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Protective effect of salvifolin on liver mitochondrial function in rats with experimental diabetes

Abstract: The influence of diterpenoid salvifolin on mitochondrial function was investigated. It was shown that in streptozotocin-induced diabetes damaged functional systems of rat liver mitochondria: respiration and oxidative phosphorylation, mitochondrial permeability transition pore and ATP -dependent potassium channel. Pharmacotherapy with salvifolin (intraperitoneally in dose of 3,5 mg/kg body weight) for 8 days has a protective effect on mitochondria in experimental diabetes, correction membrane disorders.

Keywords: diabetes, mitochondria, respiration, oxidation phosphorylation, permeability transition pore, salvifolin.

Introduction

Studying the mechanisms of damage to cellular structures and functions in various pathologies and ways to treat these injuries with pharmacological agents is a priority of modern biomedical research. Despite the variety of treatments for diabetes remains popular search for new pharmacological agents and their “targets”. In the cell, such “targets” are the mitochondrial membrane and localized in their structure, firstly mitochondrial respiratory chain, megapora (mitochondrial permeability transition pore, mPTP) [1, 101–127]. The formation of reactive oxygen species in cells and excessive activation of free radical oxidation processes underlie the development of diabetes [2, 1405–1423; 3, 1986–2001]. It is also known that the mitochondria is disrupted the functioning of the citric acid cycle, there is a partial uncoupling of oxidation and phosphorylation. These processes are considered as a universal mechanism that combines the basic biochemical pathways of the toxic effect of hyperglycemia on the body.

The development of experimental diabetes also involves ATP-dependent potassium channels in the plasma membrane-localized β -cells of the pancreas are opened. To date, known inhibitors and activators of potassium channels. However, in the literature on the role and status of ATP-dependent

potassium channel of the mitochondria (mitoK_{ATP} channel) in diabetes, as well as modulators of their data available. It was found that open ATP-dependent potassium channel (mitoK_{ATP} channel) protects the heart from ischemic contractures and improve its post ischemic functional recovery [4, 2463–2469; 5, 51–57], play an important cardioprotective role during all phases of the ischemia-reperfusion myocardial injury [6, 1–21]. The literature also little information on potassium channel modulators of plant origin, having the property of lowering blood sugar.

Clerodane-type salvifolin isolated from the *Pulicaria salvifolia*, having a hypoglycemic effect, it normalizes the metabolic processes of the body in experimental diabetes [7, 86–91; 8, 161–163]. However, salvifolin influence of on mitochondrial function is not investigated and therefore the aim was to study the effect of salvifolin on respiration and oxidative phosphorylation, state of mPTP and mitoK_{ATP} channel in the rat liver mitochondria of streptozotocin (STZ)-induced diabetic rats.

Methods

For screening and detailed study of the mechanism of action of pharmacological agents are widely used various experimental models of diabetes caused by administration of alloxan and STZ al., cytotoxic activity on β -cells of the pancreas. We

have in this study used an experimental model of diabetes induced by STZ.

Experiments were performed on 90 white mongrel male rats weighing 180–200 g. The animals were divided into three groups: I group — intact, II group — the animals with experimental diabetes, which once were injected intraperitoneally with an STZ (50 mg/kg body weight intraperitoneally in a 0,1 mol/L citrate buffer, pH 4,5) (control) and III group — STZ-induced diabetes + salvifolin (intraperitoneally dose of 3,5 mg/kg body weight) for 8 days starting from 12 days after administration of STZ and reaching a predetermined level of hyperglycemia. Blood glucose was determined using glucose oxidase method set «Glucose — enzymatic-colorimetric test» (Cypress diagnostic, Belgium).

The content of mitochondrial protein was determined by the Lowry method in the modification of the Peterson [9, 346–356].

Mitochondria isolated from rat liver by differential centrifugation according to Schneider [10, 619–635]. Nuclei and cellular fragments were removed by centrifugation at 600 g for 7 minutes in a centrifuge. The mitochondria are pelleted at 10000 g for 15 minutes at the same temperature. The mitochondrial pellet was washed twice in the isolation EDTA-free medium.

mPTP condition assessed by the speed of Ca^{2+} -dependent swelling of mitochondria, the mitochondrial suspension recording light scattering at 540 nm. Experiments at room temperature 25 °C in a medium containing 200 mM sucrose, 20 μM EGTA, 5 mM succinate, 2 μM rotenone, 1 $\mu\text{g/ml}$ oligomycin, 20 mM Tris, 20 mM HEPES, and 1 mM KH_2PO_4 , pH 7,2 [11, 16755–16760]. The concentration of mitochondria in the swelling experiments was 0,5 mg protein/ml.

Mitochondrial respiration and oxidative phosphorylation was measured polarography method (polarograph OH-105, Hungary) at 25 °C. The assay medium contained 100 mM sucrose, 75 mM KCl, 10 mM Tris-HCl, 2,5 mM K_2HPO_4 , pH 7,4 and 10 mM succinate or 5 mM glutamate and 1 mM malate as respiratory substrates. Protein concentration of mi-

tochondria corresponded to 3 mg/ml of the reaction medium ADP (200 μM) was added as a respiratory stimulant. Calculated the rate of mitochondrial respiration in different metabolic states: V_3 — respiration rate after making ADP, V_4 — respiration rate after spending listed ADP. The indices characterizing pair of oxidation and phosphorylation in mitochondria: respiratory control (RC) ratio ($\text{RC} = V_3/V_4$) and the coefficient of phosphorylation of ADP/O. Mitochondrial respiration rate in different metabolic states are expressed in nanograms of consumed oxygen atoms per 1 minute per 1 mg of mitochondrial protein. The respiratory control and ADP/O ratio was calculated according to the method of Chance [12, 409–427].

The rate of swelling of the mitochondria was studied using a photometer LMF-69. Mitochondrial swelling induced activation $\text{K}_{\text{ATP}} \text{Mg}^{2+}$ channel was recorded using a change in light scattering at a wavelength of 540 nm. Mitochondria were added to the standard incubation medium of the following composition: 125 mM KCl, 10 mM HEPES, 5 mM succinate, 1 mM MgCl_2 , 2,5 mM K_2HPO_4 , 2,5 mM KH_2PO_4 , rotenone 1 $\mu\text{M/ml}$, oligomycin 1 $\mu\text{g/ml}$, pH 7,4.

Static analysis of data was performed using the program features Origin 7.5 (Microcal Software Inc., Northampton MA). The data were expressed as means \pm S. E. M. Paired Student's t-test was used for estimation of significance; minimum accepted level of significance was $p < 0.05$.

Results and discussion

Figure 1 shows the results of a study of respiratory and phosphorylating activity of rat liver mitochondria from STZ-induced diabetic and salvifolin action. The results showed that in STZ-induced diabetes, the rate of mitochondrial respiration is stimulated by the oxidation of substrates — glutamate + malate and succinate. Intoxication with STZ in rat respiration rate in the rat liver mitochondria state V_3 is increased by $37,4 \pm 2,5\%$ in the oxidation of malate+glutamate and succinate in the oxidation — by $34,8 \pm 3,0\%$, compared with that of mitochondria liver of intact animals (Fig.1A).

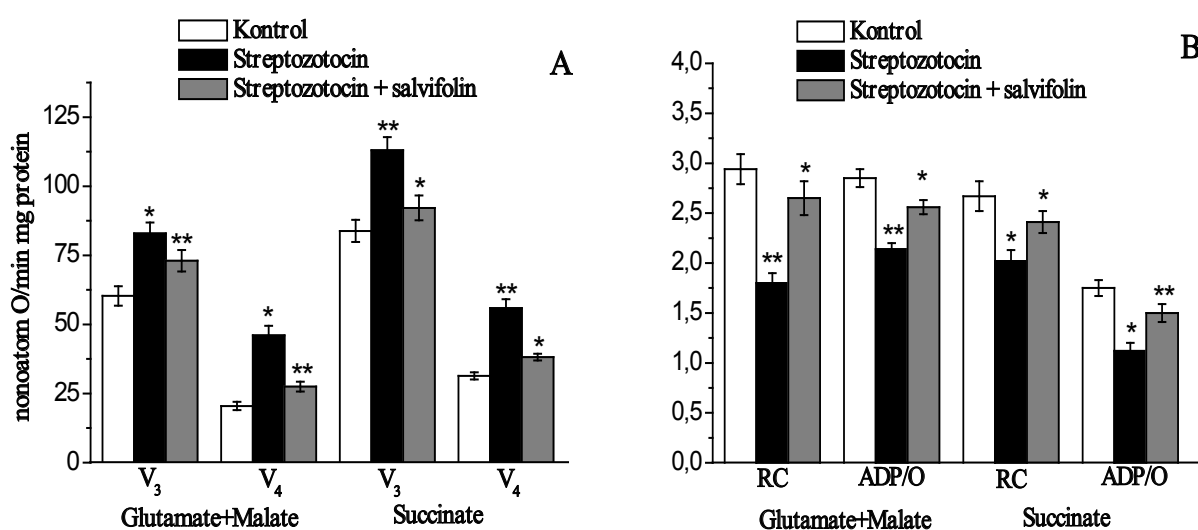


Fig. 1. The effect of salvifolin on mitochondrial respiration with glutamate+malat and succinate in the liver of rats with STZ-induced diabetes. (A — mitochondrial respiration in states V_3 and V_4 ; B — RC and ADP/O ratio) * $P < 0,05$; ** $P < 0,01$; $n = 5$

Under these conditions, the rate of mitochondrial respiration in a state V_4 , during the oxidation of malate+glutamate and succinate increased by $124,4 \pm 3,5\%$ and $78,0 \pm 4,2\%$ respectively, compared to controls (Fig. 1A).

In experimental diabetes conditions, a decrease of the coefficient of RC to $38,8 \pm 1,3\%$ during oxidation glutamate malate and $24,9 \pm 1,1\%$ at oxidation of succinate compared to the control (Fig. 1B). Such a decrease is due to increased RC mitochondrial respiration in state V_4 compared with state V_3 . Also, when reduced STZ-induced diabetes coefficient ADP/O mitochondria compared to intact group $24,3 \pm 1,6\%$ when the oxidation and malate+glutamate $36,0 \pm 2,1\%$ when compared succinate oxidation control (Fig. 1B).

The studies the effect of pharmacotherapy salvifolin on respiration and oxidative phosphorylation of rat liver mitochondria was investigate. The rate of respiration of mitochondria isolated from rat liver III-group (pharmacotherapy salvifolin) was lower than the rate of respiration of the rat liver mitochondria II-group. Rat liver mitochondria respiration in the group III at state V_3 of oxidation glutamate + malate and succinate inhibited by $16,4 \pm 3,9\%$ and $24,8 \pm 4,5\%$ respectively compared control (Fig. 1A). Respira-

tion rat liver mitochondria in the groups III reduced state at glutamate+malat V_4 $90,2 \pm 2,8\%$ succinate and $56,4 \pm 2,2\%$ as compared with the mitochondrial respiration II-group (Fig. 1A). In terms of pharmacotherapy salvifolin, RC coefficient increased the oxidation of glutamate+malate and succinate to $28,9 \pm 1,4\%$ and $14,7 \pm 1,2\%$, respectively, compared indicator STZ-induced diabetes (Fig. 1B). Pharmacotherapy with salvifolin index increases ADP/O at $14,6 \pm 1,7\%$ in the oxidation of glutamate and malate $21,7 \pm 1,9\%$ during succinate oxidation as compared with the II-group rats (Fig. 1B). The findings suggest that pharmacotherapy with salvifolin increases the coupling of oxidation and phosphorylation in the mitochondria. The results indicate the activation of the respiratory V_3 and V_4 in the oxidation of substrates liver mitochondria STZ-induced diabetes rat, which is partially removed salvifolin pharmacotherapy.

The results of our research on models of STZ-induced diabetes rats showed a significant hypoglycemic effect in intraperitoneal application salvifolin. Fig. 2 shows the results of experiments on the effect of experimental diabetes and salvifolin effect on the permeability of rat liver mitochondria.

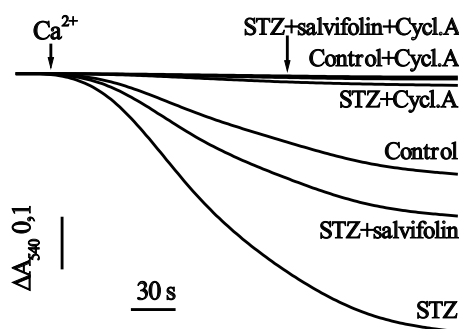


Fig. 2. Effects of the pharmacotherapy of salvifolin on mPTP opening rat liver mitochondria at STZ-induced diabetes

(Changing of calcium-induced mitochondrial swelling in liver mitochondria isolated from intact rats, STZ-induced diabetes rats and salvifolin treated rats (STZ-induced diabetes+salvifolin). Mitochondrial increase in volume was determined by following the decrease in the absorbance at 540 nm of the mitochondrial suspension. The small increase in absorbance is due to the formation of calcium complexes in the mitochondrial matrix. Addition of cyclosporine A $4 \mu\text{M}$, $P < 0,05$, $n=4$.)

In our experimental conditions used (incubation medium containing Ca-EGTA buffer) swelling of mitochondria can be seen as the result of an open state of mPTP, and the suppression of swelling — as a closed, ie, using this technique, you can assess the condition of mPTP in the STZ-induced diabetes and action salvifolin. Adding to the incubation medium $+50 \mu\text{M}$ CaCl_2 leads to swelling of mitochondria and liver of rats in group I (Fig. 2). This swelling rate of liver mitochondria was $0,19 \Delta E_{540}/5\text{min}$, respectively. In those conditions, the rate of swelling of mitochondria isolated from rat liver group II (STZ-induced diabetes), was equal to $0,49 \Delta E_{540}/5\text{min}$, which is $157,8 \pm 4,7\%$ higher than in the control group (Fig. 2).

Since we used conditions the swelling of mitochondria can be regarded as the opening of mPTP, the results indicate that in STZ-induced diabetes mPTP liver are in the open state. Pharmacotherapy salvifolin rats with STZ-induced diabetes is associated with marked contact inhibition of liver mitochondrial swelling. Thus, the rate of swelling of mitochondria isolated from the liver of rats of group III STZ-induced diabetes+salvifolin) was $0,27 \Delta E_{540}/5\text{min}$ that $116,0 \pm 4,3\%$ less than the rate of swelling of the rat liver mitochondrial group II (Fig. 2). Under these conditions, the classic mPTP inhibitor cyclosporin-A at the concentration $4 \mu\text{M}$ full inhibited the mitochondrial swelling, isolated from liver I and III groups of rats, in contrast to II groups.

Thus, the STZ-induced diabetes causes, including the development of mitochondrial dysfunction, manifested opening mPTP. Pharmacotherapy rats with STZ-induced diabetes salvifolin corrects mitochondrial dysfunction, effectively influencing the state of mPTP.

