principles and rules for insurance and reinsurance companies in the insurance and reinsurance mediation and supervision of state entities that undertake and perform activities provided in this law. So, consumer protection was not provided as a specific goal, in the law passed in 2004.

The inclusion of new provisions, which place the client at the center of attention, in the law no. 52/2014 is undoubtedly the consequence of efforts to align domestic legislation with the acquis communautaire, in the context of Albania's efforts to join the European Union. Thus, one of the prerequisites that a company must meet, in order to be granted the required license to conduct insurance activities, is to present a document containing the company's

policies and internal procedures for handling consumer rights. Article 61 of law no. 52/2014 contains some general principles which the insurer must adhere, to fulfill the obligation that weighs on him, on informing the client. These obligations include, informing the consumer before signing, constantly, while the contract is valid and on an ongoing basis. These obligations to inform apply not only to the insurer, but also to the broker.

At the European Union level, it is Directive 92/49/EEC, which provides for obligations of the insurer about the information that he should transmit to the client, before and after entering the contract. Thus, pursuant to Article 31 of the directive, the insurer must notify the client about:

– The law, which the contract is subject to, when the parties cannot freely choose it or the fact that the parties may freely choose the applicable legislation and, in this case, the law proposed by the insurer.

– Procedures for handling complaints of policyholders including, where appropriate, the existence of an administrative body, without prejudice to the right of policyholders to go to court.

If we compare Article 61 of law 52/2014 with the contents of Article 31 of Directive 92/49/EEC, we can say that the legislator is trying to fully implement the rules contained by the Directive. In addition to the Directive, in formulating article 61 of the law, the Albanian legislature has also considered Article 36 of Directive 2002/83/EEC, which provides that information should be furnished to the customer either before the signing of the contract or during its execution, written in one of the official languages of the country where the contract is entered into. Information can also be given in another language, if requested by the client and if the law of the country where the contract is signed allows it, or if it is the customer who has chosen the law applying to contract.

Directive 2002/83/EEC also allows that customer to be provided with data on the progress of activity of the insurance company, the method of calculating the provisions and the measures taken by the company to have sufficient income to afford payments that can be made, if the criteria are met. The Directive stipulates the obligation of the insurance company to inform the insured of any changes that may occur in the way of calculating the provisions and the consequences of these changes for the client.

Regarding the consequences arising from non-compliance to the obligation of information, the Albanian legislator has recognized the right for the customer to require termination of the contract and payment of damages, if any, if he was not given the requested information or if the given information is untrue, and led to the decision of entering the contract. This rule does not have a specific equivalent in the Directives of the European Union, due to the fact that the decision of the consequences is one of those aspects that are left in the management of Members states and for which the guidelines predict regulation by national provisions of each of them.

To continue compliance of national regulations with rules set by the directives 92/49/EEC and 2002/83/ECC, the Albanian lawmaker added a specific article to law no. 52/2014, which details the information insurers and brokers must give to every customer, in writing, before signing the insurance contract. This information includes general data about the identification of the company, specific data about the rules applying to the contract, the methods used to calculate the premium, payment terms and ways to realize it.

The law also provides for an exception, which applies if the customer requires immediate coverage. In this case, the information concerned may be given verbally. However, if such a situation is presented, after signing the contract, the insurer gives consumers the information in writing as well. The signing of the insurance contract, the terms or its appendixes means agreement with the information provided verbally and acceptance of the terms.

The insurer and the broker are obliged to inform the insured of any changes to insurance legislation, bankruptcy, mergers, ownership, liquidation or closure of the company in any way, revocation of a license for a certain class or all classes of insurance, and of any other changes or events which impact the rights and obligations of the insured, within 10 calendar days from the date of the event.

The insurer and broker fulfill the obligation of information during the period of contract validity, via the official website, email, fax, telegraph, mail, and secure electronic signature. Information obligation conducted via telephone or communication service center, is considered fulfilled if the telephone conversation is recorded by magnetic or digital means, and the insurer can prove that. These rules, which are provided in Article 64 of law no. 52/2014, align Albanian regulation with principles established by Directive 2002/83/EEC and 88/357/CEE.