Our experimental results indicate that diabetes with STZ seriously impairs the function $\text{mitoK}_{\text{ATP}}$ channel rat liver mito-

chondria (Fig. 3). Experiments have shown that in the absence of ATP in the incubation medium, with STZ-induced diabetes activity $\text{mitoK}_{\text{ATP}}$ channel is increased by $20 \pm 4,5\%$ as compared to that of an intact rat group. In the presence of ATP, in experimental diabetes $\text{mitoK}_{\text{ATP}}$ channel liver becomes more open state, ie, the rate of swelling of mitochondria in rat liver group II up $92,1 \pm 4,8\%$ than the group intact mitochondria (Fig. 3). In diabetes, liver $\text{mitoK}_{\text{ATP}}$ channel becomes more open state, ie, the swelling rate of the rat liver mitochondrial group II is higher by $88,5 \pm 2,5\%$, than the control group mitochondria (Fig. 3).

Pharmacotherapy salvifolinom corrects pathological change in function $\text{mitoK}_{\text{ATP}}$ channel: wherein the rate of swelling of rat liver mitochondria group III was inhibited in the absence of ATP to $9,4 \pm 0,6\%$ and in the presence of ATP to $65,7 \pm 4,4\%$ in comparison with swelling rate of mitochondrial group II (Fig. 3).

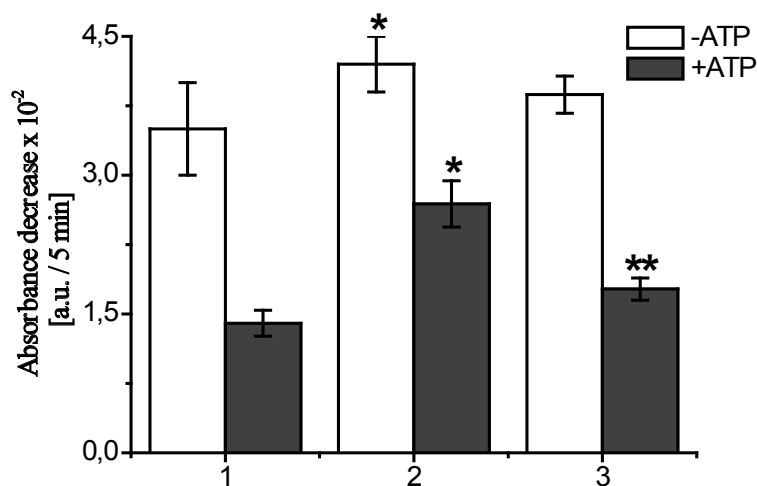


Fig 3. The effect of salvifolin on $\text{mitoK}_{\text{ATP}}$ channel of the rat liver mitochondria with normal and STZ– diabetes 1 — intact, 2 — STZ–diabetes (control), 3 — STZ–diabetes+salvifolin. * $P < 0,05$; ** $P < 0,01$; $n=4$

Antidiabetic drugs sulfonylurea have an inhibitory effect on the receptors mitoSUR , resulting $\text{mitoK}_{\text{ATP}}$ been closed channel [13, 961–965; 14, 13578–13582]. However, there is no data in the literature about the mechanisms of action of modulators $\text{mitoK}_{\text{ATP}}$ channel liver in experimental diabetes. Obviously, in a diabetes affects not only pancreatic tissue, heart, kidney and brain [15, 807–812; 16, 1–9; 17, 3133–3147], but other tissues of the body.

Thus, at the experimental diabetes respiration and coupled phosphorylation of rat liver mitochondria are seriously damaged. In this accelerated rate of oxygen consumption in states V_3 and preferably V_4 , RC coefficient decreases when the oxidation of glutamate+malate and succinate compared with analogical mitochondrial indices of I group rat liver.

Under the influence of the body salvifolina STZ-induced diabetic rats a decrease in mitochondrial respiration rate noted in both states. However, despite pharmacotherapy by salvifolin, these rates of respiration were higher than the control groups. At the pharmacotherapy salvifolin also observed an increase in the coefficients of RC and ADP/O, indicating that phosphorylation of effective function of liver mitochondria at effects of salvifolin. Thus, the identified corrective

Thus, at the STZ-induced diabetes occurs the opening the $\text{mitoK}_{\text{ATP}}$ channel which leads to increased transport of K^+ ions into the mitochondrial matrix, changes in potassium homeostasis cytosol and mitochondrial membrane potential, as well as uncoupling of oxidation and phosphorylation. The pathological process, ie, $\text{mitoK}_{\text{ATP}}$ channel open in experimental diabetes may develop as a result of reducing the concentration of adenine nucleotides.

It is known that the protein components $\text{mitoK}_{\text{ATP}}$ channel — mitoSUR mitoKIR and regulates the state channel inhibitors mitoKATP channel acts on these components [1, 101–127]. It is possible we studied diterpenoid salvifolin also interaction regulatory sites of the channel — mitoSUR , as a result of the channel is inhibited.

action salvifolin to functional impairment of mitochondrial STZ-induced diabetes rat, which is reflected in the restoration which is reflected in the restoration of the state of coupling of respiration and phosphorylation.

We have also revealed that at the STZ-induced diabetes mPTP switches to state of high permeability, which first found authors [18, 519–523; 19, 231–237]. The observed swelling of mitochondria us, ie mPTP high permeability transition in the state in experimental diabetes, may be a result of the membrane are interconnected processes: lipid peroxidation, oxidation of the thiol groups mPTP , decrease in membrane potential, the formation of fatty acids and free radicals. It is possible the mechanism of inhibition mPTP salvifolin, is the reduction of the above processes or interaction with cyclophilin D, which is located in the matrix of mitochondria.

We have shown, that at the STZ-induced diabetes occurs the opening the $\text{mitoK}_{\text{ATP}}$ channel. Perhaps, the opening $\text{mitoK}_{\text{ATP}}$ channel leads to increased transport of K^+ ions into the mitochondrial matrix, changes in potassium homeostasis cytosol and mitochondrial membrane potential, as well as uncoupling of oxidation and phosphorylation. The pathological process, ie, $\text{mitoK}_{\text{ATP}}$ channel open in experimental diabetes

may develop as a result of reducing the concentration of adenine nucleotides.

It is known that the protein components mitoK_{ATP} channel — mitoSUR and mitoKIR and regulates the state channel inhibitors mitoK_{ATP} channel acts on these components [1, 101–127]. It is possible we studied salvifolin also interaction regulatory sites of the channel — mitoSUR, as a result of the channel is inhibited.

Conclusions

Thus, in STZ-induced diabetes impairs the function of rat liver mitochondria as the mitochondrial respiration, the functional state of mPTP and mitoK_{ATP} channel. Pharmacotherapy diterpenoid salvifolinom has a protective effect on mitochondria in experimental diabetes, correction membrane disorders.

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Section 2. Journalism

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Role of repositioning of the media specialist

Abstract: The problems of discrepancy the traditional methods of personnel management, as the result of the global challenges of the marketing sphere, are considered in the article. The organizational structure of the broadcaster is analyzed. The new model of the media specialist' management is proposed in order to strengthen the positions on the media market.

Keywords: media specialist, media market, personnel management, TV.

In the modern rapidly changing environment only those companies are able to develop successfully and to be effective enough which accept changes and transform current challenges to their benefit. The working efficiency of the experts on the Ukrainian TV depends mostly inner and outer factors on the marketing sphere: the active development of innovative technologies, hybrid wars, youth auditory focusing on the Internet resources and digitalization.

In such conditions, top management of the TV-enterprises must purposefully solve the dilemma of their workers' effective productivity development and masterfully introduce these methods in the production without the quality loss.

Economic theories were always aimed to mark the difference between the intellectual and physical workers. One of the leading theorists considering the management problem, Peter Druker thinks, that the countries and branches which were leading in the elevation of physical workers' productivity became the world leaders in the last century: firstly, USA; secondly, Japan and Germany. In 50 years, if not earlier, the leadership in the world's economy will pass to those countries and branches, which will be able to elevate the productivity of intellectual labor in the most systematic and effective way [1, 85].

Peter Druker considers physical labor to be money-losing. Intellectual labor, if we want to make it productive, should be viewed as the main capital. In this case, charges should be strictly controlled and led to minimum, and the capital should be enlarged [1, 81].

In accordance with Peter Druker, specialists of the intellectual labor possess the means of production, when the workers of the physical labor possess only experience [1, 81]. For this reason, intellectual workers on TV are calmer, more mobile and tolerant to changes while using their own labor and possessing their own means of production, since their main capital — their sense, is always with them in their brains. That is why it is not necessary for them to be attached

to a working place, their labor can be used anywhere. Workers of physical labor, doing one-type mechanic work, need a job more, than a job needs them. Though, they can be very experienced, their knowledge may be applied only to the definite fields of work.

Still "in the periods of the fundamental structural transformations, only leaders of changes survive, those who sensitively feel the tendencies of transformations and rapidly get adjusted to them, using emerging opportunities to their benefit [2, 85].

So, who are better able to feel the changes and to get adjusted to them: intellectual or physical workers? Does the quality loss of production on TV depend on the loss of intellectual workers' productivity? Does the quality of production depend on customers' trust? What is needed for the elevation of intellectual workers' productivity and the raising of the enterprise effectiveness? These questions are concentrated in the area of personnel management and positioning the role of media sphere, and we will try to find the answers.

Multimedia technologies, which are becoming increasingly implemented in TV journalism, are now demanding multimedia specialists. Modern technological means of multimedia allow to perform all types of informational processes on TV. On the one hand, it makes it easier for intellectual specialist to work, on the other hand, it complicates the process of constant learning and renovation.

Not only the challenge to traditional methods of personnel management, but also the prospective for the developing new type of the media specialist, — the multimedia worker, are at the heart of this mismatch. What strategies and models should be applied by top-management in order to strengthen its positions on the market during the periods of permanent instability, information overloading, digitalization?

In order to answer these questions let's turn to the matrix of hierarchical relations in the collective body. First of all, the situation in which Ukrainian news tribe work, and will con-

tinue working in the nearest future, should be described. If we compare television industry with a ship, it is more likely to look like a drifting one, because the reduction of advertisements' volume takes place (advertisement's cost and need on the TV reduce with the rapid pace), the state is plunged into the conflict zone and military operations, what naturally reflects negatively on the economy, we are in the state of information war, therefore the level of people's trust to the traditional mass media becomes lower. Lots of powers and attention are drawn over by all these marketing sphere's inner and outer factors, what prevents the company from focusing on the promotion issues. Indeed, everybody knows one of the main business principles — if you do not develop, you move backwards.

During the last years Ukrainian people lost the trust to the mass media, they stopped watching TV, not only because of new multimedia resources' emergence, but also they had enough of watching "toxic" news, which are produced under the influence of channels' owners. In such a way, the mind of Ukrainian customers blocks the income of negative information.

In accordance with the data of opinion poll, conducted by "KIIS" (Kyiv International Institute of Sociology) and public association "TV-critics", 72% of Ukrainian people learn about news from news resources (mainly from Ukrainian TV-channels), and from the Internet media. Moreover, only 43% of Ukrainian people watch TV, 29% — use the Internet, and 6% of Ukrainian people are not interested in the news at all [3].

Besides, interviewed respondents think that the editorial politics of the Ukrainian mass media are determined, first of all, by its owners. 45% of them think that the owner has the highest influence on mass media, 21% consider the state to be the most influential in these issues, and 11% believe that journalists and editors make content by their own. Only 4% of respondents said that the editorial politics is determined, first of all, by the society. 18% of the respondents are not interested in this question [4].

These tendencies outline double challenges for the national mass media, as well as, for TV. Therefore, in order to raise the labor productivity owing to human resources, it is needed to take into consideration the abovementioned aspects and to focus on permanently changing marketing sphere. New time demands the reconsideration — the repositioning of the media specialist' role.

A lot of theorists and practitioners suggest that there should be the new distributing of journalists' roles. Maxim Filimonov — the chief of the United newsroom RIA "News" shares the experience of uniting all the subdivisions in convergent multimedia editorial on the basis of the 'open space' principle, what allows to optimize human resources and raise the content's productivity [5, 66]. Paul Bradshaw — the English web journalist and consultant on social media points out the new roles in the editorial staff: an editor-aggregator, a mobile journalist, a journalist-analyst, a multimedia-producer, an expert editor, an editor of mass media community [6].

The Internet resource edu.ru proposes a very interesting list of professions in the management sphere, which will be needed in the future:

Time-broker — the specialist who 'sells' the working time of the specialists who work on flexible hours, so he is the manager of other people's employment on the open market.

Trandwatcher/foresighter — the specialist who control the emergence of the new tendencies in different branches of economy, public life, politics and culture.

Virtual legal-counsel — the specialist of elaborating the decisions, which allow to work, study and have a rest in the virtual reality.

Corporate anthropologist — the specialist who is in charge of examining the market of innovation products by the anthropological methods (for example, an overt observation) and he is also in charge of raising company's connectedness with its target audience.

Coordinator of the communities' development programs — the specialist who organizes and maintains the dialogue between independent producers' teams, coordinating their long-term aims and the general image of their future.

Personal brand-manager — the specialist who is engaged in forming the personal image with using social networks and other public platforms in accordance with customer's aims and demands.

Manager of cross-cultural communication — the specialist who accompanies document flow of the company in foreign languages, and who controls the key senses (for example, in the marketing slogans' choice).

Moderator of users' communities — the specialist, who organizes online-communities, accompanies the dialogue with the products' developers of the company for the development of product line, maintains their loyalty (for example, organizes contests, etc.).

Manager of controlling the online-selling — the specialist who elaborates the mechanisms of products' promotion on the web for the off-line companies, organizes marketing campaigns in the Internet, accompanies the company's online-shops or work with partners on improving the service for clients (for example, the speed of delivery).

Designer of the individual financial trajectory — the specialist, who calculates the model of individual investments, judging by the planned income and expenses, gives recommendations about the planning of individual and family budget, career's development, etc. [7].

Having examined the abovementioned tendencies and the distribution of journalists roles, we suggest the model of managing the workers in the media sphere, with taking into account the repositioning, and the possibility to transit to the convergent editorial staff. The first thing we should pay attention to is the attraction of highly-qualified intellectual workers and positioning them as one of the main resources of the company. We are assured that with flow of the years any intellectual labor may become mechanical, for example, when the journalist or the writer is said 'to be done with writing'.

The specialists of the intellectual sphere need to switch back and forth between different labor's operations, in order not to get stuck on some single action. The convergence pushes journalist towards multi-functionality. Now the new generation of Y (millennial) is growing and it will be possible for them to operate the levels of multitasking. In order to make the working atmosphere not so boring and to create stimuli for the constant development on the working place, the new dotty-spiral model of managing the human resources should be created. The stippling is defined by the presence of the groups with the similar production's organization (the same when a choir is divided into parties: soprano, alto, tenor, bass), in which every specialist has his definite role — the specific place and duties. The spirality means the absence of getting stuck on the production of goods, the ability to quickly and knowledgeably switch back and forth between the blocks of production, and to constantly develop due to plugging in new technologies, acquiring new knowledge and experience.

This model presupposes the creating of groups in the team, which will work with the suchlike functions inside the every cell of the team. For example, in the group of news journalism the certain number of the newscasters, correspondents, live reporter, editors, editorial control, literary editors (the number may vary, depending on assigned tasks and human resources) will be involved. Another group will be formed out of the camera operator, camera crew, video engineers, sound engineers, assistant news directors. Within a certain time all of them (depending on the number of human resources and time) will exchange roles, being involved in the range of the named professions. This will give dynamics, improvisation and constant development to their work. Sound competition,

when every specialist tries to be the best in the group is great stimuli for raising the productivity and for aligning the value context. There may exist as many suchlike groups as it is needed for the TV-product elaboration. Names of the positions must correspond to the employee's assigned mission. These may be the abovementioned specializations. Multimedia producer will manage the process (a kind of a conductor). Dotty-spiral model was introduced in the production and learning process in the Institute of Journalism of Taras Shevchenko National University of Kiev, for the 3d course students who have the specialty 'journalism', during the first semester of 2015 year. The results of raising the labor productivity were increased by 25%. Within one semester, 10 informational programs 'IZH-TV' were held, instead of planned 8 programs. All the students were so motivated and oriented on the final result, that the general performance level increased.

Work should be stimulated not only by material resources and social packages, but also by setting the task correctly, plans which they have to solve together, worrying about the common business as if it was their own, aiming at the final result of the company.

In such a way, the suggested dotty-spiral model of the media sphere experts' management is destined to help with solving the problems of increasing labor's productivity and decreasing of the financial risks, from the human resources management's point of view. By repositioning the worker of the media sphere into the multimedia worker and by attracting intellectual specialists, Ukrainian managers will acquire the possibility of the soft transition to convergent editorial staff (in case it is needed), and they'll be able to overcome double-challenges, they face with, easier.

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Section 3. Information technology

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Classification and analysis of computer programs for the physical preparation of athletes and exposure of prospects for their studies

Abstract: The analysis of existing computer programs and scientific research on physical training for assessing the completeness of the application of computer technology for the development of the concept of creation and use of educational computer programs on national sports (Kurash, kasharman, shullik and others).

Keywords: computer programs, classification, training programs, electronic textbooks

The introduction of modern computer technology and means of transmitting information in various spheres of human activity in order to improve their effectiveness led to the emergence of fundamentally new ways to implement these activities. These methods are based on the extensive use of the unique capabilities of computer equipment for the collection, processing, storage and presentation of information are combined in the concept of the new information technologies [1]. Broad prospects for the new information technologies are being open in teaching area. The objective prerequisite for this is information essence of the learning process, in which a special place belongs to a dif-

ferent type of information exchange between the teacher and students. According to opinion of experts, the use of new information technologies in teaching and pedagogical process represents, a new stage in the theory and practice of pedagogy. Aspiration of progressive educators to meet the growing needs of the society in education by making use of the potential of new information technologies brings to life and new forms of learning. One such form is teaching using software [2].

Computer programs can be categorized by content of direction, features of usage, method of presentation of the material (Figure 1).

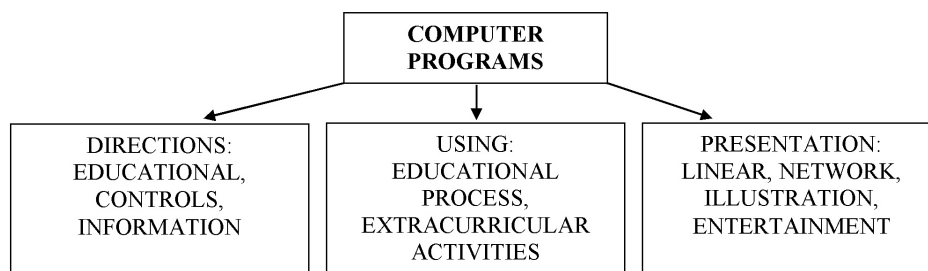


Fig. 1. Classification of computer programs

The classification of computer programs in direction laid the main purpose of the computer program contained in the title: teaching — for learning; control — for control; information — for receiving information. This division, of course, rough and not absolute, as almost every training program is the controlling and to what extent the information. Similar examples can be cited in other programs, although there are programs that work like stand-alone — only one type. To streamline the software offer to refer them to one or another type of the main tasks of the program.

Educational computer programs are divided into electronic books and electronic manuals. As a rule, computer

programs include various types of illustrative presentation of material: static type planar animation and video in a computer animation or complex — media (various combinations of audio, video, animation, etc.).

Monitoring computer software can be divided into three areas: — management; — Control of knowledge; — Control of the individual systems.

Information Computer programs can be integrated into training or monitoring programs and autonomous. Information Computer programs can be categorized as follows: — Reference bibliographic; — Encyclopedic; — Target highly specific, and others.

By the way of accessing the program can be open or closed. For owners, exactly for developers, these programs are usually open, and for users can be open and closed.

Most computer programs designed for the educational process, can be used in teaching and in extracurricular process, although there are exceptions [3].

Consider some software on physical training.

Computer program "Athlete"

Computer program "Athlete" — a training and is designed on the principle of a network of presentation (hypertext system).

The "Athlete" has not got data model, which would have served as a framework for storing information, i. e. no hard algorithm scrolling text. A student or a teacher, working with the program, establishes those connections, the sequence of which are considered essential that maximizes the use of an individual approach to learning. The program is developed on 4 levels, which facilitates orientation at work with her, but at the same time allows the student to select his/her level of learning.

The "Athlete" includes both planar animation (Fig. 2) and screens with the video clips animation.



Fig. 2. The screen of the computer program «Athlete» section — muscles

Evaluation of mastering of theoretical material allows the teacher to engage in or to identify the degree of assimilation of acquired knowledge for the course "athletic training" in percent (100% taken the absence of errors in the answers to test questions).

In the part of "Recommended Literature", learner can choose publication which is interested and can read the summary and get acquainted with table of contents of the selected book [4].

The computer program "Techniques of throwing grenades"

The computer program "Techniques of throwing grenades," prepared for the detailed learning of throwing a grenade from his knee and allows any speed viewed from three different sides of the implementation of the sports movement (Fig. 3).

This type technology demonstration movement favorably with video that eliminated all minor objects and when the movement focuses on the main elements [4,5].



Fig. 3. Screen of computer programs «Technology throwing grenades»

The whole complex of computer programs developed by the Russian State Academy of Physical Culture. At the University after N. E. Bauman was created information-methodical system, operating in an interactive mode. The computer program

performs three main tasks: — monitoring and control of the progress of the educational process; — The establishment and maintenance of methodological and information documents in a database; — Searching for and reading information.

Group experts prepared a computer system for operational planning training in middle distance runners for up to two months for the obshchepodgotovitel'nogo and precompetitive stages of preparation [6].

In St. Petersburg State Technical University and Samara State Aerospace University. after S.P Koroleva for several years was create computer software for use in the educational process in the discipline "Physical training". Thus, in the Inter-University Center for Physical Culture in 2001 was completed the computerization of all the theoretical material on the discipline "Physical Culture", which included theoretical and methodological materials, static illustrations, software, and video clips.

Solving the problem of convenient storage of the results of pedagogical diagnosis with the assessment indicators introduced, with the possibility of comparing individual indicators in the dynamics or between the various athletes with example of gymnastics taken in the Russian State Academy of Physical Culture. In fact, this information program, but with elements of assessment [7, 8].

Computer technology began to be used in sports activities much earlier than in the teaching process of physical education. A number of sports computers have become part of the process as preparation of athletes [9].

So, with the help of computer technology in the St. Petersburg Research Institute of Physical Culture are real-

izing monitoring and training rowing technique. This program can be used as the selection system. Also, for a system of selection, but not in a particular sport, but almost in all forms, is an automated control system of standardized assessment of the level of development of motor functions [10].

Teachers Uzbek State Institute of Physical Culture developed for the educational process of their high school educational software: "Mathematical Statistics", "Sport Metrology", "Biomechanics", "control of knowledge of students".

Thus, we note that at present the role of computer programs has a significant place in the theoretical and practical preparation of hardened athletes. They also allow athletes to strengthen their theoretical knowledge in practice and applying as a consequence improve athletic performance. Using computer software can control the entire process of preparing the athletes and diagnose the overall physical condition of athletes. In addition also highlighted that the computer program and the process of training of athletes is inseparably mutually-linked and it pays off today.

Analysis of existing scientific research allowed to evaluate the completeness of an exemplary application of computer technology and will be the basis for the development of the concept of creation and use of computer programs to train national sports (Kurash, kasharman, shullik and others).

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Section 4. History and archaeology

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Weapons and armament on the miniatures of Tabriz miniature school of the XV — XVI centuries

Abstract: Tabriz miniature school is an important part of the art of the Middle East. The article discusses battle miniatures in which medieval artists reliably and historical accuracy depicted various weapons and armament. These miniatures can serve as an important historical source for the study of weapons of the XV — XVI centuries. The main purpose of this article is to give the proof of these miniatures of art school which can be considered as a source for the study of arms and armament of the XV — XVI centuries in Azerbaijan.

Keywords: Tabriz miniature school, medieval weapons, battle miniatures of the Muslim East.

Tabriz miniature school is an important part of the arts of Middle Eastern peoples. Much research has been done on foundation and development of the school as specific direction of Eastern miniature arts. Upon investigation turns out miniatures can be credible sources to explore the way of life, customs and traditions, lifestyle through the illustrated characters and societies. The main purpose of this article is to give the proof of these miniatures of art school which can be considered as a source for the study of arms and armament of the 15th –century.

After heavy wars of the early 15th century, the region was experiencing a period of relative stability. In 1410 was created by the state of the Kara Koyunlu, with its capital in the city of Tabriz. When the ruler Jahanshah (1435–1467), there is a rise of art, including miniature painting. In 1467 on the same property was created by the state of Aq Qoyunlu, also with its capital in the city of Tabriz. When the ruler Uzun Hasan (1468–1478) and then Sultan Yaqub (1478–1490) were created a number of outstanding works of Tabriz miniature painting [6, 165–166].

15th century — the little investigated period in the history of Tabriz miniature school [1, 67]. It is proved that in this period were created by separate miniature sheets that have been collected in albums — *muraka*. The most famous of all the album miniatures — “Album Fateh” was so named because it features a portrait of the Ottoman Sultan Mehmet Fateh (1444–1481 years), however, it is proved that some of the miniatures created in the late XIV century and the other in the fifteenth century by order of the Governor of the state of Aq Qoyunlu Sultan Yaqub (1478–1490). Experts identify the miniatures of this period in a separate style [7, 215]. In the miniatures of the weapons depicted very accurately.

Miniatures “Album Fateh”, the miniatures to poems of Nizami Ganjavi “Iskander-nameh” (1418), “Leyli and Maj-

nun” (1442), “Khosrov and Shirin” (1481), painting on fabric “A Feast in a spring garden” (1430), individual miniature “Padishah Yaqub from a court” (70–80-ies of the XV century), “Hunting scene” (1460–1470-ies) provide insight into the development of weapons [2, 193–198, 206]. Among them the most remarkable miniatures “Battle of the reserve with the Bahram Chubin”, “Iskander and dying Darius”, “Iskander in battle”, “Majnun is watching the battle”. Here, in addition to conal helmets depicted so-called “turbaned type”, ringed, and plate-and-ring armor. Compared with previous periods, a lot more images bracers and greaves. Horse armor can be divided into several different types.

Similar samples of the helmets of the 15th century, used in the territory of Azerbaijan, are in the collections of several major museums: Metropolitan Art Museum (New-York), Furusiyya Collection of Museum of the Institute of Arab world (Paris), Askeri Museum (Istanbul) [8, 98, 102, fig. 7; 9, 314, fig.309; 10, 50; 11, 10, fig. 9]. In the Askeri Museum (Istanbul) and the Turkish Chamber of the Dresden Museum (Dresden) stores multiple samples of similar armor of the 15th century. Two of them have the names of the rulers of Aq Qoyunlu, Uzun Hasan and Sultan Yaqub [12, 155; 13, 43, fig.3]. In Askeri Museum (Istanbul) a few samples are stored protective feet and hands, made in the 15th century in the Aq Qoyunlu state [12, 156, 158].

In the early sixteenth century in connection with the establishment of the Safavid state (1501–1736) comes the heyday of Tabriz miniature school. Tabriz was the capital of the state. Rulers, Shah Ismail I (1501–1524), Tahmasp I (1524–1576) was a patron of artists. In Tabriz library worked outstanding calligraphers and painters of the era of Sultan Muhammad, his sons Mirza Ali and Muhammedali, Mir Musavvir and his son Mir Seid Ali, Muzaffar Ali, Sadiq

Bey Afshar, Shah Mahmud Nishapuri, Doust Mohammed and others [3, 15, 19].

Battle miniatures and miniature genre scenes with images of weapons are found in manuscripts of this era. So, by the end of the XV century — 1524 years is illustrated manuscript of the poem "Shahnameh", completed at the time of Shah Ismail I. To 1505–1525 years include miniatures of the manuscripts of the poet Asefi "Gui-and chovgan" and "Dastan-Jamal and Jalal". To 1526–1527 years include the so-called "Houghtons "Shahnameh" — illustrated manuscript of the poem "Shahnameh", completed at the time of Shah Tahmasp I and named after the collector A. Houghton. "Khamsa" of Nizami, dating back to the years 1539–1543, is kept in the library of the British Museum and was illustrated by the best artists of the era.

Arms and weapons are clearly and accurately depicted on the following miniatures from the above manuscripts: "Sleeping Rustam", "Jalal kills divas Samtale", "Jalal kills Pirafghan", "The Battle of Alexander and Darius", "Rustam catches Rakhsh", "Manouchehr returned from the battlefield", "Rustam kills Sohrab", "Rustam before Keykavus", "Death of Piran", "Fight Faramarz with Bahman", "Rustam kills the witch", "Teimuraz and divs", "Combat of Rustam with the Kamus", "Rustam and the seven knights hunt in Turan", "Rustam picks Shangul the spear", "Rustam forced to flee the warrior of Turan", "Combat of Rustam with the warrior of Turan", "Karan kills the Barman", "Bijan forced to flee Farud run", "Fight Farihorz with Kavad", "Kay-Khosrow welcomes his grandfather Kay-Kavus", "Isfandiyar kills the bird Simurg", "Bahram Gur kills the wolf", "A night attack on the camp of drunken Iranian soldiers", "Kay-Khosrow captivated div, who seized the castle of Bahman", "Sohrab steal horse", "Kay-Khosrow kills Afrasiab and avenges the Siyavush", "Bahram Gur hunting" [2, 222–224, 227–230, 242–243, 250–267, 276–280, 287–293; 3, fig. 19, 21, 22, 32, 48, 51, 72, 73, 78; 4, 128, fig. 176; 5, 180–181, 184–187, 189, fig. 84, 89–91, 97–98].