Even in this case, to complete the rights that are guaranteed to policyholders regarding the available information, the Albanian legislator has provided that the information should be provided in Albanian and shall be worded clearly and accurately. Exceptionally, information can be given in a language other than Albanian, when so requested by the client and accepted by the insurer.

Alignment with the rules established at Community level, specifically with Directive 92/49/EEC and compliance with trade developments through electronic services, led the Albanian legislator to include in the law no. 52/2014 an article which provides that the insurance company must take all technical and administrative measures to establish information technology infrastructure in accordance with the rules approved by the Financial Supervisory Authority, to inform the insured or other interested persons regarding legal developments and changes in the insurance sector.

The insurance company must establish and maintain an official website, to effectively meet the obligation to inform. It should also prepare, in easy to read formats, a range of information related to company performance, location and its bodies, the coverage provided and the conditions in which they offer their services, rights and obligations of the parties, the procedures for handling compensation claims, statistics and the most recent audited financial statements, together with the auditor's opinion. The company should establish a special link, separate from the main page, which interested persons can access to get all the necessary information, referred to above. Besides this information, the insurance company must make available to interested parties, through the separate link, electronic forms, which allow policyholders and other interested parties, to submit requests for information and redress electronically.

The insurance company also has an obligation to create information technology infrastructure, enabling policyholders and other interested parties, to receive updated information on the insurance contract via the Internet. For contracts of life insurance, the insurance company must provide information, via the website, about premiums calculated and accumulated, the coverage offered and the amounts, possible discounts including commissions, administrative costs and expenses, other amounts accrued and bonuses if any, the amount of delivery of the insurance contract, bonuses and rebates, status for the contract subject to rebate and bonus items. The Financial Supervision Authority has the opportunity, through regulations approved by its Board, to determine additional information that insurance companies must necessarily present on their website.

Law no. 52/2014 also contains some rules in terms of promotional activity, carried on by the insurance company. The law provides firstly, a general principle of providing clear and truthful information. The insurance company is responsible for the publication of this information. Then the law gives a definition of promotional information, which includes all information that is disclosed to third parties or possible clients, through publicity in the print and visual media, meetings, phone calls, internet and electronic media, interactive television, as well as any other means by which the promotion goal is achieved. The legislator has given a very broad definition, in order to cover all means of communication, which can be used by insurance companies to make promotions to customers. These rules apply not only to insurance companies, but also to brokers. In this regard, the Albanian legislator has managed to align domestic legislation with Directive 2002/83/EEC (Article 47) and Directive 92/49/EEC (Article 41). The Legislator has completed the domestic legal framework with other rules as well, which despite not relying on a single directive, provide additional guarantees for the consumer, seeking to enter an insurance contract in Albanian territory.

In order for consumer protection to be effective, the law no. 52/2014 provides that the customer has the right to appeal to the society, if it finds that the insurer fails to comply with the contract. The insurance company must respond to the filed complaint in writing or in electronic form and provide any information requested, in relation to the insurance contract, within 15 working days from the date of receipt of the request. In order to address these requests, the company should establish an internal system for dealing with complaints and resolving them in a fair manner.

The insured or any other interested person has the right to turn to the Financial Supervisory Authority for any disappointments in the handling of the complaint by the insurance company. This rule applies also to complaints related to brokers and appraisers. When it deems necessary, the Authority returns the appealed case to the insurance company. The Authority may also, within its supervisory powers, check whether the insurance company is respecting the law requirements and the terms of the insurance contract. The law provides that it is the Financial Supervisory Authority, which provides appeal and review procedures through a regulation (For this purpose, the Financial Supervision Authority has approved the decision of the board no. 35, dated May 28 2015 Regulation "On procedures and reviewing complaints"). In establishing these rules, the Albanian legislator has referred to Article 10 of Directive 2002/92/EEC, which was fully implemented.