The miniatures are clearly visible helmets, armor, shields, spears, swords, and other weapons used in this era. The sword of this period even more curved. Dramatically increased the image of daggers: with a straight blade, with a curved blade on the belt or waistband. The miniatures depict and a combat knife. The artists clearly show several types of horse armor. For the first time are given the image of a battle axe, as well as symbolic axe.

In the middle of the sixteenth century, the tendency to illustrate the arms of local production was widely spread. Noteworthy, that miniatures "Hunting shah" (from the album of 1540s), "The lion hunt" (from the album of 1550s), "Stirrups and horse", "Falconry" (miniature of Sultan Muhammad to the manuscript of Abdurrahman Jami "Silsilat az-Zahab", 1549s) without illustrations of battle scenes, but they depict the use of various weapons. In the miniature "Feast" which was drawn by artist Mirza Ali (to the manuscript of Jami "Lavach", 1549s) was shown the image of a warrior with a rifle for hunting [2, 180, 300; 3, fig. 72, 73, 78; 4, fig. 176; 5, fig. 97, 98].

Similar samples of Safavid helmets of the 16th century are kept in the State Armory Chamber of the Moscow Kremlin (Moscow) and the National Museum of history of Azerbaijan (Baku) [14, 72, fig. 11; 15, 27]. In these museums are demonstrated similar samples of Safavid armor [14, 94, fig. 18; 15, 72–74]. In the collection of Furusiya (Institute of the Arab world, Paris) stored samples of horse head protection 15–16th centuries, made in the territory of States Kara Koyunlu, Aq Qoyunlu and Safavids [9, 342, fig. 328].

The political peripetias of the era was reflected in Tabriz painting. In connection with removing the capital from Tabriz which was led to the relocation of a number of major artists in Qazvin, Isfahan, and some of them moved farther to India. Some artists had moved or were taken away in Turkey. Some artists moved to Iran. By the beginning of the seventeenth century the quantity and quality of the illustrated miniatures with battle scenes were reduced [3, 29].

Thus, the conducted research shows that the miniatures of Tabriz miniature school of the 15th — 16th centuries can be used as a credible historical sources for the study of arms and weapons of the reviewed epoch. The army of the States of Kara Koyunlu and Aq Qoyunlu was formed mainly Turkic tribes living on the territory of Azerbaijan and neighbouring territories. Army of the Safavid state until the military reforms of the early 17th century also consisted of kyzylbash tribes of Azerbaijan [17, 5, 40–44]. The majority of artists working in Tabriz in the 15th and 16th centuries were natives of Azerbaijan. Researchers have found even the names of more than 30 such artists [16, 188]. Thus, Tabriz miniatures of the 15th — 16th centuries can be seen as a source for the study of weapons used in the territory of Azerbaijan.

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Section 5. Mathematics

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Formula for exact number of pairs of twins of Primes on the segment

Abstract: Using Druzhinin's sieve type of sieve of Eratosthenes for the twin pairs, we consider the question of the exact number of pairs of twin primes on an arbitrary segment.

Keywords: primes, a pair of twins, Sieve of Eratosthenes.

The question of the distribution of pairs of twin (PT) of primes (P) for the whole real axis was raised, apparently, more by Eratosthenes. In the article [1] it was proved that the PT are spread over any distance up to infinity by creating a special type of sieve of Eratosthenes. In this paper, we derive a formula for calculating the exact number of PT on any segment of the real axis. The PT means two primes $\{p_1; p_2\}$. The difference between them is $p_2 - p_1 = 2$. These sets are $\{5; 7\}, \{11; 13\}, \{17; 19\}, \dots, \{311; 313\}, \dots$. Each PT has a center $6\widehat{m}, m \in \mathbb{N}$ — the natural numbers. PT is formed like $\{6\widehat{m} - 1; 6\widehat{m} + 1\}$. For indicated PT $\widehat{m} = \{1; 2; 3; \dots; 52\}$. All indexes m , we divided into two classes: the "good" \widehat{m} that give PT, and "bad" \bar{m} , which do not allow such a pair. For example, $\bar{m} = \{4; 6; 9\}$ give the following pairs of numbers $(6\bar{m} \mp 1) = \{23; 25\}, \{35; 37\}, \{54; 55\}$. To remove the "bad" \bar{m} was proposed the type of sieve of Eratosthenes [1]. On every "good" \widehat{m} have four arithmetic sequence (AS)

$$\begin{aligned} \bar{m} &= \widehat{m} + (6\widehat{m} - 1)n; \bar{m} = (5\widehat{m} - 1) + (6\widehat{m} - 1)(n - 1); \\ \bar{m} &= \widehat{m} + (6\widehat{m} + 1)n; \bar{m} = (5\widehat{m} + 1) + (6\widehat{m} + 1)(n - 1), \end{aligned} \quad (1)$$

where $n \in \mathbb{N}$. For example, the first row $\widehat{m} = 1$ delete $\bar{m} = (4; 6; 9; 11; 14; 16; 19; \dots)$, i. e. all numbers ending in $\langle\langle 1 \rangle\rangle$, $\langle\langle 4 \rangle\rangle$, $\langle\langle 6 \rangle\rangle$, $\langle\langle 9 \rangle\rangle$, other than $\langle\langle 1 \rangle\rangle$. Thus there is a rule: when you sequential walk through \widehat{m} , the first m not deleted by previous \widehat{m} "is also a "good" \widehat{m} . For example, $\widehat{m} = 1$ (1) does not delete $m = 2$, and therefore this number gives a pair of PT. A second example: the AS for set $\widehat{m} = \{1; 2; 3\}$ delete $\bar{m} = (4; 6; 8; 9; 11; 13)$, so the numbers $\widehat{m} = \{5; 7; 10; 12\}$ give PT. Thus it is possible to formulate a rule: if we take the all good $\widehat{m}_k, k = 1; 2; \dots; N$ in ascending order, delete all \bar{m} by (1) and find the first not deleted number \widehat{m}_{N+1} , then there is a buffer zone — a segment $L_N = [\widehat{m}_{N+1}, M_N]$ which contains the all remaining numbers. Moreover these numbers are good. The index M_N is given by $M_N = \left(\left((6\widehat{m}_{N+1} - 1)^2 \pm 1 \right) / 6 \right) - 1$. The sign $\langle\langle + \rangle\rangle$ or $\langle\langle - \rangle\rangle$ is taken from the multiplicity of numerator to denominator. Example. Suppose we have pro-

cessed $\widehat{m} = 1$. Then $\widehat{m}_2 = 2$. $M_1 = \left(\left((6 \cdot 2 - 1)^2 \pm 1 \right) / 6 \right) - 1$. We take the sign $\langle\langle - \rangle\rangle$ and $M_1 = 19$. The bad deleted \bar{m} by the first four AS $\bar{m} = 1 + 5k, \bar{m} = 4 + 5k, \bar{m} = 1 + 7k, \bar{m} = 6 + 7k$ on the segment $[2, 19]$ following

$$(4; 6; 8; 9; 11; 13; 14; 15; 16; 19) \quad (2)$$

The centers of PT remain following

$$\widehat{m} = \{2; 3; 5; 7; 10; 12; 17; 18\}. \quad (3)$$

Thus, the processing of a few PT by (1) gives not only the first not deleted new center, but we get large number of them. In this example, the first PT gives eight additional PT. On this condition we build the formula for exact number of PT on any segment $[a, b]$ of the real axis. First, we must ensure that we are in the buffer zone, ie $b \leq M_N, a \geq \widehat{m}_{N+1}$. Next, it is necessary to consider the deleted \bar{m} , included in $4N$ AS (1) for the all $\widehat{m}_1 = 1 \leq \widehat{m} \leq \widehat{m}_N$, on this segment. Enumerate $\bar{m}_t(s_t)$, where t numbers \bar{m} in ascending order, s_t indicates how many times this \bar{m}_t is deleted by different AS. If such indexation carried out, then on $[a, b]$ there is the following number of PT

$$c(a : b) = (b - a + 1) - N_{ab}. \quad (4)$$

The number of bad \bar{m} is $N_{ab} = N_{ab}(1) - N_{ab}(2) + N_{ab}(3) - \dots - (-1)^{k+1} N_{ab}(k)$ on this segment, where $N_{ab}(k)$ is the number of bad indexes \bar{m} deleted k times.

There is the general rule for calculating the number $N_{ab}(s)$ — the deleted members of the AS $d_k = \alpha + \beta(k - 1), k \in \mathbb{N}$ on the segment $[a, b]$. If $b < \alpha, N_{ab}(1) = 0$. If $b \geq \alpha$ and using the theory of comparisons $a \equiv \alpha \pmod{\beta}$ and (or) $b \equiv \alpha \pmod{\beta}$, then

$$N_{ab}(s) = \left[\frac{b - a}{\beta} \right] + 1. \quad (5)$$

In all other cases, there is no $\langle\langle + 1 \rangle\rangle$ in (5). Square brackets denote the greatest integer number not exceeding the number in brackets. In the above example $\bar{m} = 1 + 5k$ gives a $\langle\langle 3 \rangle\rangle$, $\bar{m} = 4 + 5k$ gives $\langle\langle 4 \rangle\rangle$, $\bar{m} = 1 + 7k$ and $\bar{m} = 6 + 7k$ give $\langle\langle 2 \rangle\rangle$

deleted numbers. Total «11» numbers are deleted. Thus number $\bar{m} = 6$ deleted 2 times, as $1 + 5 \cdot 1 = 6 + 7 \cdot 0 = 6$. Therefore, in general the number of deletions is «10», as there is in (2).

To find the double, triple or more deletions necessary to solve Diophantine equations of the AS, included in (1). In this example, there are the equations:

$1 + 5k = 1 + 7t$ gives $\bar{m} = 1 + 35k$; $1 + 5k = 6 + 7t$ gives $\bar{m} = 6 + 35k$; $4 + 5k = 1 + 7t$ gives $\bar{m} = 29 + 35k$; $4 + 5k = 6 + 7t$ gives $\bar{m} = 34 + 35k$.

They give bad \bar{m} , which are deleted twice by the first four equations. When taking the next \hat{m} , there are triple, quadruple and so on deletions. For example, $1 + 5k = 6 + 7t = 2 + 13s$ give $\bar{m} = 41 + 455k$ that only these AS always deleted three times. Thus, we note that if the number \bar{m} is deleted n times, his contribution in $N_{ab}(k)$ is $C_n^k = n! / k!(n-k)!$ times.

As a final example, we calculate the number of PT in the buffer zone L_3 . We use twelve AS on $\hat{m}_1 = 1, \hat{m}_2 = 2, \hat{m}_3 = 3$. The first not deleted number is $\hat{m}_4 = 5$. It gives the PT $\{29; 31\}$. We are looking for the right border area:

$M_3 = \left(\left((6 \cdot 5 - 1)^2 \pm 1 \right) / 6 \right) - 1 = \left((841 \pm 1) / 6 \right) - 1$. We have $L_3 = [5, 139]$. These AS delete $N_3(1) = 166$ numbers one time, deleted $N_3(2) = 79$ numbers twice, deleted $N_3(3) = 21$ numbers three times, deleted $N_3(4) = 2$ numbers four times. These numbers are $\bar{m} = 41$ and $\bar{m} = 54$. In result the number of PT coincides with the fact $L_3 = [5, 139] (5; 139) = 139 - 5 + 1 - 166 + 79 - 21 + 2 = 29$.

This calculation scheme tested by us up to $m = 10000000$ and gives the exact number of PT. This scheme of calculating the number of PT also points to their distribution on the whole real axis, up to infinity. In sum

$$c(a, b) = (b - a + 1) - N_{ab}(1) + N_{ab}(2) - N_{ab}(3) + \dots + (-1)^{k+1} N_{ab}(k) \quad (6)$$

we have an alternating structure in which each subsequent summand modulo less than the previous one, but with the growth of b these modules increase. Therefore, obtaining a finite number of PT on the entire axis is impossible, i. e. it is infinite.

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About invariance in problem heat of exchange with border management

Abstract: In given work is considered the question about strong and weak invariance of constant ambiguous image for equations heat of exchange with border management. Sufficient conditions are received for strong or weak invariance given ambiguous image.

Keywords: the invariant ensemble, management, ambiguous image, system management with portioned parameters.

1. Introduction

Let $Az = \sum_{i,j=1}^n \frac{\partial}{\partial x_i} \left(a_{ij}(x) \frac{\partial z}{\partial x_j} \right)$, $Pz = \frac{\partial z}{\partial n} + h(x)z$, $x \in \Omega$,

where $a_{ij}(x) = a_{ji}(x) \in C^1(\Omega)$, $i, j = 1, \dots, n$, Ω – limited area in R^n with the piecewise-smooth boundary, A – elliptical differential operator, i. e. exists positive constant γ such that $\sum_{i,j=1}^n a_{ij}(x) \xi_i \xi_j \geq \gamma \sum_{i=1}^n \xi_i^2$, for any $x \in \bar{\Omega}$ and real number ξ_1, \dots, ξ_n , $\sum_{i=1}^n \xi_i^2 \neq 0$, $h(x)$ – given positive continuous function,

$\frac{\partial z}{\partial n}$ – derivative with respect to the outer normal to the boundary of Ω at point $x \in \partial\Omega$.

Consider the problem of thermal management [1, 30–35]

$$\frac{\partial z(t, x)}{\partial t} = Az(t, x), 0 < t \leq T, x \in \Omega \quad (1)$$

with boundary and initial conditions

$$Pz(t, x) = u(t, x), 0 \leq t \leq T, x \in \partial\Omega, \quad (2)$$

$$z(0, x) = z^0(x), x \in \Omega, \quad (3)$$

here $z = z(t, x)$ – unknown function, T – arbitrary positive constant, $z^0(\cdot) \in L_2(\Omega)$ – the initial function. Governance is a measurable function $u(\cdot, \cdot) \in L_2(S_T)$, where $S_T = \{(t, x) | t \in [0, T], x \in \partial\Omega\}$.

In [1, 23–39] that in any $u(\cdot, \cdot) \in L_2(S_T)$ and $z^0(\cdot) \in L_2(\Omega)$ the problem (1) – (3) has a unique solution $z = z(t, x)$ Hilbert space $\dot{W}_2^{1,0}(Q_T)$, where $Q_T = \{(t, x) | t \in (0, T), x \in \Omega\}$, consisting of elements of the space $L_2(Q_T)$, with square-

integrable on Q_T generalized derivatives $z_{x_i}, i = 1, \dots, n$. It is known that an elliptic operator A with the boundary condition $Pz(t, x) = 0, 0 \leq t \leq T, x \in \partial\Omega$ has a discrete spectrum, ie, eigenvalues λ_k , such that $0 < \lambda_1 \leq \lambda_2 \leq \dots \leq \lambda_k \rightarrow +\infty$, and the corresponding eigenfunctions $\varphi_k(x), x \in \Omega$, constitute a complete orthonormal system $L_2(\Omega)$.

Fourier method define the solution of the problem (1) – (3). If after $f_k(\cdot)$ It marked the Fourier coefficients $f(\cdot)$ relative to the system $\{\varphi_k\}$, the solution of the problem (1) – (3) has the form

$$z(t, x) = \sum_{k=1}^{\infty} \left(z_k^0 e^{-\lambda_k t} + \int_0^t \int_{\partial\Omega} u(\tau, s) \varphi_k(s) ds \right) e^{-\lambda_k(t-\tau)} d\tau \varphi_k(x), \quad (4)$$

$0 \leq t \leq T, x \in \Omega$.

Further, through U the set of controls that are specified below by some positive number ρ .

Definition 1. The multi-valued mapping $D: [0, T] \rightarrow 2^R$, where $R = (-\infty, \infty)$ called strongly invariant with respect to the problem (1) – (3), if any $\langle z^0(\cdot) \rangle_{L_2(\Omega)} \in D(0)$ and $u(\cdot, \cdot) \in U$ the inclusion $\langle z(t, \cdot) \rangle \in D(t)$ for all $0 < t \leq T$, where $\langle \cdot \rangle$ – corresponding norm, $z(\cdot, \cdot)$ – an appropriate solution of the problem (1)–(3) [2, 266–276; 3, 232–233].

Definition 2. The multi-valued mapping $D: [0, T] \rightarrow 2^R$, where $R = (-\infty, \infty)$ It is weakly invariant with respect to the problem (1) – (3), if any $\langle z^0(\cdot) \rangle_{L_2(\Omega)} \in D(0)$ there is management $u(\cdot, \cdot) \in U$ such that $\langle z(t, \cdot) \rangle \in D(t)$ for all $0 < t \leq T$, where $\langle \cdot \rangle$ – the relevant rules, $z(\cdot, \cdot)$ – an appropriate solution of the problem (1) – (3).

2. Statement of the problem

In this paper we investigate the weak and strong invariance continuous multivalued mapping type $D(t) = [0, b], 0 \leq t \leq T$, where b – the positive constant.

Our, next goal is to find the connection between the parameters T, b, ρ so as to provide strong or weak invariance multi-valued mapping $D(t), t \in [0, T]$ with respect to the problem (1) – (3) [4, 27–29].

3. Main results.

A) Let $\langle z(\cdot, \cdot) \rangle = \|z(\cdot, \cdot)\|_{\mathfrak{H}}$

$$U = \left\{ u(\cdot, \cdot) : \sqrt{\sum_{k=1}^{\infty} \left(\int_{\partial\Omega} u(t, s) \phi_k(s) dx \right)^2} \leq \rho, t \in [0, T] \right\}.$$

Here $\|z(\cdot, \cdot)\| = \sqrt{\int_0^T \|z(t, \cdot)\|^2 dt} = \sqrt{\sum_{k=1}^{\infty} \int_0^T z_k^2(t) dt}$.

We introduce the following function

$$g(t) = be^{-\lambda_1 t} + \rho \left(\frac{1 - e^{-\lambda_1 t}}{\lambda_1} \right), 0 \leq t \leq T. \quad (5)$$

Proposition: For any positive parameters b, ρ the following equalities

$$\sup_{0 \leq t \leq T} g(t) = \begin{cases} b, & \text{if } \rho \leq \lambda_1 b, \\ \frac{\rho}{\lambda_1} + \left(b - \frac{\rho}{\lambda_1} \right) e^{-\lambda_1 T}, & \text{if } \rho > \lambda_1 b. \end{cases} \quad (6)$$

Proof of Proposition: We investigate the extremum function $g(t)$ a segment $[0, T]$. We compute the derivative

$g'(t) = e^{-\lambda_1 t} (\rho - \lambda_1 b)$. Hence it is easy to show that if $\rho \neq \lambda_1 b$ then $g'(t) \neq 0$, if $\rho \leq \lambda_1 b$ the function $g(t)$ kills, but $\rho > \lambda_1 b$ the function $g(t)$ increases. Consequently,

$$\sup_{0 \leq t \leq T} g(t) = \begin{cases} b, & \text{if } \rho \leq \lambda_1 b, \\ \frac{\rho}{\lambda_1} + \left(b - \frac{\rho}{\lambda_1} \right) e^{-\lambda_1 T}, & \text{if } \rho > \lambda_1 b. \end{cases}$$

Theorem 1. If either $\rho \leq \lambda_1 b, T \leq 1$, or $1 < \rho/(\lambda_1 b) \leq (1 - \sqrt{T} e^{-\lambda_1 T}) / (\sqrt{T} (1 - e^{-\lambda_1 T}))$, the multi-valued mapping $D(t), t \in [0, T]$, strongly invariant with respect to the problem (1) – (3).

Theorem 2. If $2\lambda_1 \geq 1$, the multi-valued mapping $D(t), t \in [0, T]$, weakly invariant with respect to the problem (1) – (3).

Proof of Theorem 1. We show that for any $\|z^0(\cdot)\| \leq b$ and $\|u(\cdot, \cdot)\| \leq \rho$ the inclusion $\|z(\cdot, \cdot)\| \in D(t), 0 \leq t \leq T$.

$$\begin{aligned} \|z(\cdot, \cdot)\|^2 &= \int_{\Omega} |z(t, x)|^2 dx = \sum_{k=1}^{\infty} z_k^2(t) = \\ &= \sum_{k=1}^{\infty} \left(z_k^0 e^{-\lambda_k t} + \int_0^t e^{-\lambda_k(t-\tau)} \int_{\partial\Omega} u(\tau, s) \varphi_k(s) ds d\tau \right)^2 = \\ &= \sum_{k=1}^{\infty} \left[z_k^0{}^2 e^{-2\lambda_k t} + 2e^{-\lambda_k t} \int_0^t e^{-\lambda_k(t-\tau)} \left(\sum_{k=1}^{\infty} z_k^0 \left| \int_{\partial\Omega} u(\tau, s) \varphi_k(s) ds \right| \right) d\tau + \right. \\ &\quad \left. + \sum_{k=1}^{\infty} \left(\int_0^t e^{-\lambda_k(t-\tau)} \int_{\partial\Omega} u(\tau, s) \varphi_k(s) ds d\tau \right)^2 \right]. \end{aligned}$$

Now, applying double inequality Koshi-Bunyakovskiy have

$$\|z(t, \cdot)\|^2 \leq b^2 e^{-2\lambda_1 t} + 2b\rho e^{-\lambda_1 t} \int_0^t e^{-\lambda_1(t-\tau)} d\tau + \left(\frac{1 - e^{-\lambda_1 t}}{\lambda_1} \right)^2 \rho^2.$$

Consequently, $\|z(t, \cdot)\| \leq be^{-\lambda_1 t} + \rho \left(\frac{1 - e^{-\lambda_1 t}}{\lambda_1} \right)$. (7)

From (5), (6) and (7) the following relations $\|z(\cdot, \cdot)\|^2 = \int_0^T \|z(t, \cdot)\|^2 dt \leq \int_0^T |z(t)|^2 dt \leq \left(\sup_{0 \leq t \leq T} g(t) \right)^2 T$.

Let $\rho \leq \lambda_1 b, T \leq 1$. Then we have $\|z(\cdot, \cdot)\| \leq \sup_{0 \leq t \leq T} g(t) \sqrt{T} = g(0) \sqrt{T} = b \sqrt{T} \leq b$.

Let $1 < \rho/(\lambda_1 b) \leq (1 - \sqrt{T} e^{-\lambda_1 T}) / (\sqrt{T} (1 - e^{-\lambda_1 T}))$. Then

$$\|z(\cdot, \cdot)\| \leq \sup_{0 \leq t \leq T} g(t) \sqrt{T} = g(T) \sqrt{T} = \left[be^{-\lambda_1 T} + \frac{\rho}{\lambda_1} (1 - e^{-\lambda_1 T}) \right] \sqrt{T} \leq b.$$

Consequently, $D(t), 0 \leq t \leq T$ much invariant. Theorem 1 is proved.

The proof of Theorem 2, the proof of Theorem 1.

B) Let $\langle z(t, \cdot) \rangle = \|z(t, \cdot)\|$ and

$$U = \left\{ u(\cdot, \cdot) : \sqrt{\sum_{k=1}^{\infty} \int_0^T \left(\int_{\partial\Omega} u(t, s) \phi_k(s) dx \right)^2 dt} \leq \rho \right\}.$$

Theorem 3. If $\rho > 0$, the multi-valued mapping $D(t), t \in [0, T]$, not much is invariant with respect to the problem (1) – (3) in the time interval $[0, T]$, where T – any positive number.

Proof of Theorem 3. Let $\rho > 0$. In the proof of the theorem essentially it takes advantage of the fact that the value

of the control can be made arbitrarily large enough small time interval. For this purpose, we choose the initial data as follows: $z_1^0 = b, z_k^0 = 0, k = 2, \dots$, for every positive $t \leq T$ management $u(\tau)$ in the interval $[0, t]$ defined as a function of the form $u_1(\tau) = \frac{e^{\lambda_1 \tau}}{\sqrt{\int_0^t e^{2\lambda_1 s} ds}} \rho, u_k(\tau) = 0, 0 \leq \tau \leq t, k = 2, \dots$

It is easy to notice so the selected control is valid. Then from the representation of the solution of the problem (1) – (3) have $z(t) = \left(e^{-\lambda_1 t} z_1^0 + \int_0^t e^{-\lambda_1(t-\tau)} u_1(\tau) d\tau \right) \phi_1, 0 \leq t \leq T$.

Means

$$\|z(t)\| = e^{-\lambda_1 t} \left| b + \rho \int_0^t \frac{e^{2\lambda_1 \tau}}{\sqrt{\int_0^t e^{2\lambda_1 s} ds}} d\tau \right| = e^{-\lambda_1 t} \left(b + \rho \sqrt{\int_0^t e^{2\lambda_1 s} ds} \right). \quad (8)$$

If we introduce the notation $\chi(t) = \|z(t)\|$, from (8) we have $\chi(0) = b$ and

$$\chi'(t) = e^{-\lambda_1 t} \left(-\lambda_1 b - \lambda_1 \rho \sqrt{\int_0^t e^{2\lambda_1 s} ds} + \frac{\rho}{2} \frac{e^{2\lambda_1 t}}{\sqrt{\int_0^t e^{2\lambda_1 s} ds}} \right).$$

Hence it is easy to see that for sufficiently small positive $t, \chi'(t) > 0$, i.e. $\chi(t) > b$ at the same values t . Therefore $\|z(t)\| \in D(t)$ not for all $t \geq 0$. Theorem 3 is proved.

Note. As a note, you can show that the multi-valued mapping $D(t), 0 \leq t \leq T$ always weakly invariant with respect to the problem (1) – (3).

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About the generalized continuity of functions in points of convergence of their spectral expansion connected with Schrödinger’s operator

Abstract: It is paper proved that if spectral decomposition of any function in some point is summarized by Riesz’s means, its average value about α in the specified point possesses the generalized continuity.

Keywords: eigenfunction, eigenvalues, spectral expansion, Riesz’s means, generalized continuity, summability, operator Schrödinger.

Let $\Omega \subset R^3$ any limited area with smooth border of $\partial\Omega \in CR^\infty$, and let $q(x)$ -non-negative function from a class $L_2(\Omega)$.

We will consider, Schrödinger’s operator of $L(x, D) = -\Delta + q(x)$ with range of definition of $C_0^\infty(\Omega)$. Let the operator H be one of self-conjugate expansions of the operator L with a discrete range. We will designate through $\mu_n = \sqrt{\lambda_n}$ own values, and through $u_n(x)$ corresponding own functions of this operator, i.e. $Hu_n = \lambda_n u_n(x)$.

Spectral expansion of any function $f \in L_2(\Omega)$ has an appearance

$$E_\lambda f(x) = \sum_{\lambda_n < \lambda} f_n u_n(x). \quad (1)$$

and Riesz’s mean of an order s are defined by equality

$$E_\lambda^s f(x) = \sum_{\lambda_n < \lambda} \left(1 - \frac{\lambda_n}{\lambda} \right)^s f_n u_n(x) = \int_0^\lambda \left(1 - \frac{t}{\lambda} \right)^s dE_t f. \quad (2)$$

Average value about $\alpha \geq 0$ functions $f(x)$ in this point x is defined as follows:

$$S_R^\alpha f(x) = \frac{\Gamma(\alpha + 3/2)}{\pi^{3/2} \Gamma(\alpha) R^3} \int_{|y| \leq R} \left(1 - \frac{|y|^2}{R^2} \right)^{\alpha-1} f(x+y) dy. \quad (3)$$

Теорема 1. Let $f \in L_2(\Omega)$. We assume that at some $s > 0$ in a point $x \in \Omega$ spectral function expansion $f \in L_2(\Omega)$ it is summarized by Riesz's means of order s . Then for any $\alpha > \max\left\{\frac{1}{2}, s\right\}$ fairly following statement: $\lim_{R \rightarrow 0} S_R^\alpha f(x) = f(x)$.

Before proving this theorem, we will establish justice of several lemmas. For any function $g(t)$ having $t \geq 0$ locally limited variation on a half-line, we will enter its averages of Riesz following in a way:

$$g^s(\lambda) = \int_0^\lambda \left(1 - \frac{t}{\lambda}\right)^s dg(t).$$

Lemma 1. Let $g(t)$ be the function of local bounded variation on the half-line $t \geq 0$ and for some $\beta > 0$ the following inequality

$$\int_0^\infty t^{-\beta} |dg(t)| < \infty$$

is valid. Set

$$g^s(\lambda) = \int_0^\lambda \left(1 - \frac{t}{\lambda}\right)^s dg(t).$$

If $l > \beta + s + 1/2$ then the following equality

$$\begin{aligned} & \int_0^\infty (R\sqrt{t})^{-l} J_l(R\sqrt{t}) dg(t) = \\ & = 2^{-s-1} \frac{R^{s+1-l}}{\Gamma(s+1)} \int_0^\infty (\sqrt{\lambda})^{-l+1+s} J_{l+1+s}(R\sqrt{\lambda}) E_\lambda^s f d\lambda \end{aligned} \quad (4)$$

is valid.

Proof see [4. 29–31].

Lemma 2. Let $\alpha > -\frac{1}{2}$. Then

$$2^l \Gamma(l+1) \int_0^\infty (R\sqrt{\lambda})^{-l} J_l(R\sqrt{\lambda}) dE_\lambda f(x) = S_R^\alpha f(x) \quad (5)$$

and integral converges absolutely and uniformly.

Proof see [1. 255–258].

Comparing the relation (4) and (5), we receive equality

$$\begin{aligned} S_R^\alpha f(x) &= 2^{\alpha-s-1/2} \frac{\Gamma(\alpha+3/2)}{\Gamma(s+1)} R^{s-\alpha-1/2} \times \\ & \times \int_0^\infty \lambda^{-\frac{\alpha-s+3/2}{2}} J_{\alpha+s+3/2}(R\sqrt{\lambda}) E_\lambda^s f d\lambda \end{aligned} \quad (6)$$

Designating $E_\lambda^s f = g^s(\lambda)$ and after, replacement of change of $t = R\sqrt{\lambda}$ we receive the following

$$S_R^\alpha f(x) = 2^{\alpha-s-1/2} \frac{\Gamma(\alpha+3/2)}{\Gamma(s+1)} \int_0^\infty g(\lambda R^{-2}) t^{-\frac{\alpha-s+3/2}{2}} J_{\alpha+s+3/2}(\sqrt{t}) dt \quad (7)$$

Lemma 3. Let $\alpha > 0$. We will designate

$$L_n(R, t) = \int_t^R \left(1 - \frac{r^2}{R^2}\right)^{\alpha-1} r \cos \mu_n(r-t) dr, \quad (8)$$

$0 < t < R$.