The law also provides a procedure for resolving disputes. The insurance company should develop and adopt appropriate internal procedures to be implemented in cases where the parties agree that disputes between the insured or customers and the insurance companies or brokers should be resolved out of court. The insurance company publishes information on nonjudicial dispute settlement rules as part of the conditions of the insurance contract. In case of a disagreement because of uncertainties created by the language used in drafting the terms of the insurance contract, drawn up by the insurer, the resolution of disputes shall be done by interpreting the conditions in favor of the insured. The insured, the beneficiary or any other injured party has no right to bring a civil action suit against the insurer if he has previously agreed on a compensation amount. This procedure is defined taking into account the rules put in place by Articles 6 and 7 of Directive 87/344/EEC and Article 11 of Directive 2002/92/EEC, which were fully implemented.

To enable the correct handling of the information gathered from customers, the law provides that the insurance company and brokers are required to maintain the confidentiality of data, facts and circumstances relating to the insured and what they gather during the exercise of the activity. Liability for disclosure of information is a principle, which does not apply only if the customer gives his consent in writing, to provide information, or if this information is needed in the framework of an investigation, whether from police and judicial organs or administrative bodies. In this aspect, the national legislation is aligned with the arrangements provided for in Article 24 of Directive 2005/68/EEC, in Article 29 of Directive 2001/17/EEC, in Article 16 of Directive 2002/83/EEC and in Article 16 of Directive 92/49/EEC which were fully implemented. To coordinate these new rules with the existing legal framework in place, the law no. 52/2014 provides that the insurance company collects, preserves, deposits and uses personal data, which are required for entering into insurance policies and for resolving complaints arising from any security issue, in accordance with law no. 9887, dated 10.03.2008, "On protection of personal data", as amended.

Rules applicable to the level of the European Union, are fulfilled even more with the approval of the Distribution Insurance Directive adopted on 14 December 2015. This directive has changed and clarified some provisions of Directive 2002/92/EEC. It also established the repeal of this Directive, on a later date, after the expiration of a period of 24 months from the date of entry into force of the directive adopted in December 2015. The new Directive includes rules that apply to the financial independence of intermediaries, their obligation to disclose revenue obtained by insurance companies, the powers of controlling bodies of insurance companies or and the obligation of companies to train employees a certain number of hours.

In this regard, given that the Albanian law was adopted before the directive of December 2015, in the future, it will be necessary to realize some interventions in the text, with the aim of strengthening the rules for the financial independence of brokers and intermediaries and to require mandatory training and education of employees who participate in the various stages of negotiating and executing of insurance contracts. On these points, the Albanian legislation can be improved even more, in terms of increasing the guarantees and protection of consumer rights.

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Criminal proceedings on the territory of diplomatic missions and consular institutions of Ukraine

Abstract: The suggested article deals with the questions of criminal proceedings, covering the proceedings outside the state border of Ukraine: on the territory of the diplomatic missions, consular offices of Ukraine, as well as the order of the proceedings by authorized officials in certain areas in the case of a criminal offense under the Criminal Procedure Code of Ukraine, and existing international instruments defining the legal status and jurisdiction of Ukraine in external international relations.

Keywords: human and civil rights, diplomatic missions, consular offices of Ukraine, a procedural order, international agreements, legal status, criminal proceedings.

Investigation of crimes committed on the territory of the diplomatic missions and consular offices of Ukraine has its own procedural order defined by the Code of Criminal Procedure. Problematic issues related to ensuring the human and civil rights are the most pressing issues during the execution of procedural rules in compliance with the basis of the law and implementation of the principle of law supremacy during the investigation on the territory of the diplomatic or consular mission of Ukraine abroad. Criminal proceedings, providing for procedural actions may be carried out outside the state border of Ukraine: on the territory of the diplomatic missions and consular institutions of Ukraine. The order of proceedings by authorized officials in certain areas in the case of a criminal offense is conducted in accordance with the Code of Criminal Procedure [1], as well as existing international instruments defining the legal status and jurisdiction of Ukraine in external international relations. These international instruments include the Vienna Convention on Diplomatic Relations of 04.18.1961 [2], the Vienna Convention on Consular Relations of 24.04.1963, etc. [3].