Then the following assessment is fair $L_n(R, t) = O(R^2)$.

Proof see [2. 238–239].

Lemma 4. We will put

$$I_n = \frac{1}{\mu_n} \int_0^R \left(1 - \frac{r^2}{R^2}\right)^{\alpha-1} r dr \int_0^r \sin \mu_n(r-t) \xi_n(t) dt. \quad (9)$$

Then, for any $\alpha > 0$ the following assessment is

$$\sum_{n=1}^\infty |I_n(R)|^2 = O(R^7). \quad (10)$$

Proof of the lemma 4. We enter the following function

$$h(y) = \begin{cases} \frac{q(a+y)}{|y|}, & \text{если } |y| \leq r, \\ 0, & \text{если } |y| > r. \end{cases}$$

Fourier's coefficients of function $h(y)$ are equal $\beta_n(r) = \int_\Omega h(y) u_n(y) dy$.

Passing to spherical coordinates, we will receive

$$\begin{aligned} \beta_n(r) &= \int_{|y| \leq r} \frac{q(a+y)}{|y|} u_n(a+y) dy = \\ &= \int_0^r \int_t^r \int_\theta q(a+t\theta) u_n(a+t\theta) d\theta = \int_0^r \xi_n(t) t dt. \end{aligned}$$

Having differentiated this equality, we will receive $\beta_n'(r) = r \xi_n(r)$. Further we will square $|\beta_n(r)|$ and we will summarize on, using Parseval's equality:

$$\sum_{n=1}^\infty |\beta_n(r)|^2 = \int_{|y| \leq r} \left| \frac{q(a+y)}{|y|} \right|^2 dy \leq \|q\|_{L_2(\Omega)}^2 \int_{|y| \leq r} \frac{dy}{|y|^2} = O(r) \quad (11)$$

Then

$$\begin{aligned} I_n &= \frac{1}{\mu_n} \int_0^R \left(1 - \frac{r^2}{R^2}\right)^{\alpha-1} r dr \int_0^r \sin \mu_n(r-t) \xi_n(t) dt = \\ &= \frac{1}{\mu_n} \int_0^R \left(1 - \frac{r^2}{R^2}\right)^{\alpha-1} r dr \int_0^r \sin \mu_n(r-t) \beta_n'(t) dt. \end{aligned}$$

Integrating in parts $\int_0^r \sin \mu_n(r-t) \beta_n'(t) dt$ integral, we

will receive

$$\begin{aligned} \int_0^r \sin \mu_n(r-t) \beta_n'(t) dt &= \sin \mu_n(r-t) \beta_n(t) \Big|_{t=0}^r + \mu_n \int_0^r \cos \mu_n(r-t) \beta_n(t) dt \\ &= \mu_n \int_0^r \cos \mu_n(r-t) \beta_n(t) dt \end{aligned}$$

Hence,

$$I_n = \int_0^R \left(1 - \frac{r^2}{R^2}\right)^{\alpha-1} r dr \int_0^r \cos \mu_n(r-t) \beta_n(t) dt.$$

We will change an integration order

$$I_n = \int_0^R \beta_n(t) dt \int_t^R \left(1 - \frac{r^2}{R^2}\right)^{\alpha-1} r \cos \mu_n(r-t) dr. \quad (12)$$

According to definition (8) equality (12) can be written down in the following look $I_n = \int_0^R L_n(R, t) \beta_n(t) dt$. On a lemma 3

$$|I_n(R)| = O(R^2) \int_0^R |\beta_n(t)| dt.$$

Further, follows from Parseval's equality:

$$\sum_{n=1}^\infty |I_n(R)|^2 = O(R^5) \int_0^R \sum_{n=1}^\infty |\beta_n(t)|^2 dt = O(R^5) \int_0^R O(t) dt = O(R^7).$$

The lemma 4 is proved.

Consequence. $\frac{1}{R^3} \sum_{n=1}^\infty f_n I_n(R) = O(\sqrt{R}) \|f\|_{L_2(\Omega)}$. (13)

On Weber formula [1. Ch.II, p. 230.], average value of function F equals

$$\begin{aligned}
 S_R^\alpha f(x) &= \frac{\Gamma(\alpha + 3/2)}{\pi^{3/2}\Gamma(\alpha)R^3} \int_{|y| \leq R} \left(1 - \frac{|y|^2}{R^2}\right)^{\alpha-1} f(x+y) dy = \\
 &= C_\alpha \sum_{n=1}^{\infty} \frac{J_{\alpha+1/2}(R\mu_n)}{(R\mu_n)^{\alpha+1/2}} f_n u_n(x) + \\
 &+ \frac{\Gamma(\alpha + 3/2)}{\pi^{3/2}\Gamma(\alpha)R^3} \sum_{n=1}^{\infty} \frac{f_n}{\mu_n} \int_0^R \left(1 - \frac{r^2}{R^2}\right)^{\alpha-1} r dr \int_0^r \sin \mu_n(r-t) \xi_n(t) t dt.
 \end{aligned} \tag{14}$$

where $C_\alpha = 2^{\alpha+\frac{1}{2}} \Gamma(\alpha + \frac{3}{2})$. We enter the following function

$$\varphi_\alpha(t) = C_\alpha \frac{J_{\alpha+\frac{1}{2}}(t)}{t^{\alpha+\frac{1}{2}}}, \quad \varphi_\alpha(0) = 1.$$

Then for average value (14) in compliance (5) and (9) we will gain the following impression:

$$S_R^\alpha f(x) = \sum_{n=1}^{\infty} \phi_\alpha(R\mu_n) f_n u_n(x) + \frac{\Gamma(\alpha + 3/2)}{\pi^{3/2}\Gamma(\alpha)R^3} \sum_{n=1}^{\infty} f_n I_n(R)$$

The first representation composed in integrated has an appearance (5). It agrees (10) and (13)

$$\begin{aligned}
 S_R^\alpha f(x) &= 2^{\alpha-s-1/2} \frac{\Gamma(\alpha + 3/2)}{\Gamma(s+1)} \int_0^\infty g(\lambda R^{-2}) t^{-\frac{\alpha-s+3/2}{2}} J_{\alpha+s+3/2}(\sqrt{t}) dt + \\
 &+ O(\sqrt{R}) \|f\|_{L_2(\Omega)}
 \end{aligned} \tag{15}$$

Proof of the theorem 1. In equality we will designate (15) subintegral function

$$F_R(t) = g^s(tR^{-2})(\sqrt{t})^{-l-1+s} J_{l+s+1}(\sqrt{t}).$$

On a theorem condition 1 limit of function $g^s(t)$ at $t \rightarrow \infty$ exists therefore this function is limited. In that case follows from asymptotic estimates of function of Bessel that $F_R(t) \leq F(t)$, where $F(t)$ — the integrated function.

This assessment allows to apply Lebesgue's theorem of limit transition under a sign of integration, we receive

$$\lim_{R \rightarrow 0} S_R^\alpha f(x) = f(x).$$

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Section 6. Materials Science

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Influence of technological parameters of polarization on the electrical properties composite of polymeric materials

Abstract: The article examines the impact of modifications to the physical properties of composite polymer materials. It is shown that constant exposure to high electric field produces composite polymeric materials with improved electro physical properties.

Keywords: composite polymer materials, epoxy resin, physical modification, a constant electric field, electric tension, polarization.

The development of technology advances increasingly acute problem of creating materials, the structure of which the direction is organized under the influence of operational factors. For the directional changes in the structure and properties of composite polymer materials (CPM) used various methods of physical modifications. One of the promising directions in the solution of this problem is the use of physical fields — electric, magnetic, nuclear, etc.

Currently, for the modification of polymers and fillers in the preparation and processing of CPM are increasingly using physical methods of influence, providing the activation materials and their high level of performance. In many cases, the processes of obtaining the CPM under the influence of physical fields accompanied by deformation and electrical phenomena that lead to the electrification and change the properties of the polymer system. Occurrence of excessive uncompensated charge and polarization determines the system to an electret state, which significantly affects the electrical, mechanical and other properties of the polymers. Rational use of the electret state as a means of regulating the interaction between the components in the preparation of composites and performance properties of the CPM involves large reserves of increase of efficiency of application of polymeric materials in the technique [1].

Due to the orientation of the segments of the macromolecules in polarized polymers there occur orientation phenomena affecting the electrical properties of polymers. At the same time there is a change of structure, consisting in ordering the structure, strengthening intermolecular interactions and increase the degree of cure. All this leads to an improvement in the electrical properties, and increase of physical and mechanical properties of the CPM [2].

To determine the effect of polarization on the properties of polymeric materials there have been studied electrical properties depending on CPM, epoxy resin ED-16 and furan-epoxy resin FAED-20, the electric field intensity and polarization time during curing in a static electric field. As seen from the results of research (Figure 1), values ρ_v and ρ_s polymeric coatings based on epoxy binder with increasing intensity of the polarizing field, with constant polarization time $t_p=30$ min. it increases exponentially and reaches limits when $E_p=4,5-5,0$ kV/cm. Apparently, this is due to the increase in structural ordering of the polymer coating on the growth of the electric field, which leads to an increase in the degree of crosslinking, which subsequently reach the limit values.

Changes in $\text{tg}\delta$ and ϵ epoxy coatings have the opposite character with increasing intensity of the polarizing field (Figure 2). Dielectric loss $\text{tg}\delta$ monotonically decreases and reaches a minimum value at $E_p=5-6$ kV/cm, whereas the permittivity of ϵ increases monotonically, approaching the limit values for electric field $E_p=4,5-5,0$ kV/cm. When the polarization electric field acting on the segments of the macromolecules leads to an orientation relative to each other, and consequently leads to reduction of $\text{tg}\delta$. The higher the intensity of the polarizing field, the more the degree of orientation and the lower the value of $\text{tg}\delta$. Furthermore, an increase in the amount of structuring polymer coating and the stiffness of the spatial structure with increasing quantities E_p leads to reduced mobility of macromolecular segments and hence the dielectric loss. Also, the findings suggest the existence of residual polarization responsible for the relatively high ϵ and low dielectric loss $\text{tg}\delta$ polarization at a given temperature T_p . Changes ρ_v , ρ_s , $\text{tg}\delta$ and ϵ in dependence on the strength of the polarizing field coating resin FAED-20 have a similar charac-

ter. As seen from the results of research (Figure 1 and 2), with an increase in E_p observed monotonic increase values ρ_v , ρ_s and

ϵ polymer coatings and reduced $\text{tg}\delta$ to the limits and at the same time the value of E_p is within $5,0 \div 5,5 \text{ kV/cm}$.

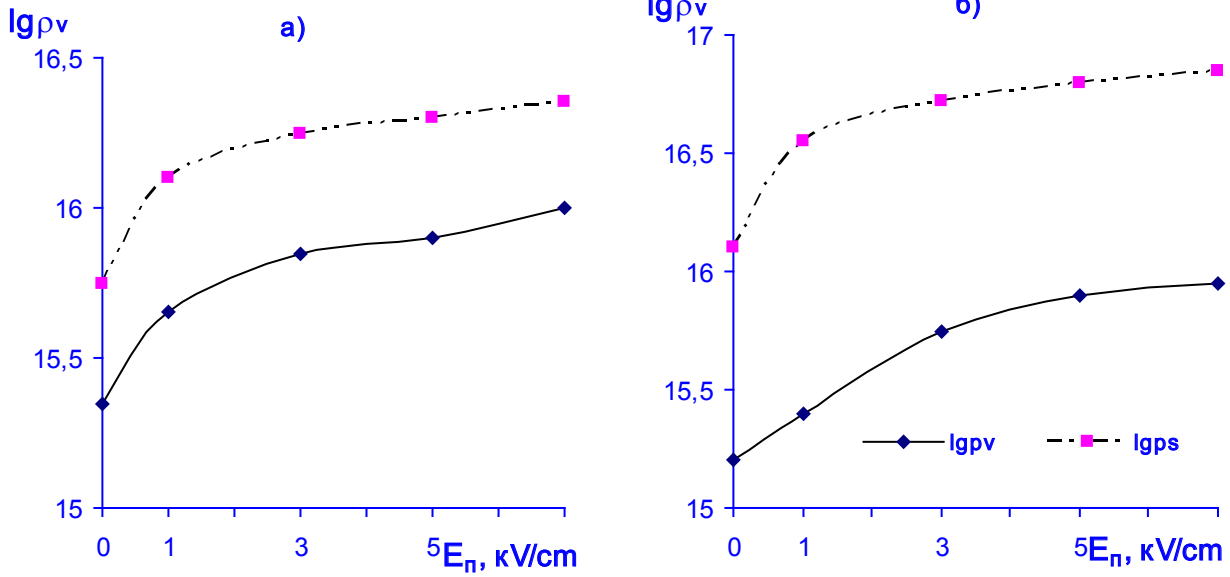


Fig. 1. Dependence of $\lg \rho_v$ and $\lg \rho_s$ samples CPM used on the ED-16 (a) and FAED-20 (b) the strength of the polarizing field

Figure 3 and 4 show the results of a study based on electrical properties of polymer coatings on the basis of ED-16 and FAED-20 of the polarization time t_p at a constant value of the electric field strength ($E_p=5,0 \text{ kV/cm}$). As seen from Figure 3, with increasing polarization time t_p samples by curing them in an electric field, a specific volume ρ_v and specific surface ρ_s resistance of coatings based on resin ED-16 exponentially increases and at $t_p=30 \div 40 \text{ min}$ reach the limit values. A further increase in

t_p does not lead to a noticeable increase ρ_v and ρ_s coatings. Obviously, this can be explained by the fact that the processes of ordering of supramolecular structure of the polymer, creating a centered state, increasing structural uniformity, occurring under the influence of a constant electric field in epoxy coatings is substantially complete at this time and will not change significantly as a result of a sharp increase in the viscosity of the polymer.