The peculiarities of the proceedings outside the state border of Ukraine are the following:

a) a special procedure for the start of pre-trial investigation;

b) a separate category of officials authorized to carry out proceedings outside the state border of Ukraine;

c) a list of the proceedings, which may be held by the relevant officials.

1. The start of the pre-trial investigation has a special procedure. On receipt of the application, the message, the self-revealing signs of a criminal offense or from other sources, if it became aware of a criminal offense in the territory of the diplomatic or consular mission of Ukraine abroad, officials defined by p. 1, Art. 519 of the Criminal Procedure Code must immediately carry out the necessary procedural steps and begin pre-trial investigation. According to p. 3 art. 214 of the CPC information about a criminal offense should be entered in the Unified Register of pre-trial investigations at the earliest opportunity.

CCP provides that information in the Unified Register of pre-trial investigations may be entered after the establishment of connection with the authorized persons in Ukraine competent to entering information in Unified Register of pre-trial investigations, in accordance with p. p. 1, 2 art. 210 of the Code of Criminal Procedure. These authorized persons are the investigator, the prosecutor, or another official person authorized to accept applications and register the criminal offenses and report according to part 4 of Art. 214 of the Code of Criminal Procedure.

2. Proceedings outside the state border of Ukraine can only be carried out by a separate category of authorized officials. According to Part 1 of the Criminal Procedure Code of Ukraine st. 519 those officials authorized to perform procedural actions are the following: the head of a diplomatic mission or the consular post of Ukraine — in the case of a criminal offense in the territory of the diplomatic or a consular mission of Ukraine abroad.

According to Sect. 2.4 of «Regulations on the diplomatic mission of Ukraine abroad» from 22.10.1992 [4], the diplomatic mission of Ukraine is a permanent institution of Ukraine abroad, which is designed to maintain official interstate relations, as well as to carry out the mission of Ukraine to protect the interests of Ukraine, the rights and the interests of its citizens and legal entities. The head of the diplomatic mission of Ukraine is an ambassador, an envoy, or a charge d'affaires. In accordance with Articles 1, 2 of «The Consular Statute of Ukraine» dated April 2, 1994 [5], the consular offices of Ukraine abroad protect the rights and interests of Ukrainian legal entities and Ukrainian citizens. Consular offices contribute to the development of friendly relations between Ukraine and other countries, to the expansion of economic, trade, scientific-technical, humanitarian, cultural, sports ties and tourism. Consular offices assist people from Ukraine and their descendants to keep in contact with Ukraine. The consular offices of Ukraine abroad are — the general consulates, consulates, vice-consulates and consular agencies. The head of a consular post is a general consul, consul, vice-consul or consular agent.

According to a general rule, the head of the diplomatic mission or a consular post of Ukraine abroad, has to designate another official, authorized to commit the proceedings if he is injured as a result of a corresponding criminal offense in accordance with

Part 2 of Art. 519 of the Code of Criminal Procedure of Ukraine. It may be substitutes, assistants or other officials. Such a decision should be issued with a decree on the appointment of persons to carry out procedures in accordance with the requirements of Art. 110 of the Code of Criminal Procedure. An important element in this process is the clarification of the circumstances of a criminal offense. Those authorized officials who were conducting the proceedings outside the state border of Ukraine, in accordance with Part 3 of Art. 519 of the Code of Criminal Procedure, are involved as witnesses in criminal proceedings after its extension to the territory of Ukraine. They agree to provide explanations to the investigator, the prosecutor about the conducted proceedings immediately after the transfer of the materials of criminal proceedings to the relevant body of pre-trial investigation on the territory of Ukraine. The need for their interrogation is caused by the need to clarify the questions of the circumstances of the proceedings outside Ukraine, as well as obtained results, to check the admissibility of evidence obtained by such persons in the commission proceedings outside the territory of Ukraine in accordance with the requirements of Art. 86–88 of the Code of Criminal Procedure and other circumstances, which are to be proved.