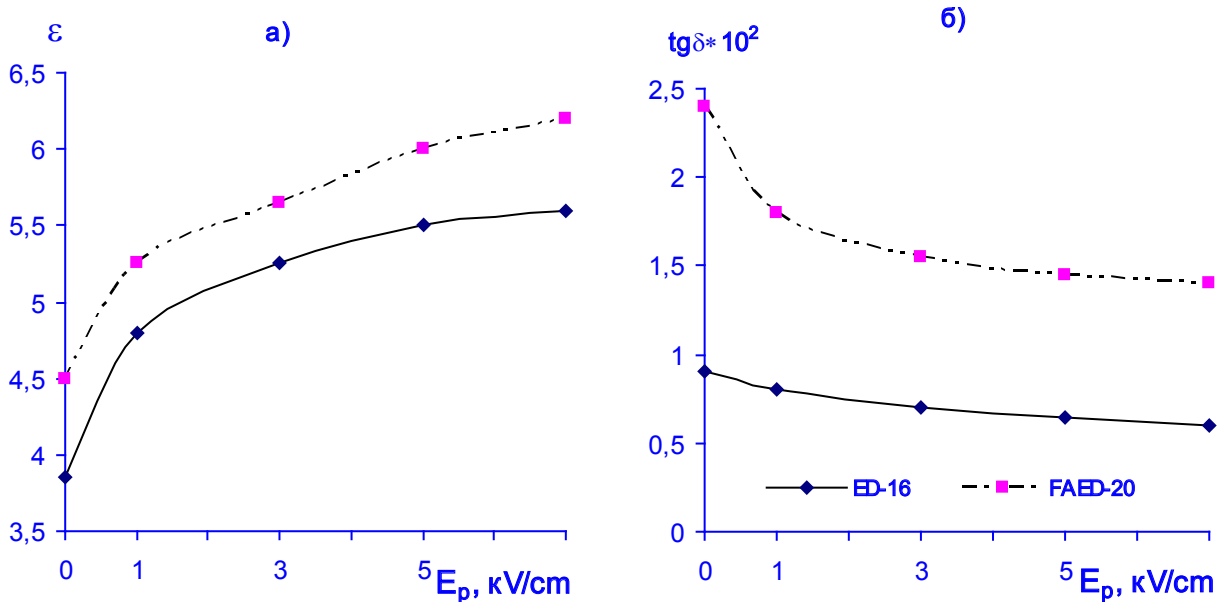


Fig. 2. Dependence of ϵ (a) and $\text{tg}\delta$ (b) samples CPM the strength of the polarizing field

Changes of $\text{tg}\delta$ and ϵ polymeric coatings based on epoxy binder, and are not linear (Figure 3). If $\text{tg}\delta$ monotonically decreases, it reaches a minimum stable value, the ϵ , on the contrary, increasing up to the maximum limits at $t_p=30 \div 40 \text{ min}$.

In the works [3, 4], also noted the increase in ϵ upon curing of organic substances in an electric field. The effect is attributed to the formation of dipoles associates — polar groups. The increase ϵ in the formation of electrets in strong fields, explain sometimes the increasing number of charge carriers in the polymer as a result of the injection or ionization.

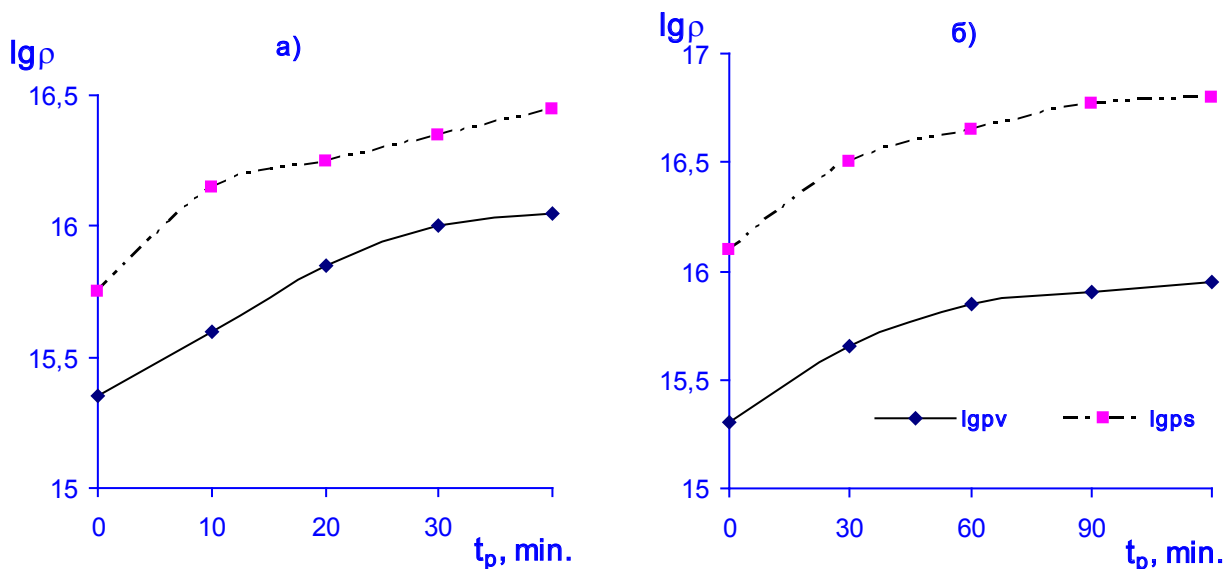


Fig. 3. Dependence of $lg\rho_v$ and $lg\rho_s$ samples CPM based on the ED-16 (a) and FAED-20 (b) from the polarization time ($E_p=5$ kV/cm)

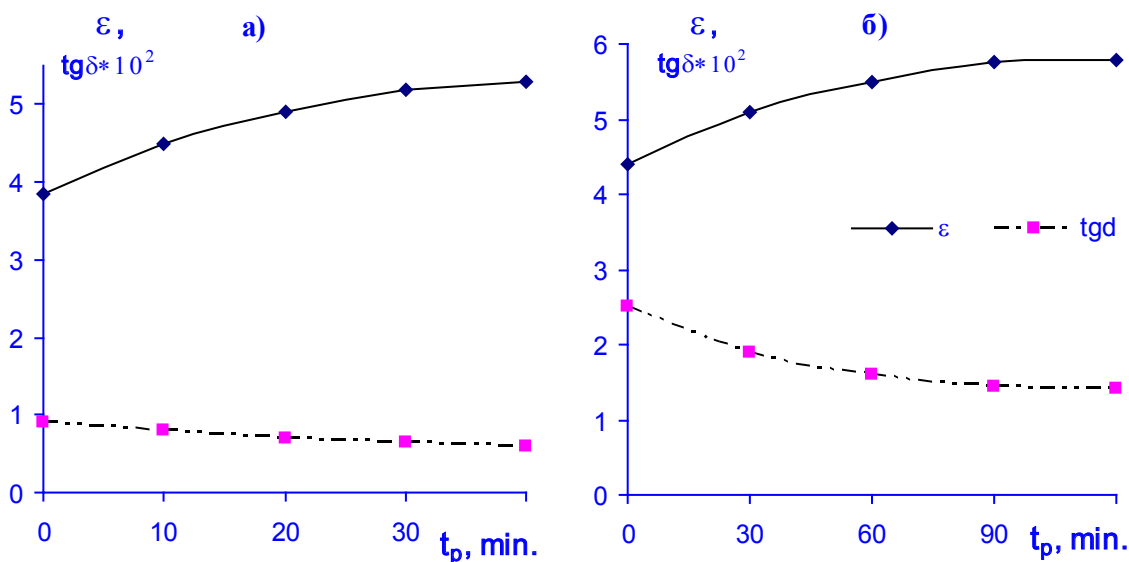


Fig. 4. Dependence of ϵ and $tg\delta$ samples CPM based on the ED-16 (a) and FAED-20 (b) from the polarization time ($E_p=5$ kV/cm)

The nature of the changes of ρ_v , ρ_s , $tg\delta$ and ϵ polymer coatings on the basis of furan-epoxy binder are similar (Figure 3 and 4), but the effective time of processing the samples in a constant electric field is $t_p = 90 \div 100$ min., due to a larger value of survival time furan-epoxy resin.

Thus, exposure to constant high electric field produces polymer coatings on the basis of ED-16 and FAED-20 with improved electro-indices, indicating that optimization of the structure of polymers.

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Section 7. Medical science

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Characteristic morphologic alterations in liver in experimental ischemic damage of brain

Abstract: Dysfunctions of liver in ischemic disorders are characterized by central dysfunctions of liver and often serve to be not only background together with which later severe hepatic diseases develop under influence of infections, intoxications and other impacts, but also act as an activator of deterioration of the general state.

Keywords: cerebral ischemic insult, alterations in liver, morphology.

Topicality. It is known, that the main defecting factors, which are able to suppress the function of liver, are, first of all, all the situations causing disorders of hepatic blood supply [1; 4; 6]. A damaged liver itself can change the progress of many states and organism's metabolisms as a whole, including pharmacologic impact of pharmaceutical agents [3; 2; 8]. Polypragmasia and a great amount of agents available in the modern staff of pharmacopoeia for ischemic insult, absence of a common standards for administration of agents and insignificant evidence of efficacy of the agents — all these complicates the functioning of liver and in complex negatively effects the status of patients with cerebral ischemic catastrophes.

Objective: is to study morphologic peculiarities of the liver status at the early terms of cerebral ischemic insult in experiment.

Materials and methods of the research. In experiment we performed incomplete ischemia of brain for creation of cerebral reperfusion injure mechanism. All the procedures of the experiment corresponded to the requirements of International rules of humane attitude to animals, stipulated in Sanitary rules of equipment and maintenance of experimental-biologic clinics (vivarium). The choice of the experiment object was conditioned by the resemblance of human and Wistar laboratory white rats' cerebral architectonics and similarity of the main hem dynamic parameters. The animals 250–280 grams in the age from 4 to 7 months were divided to 2 groups: 1st group included 8 rats, which had skin incision on neck above carotid artery on the left side and later sutur-

ing of the skin (pseudo operated); and the 2nd group included 9 rats with dissection of the left carotid artery, clipping for 20 minutes with further reperfusion and complete restoration of cerebral blood supply.

The follow-ups were performed in 1,3 and 7 days after ischemia-reperfusion. Verification of the ischemic insult was confirmed on the basis of the checking of photo optic preparations stained by Nissle's method. To obtain semi-thin cuts the temporal lobe tissue was fixed in 2.5% glutar aldehyde with further processing in compliance with the standard strategy in alcohols with growing concentration and filling in araldite. Semi-thin cuts were obtained with the help of ultra microtome LKB and stained by methylene blue and fuchsine.

Results and discussion. Macroscopically we noted: round anterior edge of liver, focal hyperemia and relevant thickening of the capsule, and smooth surface. In case of long-lasting process and severe ischemic cerebral lesion, mostly among old animals, liver becomes thick and "septal pattern" elements appear on its surface.

As a result of morphologic studies we detected appearance of small confocal areas of inflammatory reaction and dystrophic alterations, mostly in portal tracts, characterized by the elements of small focal periportal hepatitis. Singular rare small spotty inflammatory infiltrates can exceed portal stromae and go to peripheral parts of lobules without development of necrosis of hepatocytes, locating between hepatic cells — so-called discrete infiltrate; singular periportal necrosis develop rarely.

Often at the early stages of experimental ischemic insult in rats we detect focal proliferative alterations inside lobules: clearly limited infiltrates of cells- derivatives of mononuclear phagocytes' system. Intensity of hem-tissue exchange significantly depends on the speed of blood flow in sinusoids, and it is, in its turn, associated with peculiarities of its structure.

Normally during the first day in periportal parts of hepatic lobule in experimental ischemic insult we can observe mostly straight and branched sinusoids. Later, to the 7th day periportal tracts up to the areas adjacent with the central vein are characterized by prevalence of branched sinusoids with clear tendency of anastomosis. And the significant characteristic feature was direct proportional link between the appearance of unilipodia and the degree of cerebral ischemia expression revealed by us.

Morphologic manifestations of ischemic cerebral catastrophes were disorders of beam structure of liver, intra lobular alternative manifestations with appearance of singular hepatocytes necrosis with accumulation of some macrophages, lymphocytes, neutrophils and foci of hepatocytes fatty dystrophy in these areas, proliferation and hypertrophy of stellate reticular endotheliocytes, edema and widening of portal tracts with infiltration by lymph histocyte elements and neutrophils, sometimes proliferation of periportal and intra lobular bile ducts and formation of lymphoid follicles.

In our research in experimental ischemic insult we noted a tendency for centralization of intra hepatic blood circulation linked with the presence of portal-portal anastomosis inside hepatic lobules and collaterals. Microscopically we detected polymorphism of hepatocytes (cells of various sizes, among which many bi and multinuclear ones, and with different sized nuclei), their swelling, resulting in the definition of beam structure. Protein (hydropic, balloon) and fatty dystrophy have small focal character, and it is difficult to define the expression of these alterations as characteristic or specific ones in a certain case. In various parts of hepatic lobules we can see small foci of parenchyma necrosis with destruction of argirofillic stromae and focal infiltrates of macrophages, lymphocytes, and neutrophils. There was explicit proliferation and hypertrophy of stellate reticular endotheliocytes (liver macrophages). Portal tracts were widened, edematous, with

moderate or weak infiltration with lymph histocyte elements with a mixture of neutrophils.

Thus, macroscopic alterations we observed, such as consolidation of liver with round anterior edge, focal hyperemia and some thickening of the capsule with smooth surface, appearance of "septal pattern" elements on its surface indicated high probability of further development of focal fibrosis.

Result of our research was confirmation of the opinion of many authority scientists, that in the acutest period of ischemic insult in liver there occurs narrowing of capillaries with slow down of the blood flow and aggregation of erythrocytes [5], and it plays a great part in the mechanism of hepatic blood supply disorder [7]. There was also narrowing of small veins, gradual widening of sinusoids with slow blood flow and aggregation of erythrocytes in them, and intra hepatic shunting of blood flow.

Presence of small confocal areas of inflammatory reaction with elements of dystrophic alterations mostly in portal tracts and periportal areas, i. e. in I zones. It is known? That exactly in these zones there is greater amount of oxygen and substances of metabolic reactions in comparison with others, while metabolic and regeneration activity of this zone is the most intensive; that's why we consider these areas to be first involving in the concomitant pathologic processes. Widening of portal tracts, its edema and infiltration with lymph histocyte structures testify the possibility of further development of sclerotic processes in these areas mostly moderate degree of expression. Clearly limited infiltrates of cells characterizing focal proliferative alterations inside lobules at the early stages of experimental ischemic insult in rats are manifestations of small spotty infiltrative granulomatous inflammatory process.

Conclusion. Dysfunctions of liver in ischemic disorders of central regulatory mechanisms are mostly variable, but not very explicit morphologically. According to some authors' opinion, often not only one, but several functions are disturbed, with morphologic confirmation revealed in our research. In our observations central dysfunctions of liver serve to be not only background together with which later severe hepatic diseases develop under influence of infections, intoxications and other impacts, but also act as an activator of deterioration of the general state.

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Diagnostic significance of oxidative stress markers in underweight new-born babies on the initial days of life in the prognosis of adaptation disorders (experimental study)

Abstract: Study of the level of oxidative stress and activity of anti oxidative stress in underweight young rats during initial days of life provided identification of intensification of generation of oxygen active forms in brain, blood and microsomal-cytosol fraction of liver, expressed in various degrees, and also anemia present at the birth and progressing during the initial days of life. These factors are important for adaptation reaction of an organism.

Keywords: oxidative stress, retardation of fetal development, adaptation, new-born.