3. Code of Civil Procedure defines an exhaustive list of legal proceedings that can be conducted by authorized officials, in the case of a criminal offense on the territory of the diplomatic or consular mission of Ukraine abroad. Officials referred to Part 1 of Art. 519 Code of Criminal Procedure, are authorized to:

1) ensure the application of measures of criminal proceedings in the form of a temporary seizure of the property, effect a lawful detention of a person in the manner prescribed by the Criminal Procedure Code;

2) conduct investigation (search) actions in the form of a search of the home or other possessions of the face and body searches without a court order, inspect the criminal offense in the manner prescribed by the Criminal Procedure Code.

Thus, the examination of the scene in urgent cases can be carried out by authorized officials before putting the information into the Unified Register of pre-trial investigations in compliance with the requirements of Art. 237 of the Code of Criminal Procedure. The officials listed in para. 1, Art. 519 of Criminal Procedure Code, are entitled to the right of temporary seizure of the property in accordance with Articles 167 and 168 of the CPC, as well as the right to effect a lawful detention of a person in compliance with the requirements of Articles 207 and 208 of the CPC, and to conduct investigative actions — the search of homes or another person's property,

personal search without a court order in the manner specified in articles 223, 234 and 236 of the Criminal procedure Code.

Carrying out other procedural and investigative actions on the territory of the diplomatic or consular mission of Ukraine abroad is not provided. Accordingly, other proceedings, except those listed in Part. 2 art. 520 of the Code of Criminal Procedure will be illegal and the evidence gathered in the course of such actions will not be tolerated. Procedural actions are carried out in accordance with the requirements of Art. 520 of Code of Criminal Procedure and are described in details in the relevant procedural documents, as well as recorded by technical means of fixing criminal proceedings, except the cases when such a fixation is not possible for technical reasons, in accordance with Part. 2 art. 520 of the Code of Criminal Procedure. The reasons, because of which the fixing by technical means cannot be carried out, are the lack of funds available or a fault. Fixing of the conducted proceedings, including the usage of technical means, is carried by making the protocol and its annexes, in compliance with the requirements of Articles 103, 104, 105, 106, 107 of the Code of Criminal Procedure, in accordance with Articles 167, 168, 207, 208, 223, 234, 236, 237 Criminal procedure Code regulating the procedure for proceedings under Part. 2 art. 520 of the Code of Criminal Procedure.

The place of pretrial investigation depends on the location of the criminal offense. In fact, the pre-trial investigation is carried out by the investigator of the pre-trial investigation institution under whose jurisdiction is the place of a criminal offense, in accordance with the rules of jurisdiction, in accordance with Art. 216 of the Code of Criminal Procedure. If a criminal offense is committed on the territory of the diplomatic mission or the consular office of Ukraine abroad, the pre-trial investigation is carried out by the investigator of the pretrial investigation institution, the jurisdiction of which applies to the territory of the location of the central executive authority in the field of foreign affairs of Ukraine. For the present moment it is the Ministry of Foreign Affairs of Ukraine.

Considering the peculiarities of the criminal proceedings on the territory of the diplomatic or consular office of Ukraine abroad, it should be noted that the questions of the competence of carrying out certain procedural actions by heads of diplomatic missions and consular offices of Ukraine abroad still remain quite problematic. On their decisions will depend the property and the admissibility of recorded facts of a criminal offense and the legality of the conducted proceedings. Therefore, awareness of the procedural subtleties and procedures of their conducting are the necessary conditions for the fulfilling of criminal justice tasks.

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