Retardation of fetal development is one of universal reactions of a fetus as a response to unfavorable impact within intra uterine development, conditioned by maternal risk factors, pathology of placenta or pathology of fetus itself [7]. The part of stillborn preterm babies with retardation of fetal development was 62.8%, and the part of dead in perinatal period was 41.9%, perinatal and neonatal morbidity was 2–8 folds higher, than among the children, born with body mass corresponding to the term of gestation [4], and that dictates the necessity of study the peculiarities of underweight children's adaptation.

According to the results of 14-years follow-up we determined four clinical characteristics possessing prognostic value in the estimation of survival ability of a new-born in 23–24 weeks of gestation with low weight (LW) as follows: systolic arterial pressure, respiratory index, hemoglobin and deficit of bases controlled during the initial 6 hours of life [6]. Early cardiac-pulmonary adaptation and original level of hemoglobin at birth were leading factors, which defined survival ability in preterm babies with low weight. Exactly the level of hemoglobin at birth is associated with early outcome in new-born babies up to 32 weeks of gestation [3].

Oxidative stress (OS) is one of leading damaging factors in the pathogenesis of retardation of fetal development [2]. It was found out that, the level of 8-oxy-2-deoxyguanosine in urine (the product of oxidative degradation of DNA, OS marker) of children with low weight was increased proportionally to the body weight deficit, but only during initial days of life. At the 30th day that value correlates with the dose of received oxygenation, i. e. it is higher in the new-born babies, who received oxygen compared with those who didn't [1]. These interesting results show that, prognostic value for the definition of the risk of adaptation disorder in new-born babies with LW is valid for the values defined during initial

day after birth, the most important period on which early and late prognosis depend [5]. In relation to that it is interesting to study potential prognostically significant parameters, such as hemogram and intensity of oxidative stress during initial 24 hour after birth.

Objective: to study the dynamics of oxidative stress during initial day of life and contribution of certain organs and tissues to systemic OS.

Materials and methods. Modeling of the retardation of fetal development was performed in chronic experiment. The object of the research was white pedigreeless rats: pregnant females underwent chronic hypobaric hypoxia with 41.1 kPa (308 mm. of mercury column), at 2 weeks of gestation term 10 folds (n=14), rate of compression and decompression was 0.5 kPa/min. Exposition in the conditions of rare air and oxygen deficiency was 1 hour. The chosen model meets the requirements of the experiment, as in the result of high altitude hypobaric hypoxia there is occurrence of disorder of placental blood supply in females and development of fetal-placental insufficiency (FPI) — one of the important factors of retardation of fetal development. New-born rats were studied after birth (n=65).

Samples of peripheral blood, homogenates of brain and microsomal-cytosol fraction of liver were studied in various hours of the first day of life: at the birth, 1,3,6,12, and 24 hours.

In biomedica we determined the level of active forms of oxygen (AFO) generation according to the amount of malonic dialdehyde (MDA) by means of I. D. Stalnoy et al., activity of super oxide dismutase (SOD) was determined according to the rate of auto oxidation of adrenalin with the help method of Mirsa P. H., Fridovich I., activity of catalase (CAT) — according to Bach-Zubkova's method, and the parameters of hemogram with the help of automatic hematological analyzer MINDRAY BC-3000.

Results. We revealed that, female rats which underwent unfavorable impact (hypoxia) born young rats with retardation of height-weight parameters compared with the animals of the control group. So the deficit of the weight at birth was $18.1 \pm 3.4\%$.

Young rats of the control group had alterations of MDA level, activity of SOD and CAT during initial hours of life with unauthentic character, indicating stationary generation of AFO in initial 24 hours of life.

Young rats of experiment group born with low weight by the female rats, which underwent chronic hypoxia and modeling of FPI, in the first hour after birth had notable higher amount of MDA in comparison with the control values in all examined organs: in homogenate of brain the increase in relation to the control was 1.4 folds, in microsomal-cytosol fraction of liver (MS) to 1.8 fold, and in blood to 2.1 folds. That indicates development of oxidative stress in the fetal organism during the period of fetal development and its contribution to systemic OS of brain tissues and liver.

In 1 hour after birth there is notable growth of MDA level: in brain to 56%, in blood to 51%, in MS to 91% in relation to previous term. In 3 hours after birth growth of MDA in liver continues (to 58%) and in blood (to 152%), and in brain tissues we noted some decrease of MDA concentration in relation to the previous term. In 6 hours growth of MDA was noted only in MS of liver (to 10%), and in brain tissues there was stabilization of that value on a stationary high level, in blood the level of MDA decreased 1.75 fold in comparison with the previous term. Further, in 12 and 24 hours concentration of MDA in Ms of liver gradually continued its growth, in brain it again increased 2.2 folds above the control values, and in blood it decreased a little bit, but still was 4.3–3.2 times higher than normal.

Revealed dynamics of MDA level in various biological media indicates that, intensity of OS is different in brain, MS and blood within initial 24 hours of life in low weight young rats of the experimental group. The earliest intensification of AFO generation was noted in brain tissues in the first hour of life (increase 2.2 folds in comparison with the control), and in liver the intensity of OS reaches its maximum to 12–24 hours (increase 6.7 folds in relation to the control). In brain tissues after reaching its peak OS stayed stationary high (alterations of MDA level at 3, 6, and 12 hours after birth were statistically unauthentic to each other), and intensified to 24th hour of life. In MS of liver there was progressive intensification of OS. These data indicate earlier exhaustion of endogenous anti oxidant

power of brain tissues with washing out of lipo peroxidation toxic metabolites to blood. At the same time in liver there is stronger activation of AFO generation, compared with brain tissues: increase of MDA 6.8 folds in MS versus 2.2 fold increase in brain in “peak” terms. It is possibly conditioned by redistribution of anti oxidant power from anti oxidant deposit — liver to brain, the organ, which is more important for life and more vulnerable to AFO impact as a result of activation of detoxificative function of liver MS. Maybe that conditions stationary high amount of MDA in brain tissues and rise of its concentration in MS of liver during initial 12 hours of life. In 24 hours after birth there is exhaustion of both proper and reserve anti oxidative power of brain tissues, which serves to be precondition of OS progressing.

The obtained results testify early activation of OS in the brain of low weight rats, reflection of which in blood appear only in 3 hours, and it should be taken into account that, intensification of AFO generation in MS of liver is not accompanied by the rise of MDA in blood. Increase of MDA in blood in 3 hours of life indicates development of Os in brain tissues, while decrease of MDA in blood in 24 hours doesn't indicate liquidation of Os in brain. As it is possible to judge about OS intensity in new-born baby according to MDA level in blood, it is reasonable to detect it within initial 3 hours of life, as well as the activity of anti oxidant system (AOS) enzymes.

Conclusions.

1. Unfavorable impact during pregnancy period leads to the birth of descendants with low weight, anemia and high level of AFO generation in brain, MS of liver and blood at the moment of birth.

2. Oxidative stress in brain tissues of the generation of low weight rats born by female rats, which underwent modeling of FPI, intensified during the first hour of life and preserves at the stationary high level during 24 hours, and it can be precondition for the disorder of adaptation and development.

3. The peak of oxidative stress intensity occurs in brain within the first hour of life, in blood in 3 hours, in microsomal-cytosol fraction of liver in 12–24 hours of life, and it was linked with the redistribution of anti oxidant stress power and wash out of toxic metabolites to blood.

5. The level of malonic dialdehyde in blood, activity of super oxide dismutase and blood catalase, measured in 3–24 hours of life, change not proportionally to the intensity of oxidative stress in brain and microsomal-cytosol fraction of liver, reflecting the total level of anti oxidant stress in blood in greater degree.

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Amount of vitamin D and phosphorus-calcium exchange in children with pathology of small intestine

Abstract: We determined a high percent of vitamin D deficit in the children with pathologies of small intestine, more expressed in celiacia and chronic enterocolitis. Vitamin D deficit in this category of patients can serve to be a marker of alkali phosphatase and parathormone level. The revealed vitamin D deficit in the patients with malabsorption syndrome dictates the necessity of vitamin d supplementation in the patients with celiacia and severe forms of enterocolitis.

Keywords: pathology of small intestine, vitamin D, phosphorus-calcium exchange, children.

Pathology of intestine, manifested by maldigestion and malabsorption, is one of the actual problems of clinical pediatrics. The importance of that problem is determined by the fact that, intestinal diseases are chronic, tend to relapse and formation of severe disorders of substance exchange with development of complex dysfunctions of the whole digestive system [1; 2; 6].

Status of vitamin D in the organism is of great importance in the pathogenesis of intestinal diseases with malabsorption and maldigestion, as the absorption of vitamin D mostly occurs in duodenum and jejunum with bile acids. Further it is transported by lymphatic system of intestine in the form of chylomicrons of cholecalciferol omolate formed in the interrelation of vitamin D₃ with taurocholic acid [3; 7].

Scientific data about the metabolism of vitamin D obtained during the last years led to the change of opinion that it was just usual vitamin. In the modern time it is common to speak about integral vitamin-D-endocrine system, providing not only regulation of phosphorus-calcium exchange, but also maintaining functioning of many organs and systems [4]. Receptors to calcitriol, which is hormonal active form of vitamin D, were detected at least in 36 various tissues of organism [5; 6].

In relation with the widening of understanding of vitamin D importance in the genesis of many diseases, it is necessary to study its impact on the progress of diseases, accompanied with the maldigestion and malabsorption syndromes such

as celiacia, chronic post-infectious enterocolitis, and allergic enterocolitis.

Objective: to define the status of phosphorus-calcium exchange and amount of vitamin D in the diseases of small intestine in children.

Materials and methods of the research: the study was based on the results of checking of 160 children with pathologies of small intestine. The examined children composed three groups: 60 children with celiacia (C) in the age from 3 to 16 years old (1st group); 60 with chronic enterocolitis from 2 to 12 years old (2nd group); 40 children with allergic enterocolitis from 0 to 4 years old (3rd group). The diagnosis of the diseases was verified on the basis of carefully collected anamnesis, complex clinical-laboratory, immune genetic and instrumental checking.

For the study of vitamin D status in organism we determined the following values in blood serum: 25 (OH)D₃, calcium, phosphorus, parathormone, alkali phosphatase. The tests were performed according to common method.

Allergic enterocolitis was determined on the basis of careful collection of anamnesis, definition of immunoglobulin E, and basophile test to allergens (Shelly's reaction).

The control group involved 25 practically healthy children.

The results of the studies underwent statistic analysis with traditional methods of mathematic analysis. The calculations were performed using EXCELL software.

Results of the research: among the clinical manifestations of metabolic disorders most often mineral exchange disorders are observed. Diminishing of ionized calcium amount occurs in all forms of the disease, and statistically reliable decrease of its level was noted in the patients with celiacia and chronic enterocolitis. Concentration of total calcium in children differed little from the normal value (2.33 ± 0.02 mol/l, 2.36 ± 0.02 mol/l, 2.25 ± 0.08 mol/l corresponding to the groups, and 2.35 ± 0.02 mol/l in the control group). All patients tended to have hypocalcemia, it means ionized calcium was equal to 1.05 ± 0.06 mmol/l, 1.03 ± 0.2 mmol/l and 1.05 ± 0.1 mmol/l respectively in the groups versus 2.35 ± 0.2 mmol/l in the control group.

Phosphorus is essential anion of a cell, its deficit leads to various disorders of cellular metabolism. The level of phosphorus in comparison with the normal value had a tendency for decrease in all groups, more expressed in children with celiacia to 0.38 mol/l ($P<0.05$).

Patients of the 1st and 2nd groups had increased level of the alkali phosphatase values. The values of alkali phosphatase activity in the patients of the 1st and 2nd groups were increased. The level of alkali phosphatase activity in the patients of the 3rd group was not significantly raised. Thus, in the 1st group it was 2.1 folds higher in comparison with the control group ($P<0.05$; 195.8 ± 15.9 U/l and 95.5 ± 1.4 U/l respectively), in the second group to 1.8 fold ($P<0.05$; 175.3 ± 8.8 U/l and 95.5 ± 1.4 U/l respectively); in the third group that value was insignificantly different from the values of the control group and was equal to 102.2 ± 2.5 U/l versus 95.5 ± 1.4 U/l.

Optimal mean for the evaluation of vitamin D status was definition of 25-hydroxivitamin D [25 (OH) D] amount in blood serum. Under the term of vitamin D deficit we understand decrease of 25 (O) D concentration in blood serum less than 20 ng/ml (50 nmol/l); sufficient vitamin D is the status when the concentration of 25 (O) D in blood serum is above 30 ng/ml (75 nmol/l), while in case of deficiency the level of vitamin D in blood is preserved in the range from 21 to 29 nanogram/ml. [4; 5].

Vitamin D deficit was revealed in 48 (80%) patients with celiacia, among them in 15 below 10 ng/ml. Insufficient amount of vitamin D was revealed in 12 patients (20%).

In chronic enterocolitis the deficit of vitamin D was revealed in 34 patients (57%), and it is 1.4 fold rarer than in the patients with celiacia. Insufficient amount of vitamin D was registered in 26 (43%) patients, and it was 2 folds more often than in the patients with celiacia.

Among the children with allergic enterocolitis vitamin D deficit was revealed in 10 children (25%), and it was more than 3 times rarer than in the patients with celiacia. Insufficient amount of vitamin D was revealed in 27 (62%) children

from the 3rd group.

Average level of vitamin D decreased in all group of the children, more expressed in the 1st and 2nd groups ($P<0.05$). In the 1st group the average values of vitamin D was 14.78 ± 1.04 ng/mg, and it was almost 3 folds below the average values of the control group (45.1 ± 0.9 ng/mg). In the 2nd group the average values of vitamin D were higher than in the 1st group (18.6 ± 0.77 ng/mg versus 14.8 ± 1.04 ; $P<0.05$), but 2.4 folds below the control group results (18.6 ± 0.77 ng/mg versus 45.1 ± 0.9 ; $P<0.05$). In the third group the amount of vitamin D was 22.8 ± 0.6 ng/mg, and it was above the average level in the second group, but 2 folds lower than the control values (22.8 ± 0.6 ng/mg versus 45.1 ± 0.9 ; $P<0.05$).

We observed increased level of parathormone in all groups. More expressed increase was observed in children with celiacia (29.3 ± 1.9 pg/ml versus 9.1 ± 0.5 pg/ml in the control group; $P<0.05$) and chronic enterocolitis (27.2 ± 1.4 pg/ml versus 9.1 ± 0.5 pg/ml in the control group; $P<0.05$). In the third group that value was 1.7 fold increased in comparison with the control group (15.6 ± 1.3 pg/ml versus 9.1 ± 0.5 pg/ml; $P<0.05$) and 1.9 fold lower than in the 1st group (15.6 ± 1.3 pg/ml versus 29.3 ± 1.9 pg/ml).

The analysis of correlation link of vitamin D showed strong correlation interrelation with the value of alkali phosphatase ($r=+0.721$) and strong correlation feedback with parathormone ($r=-0.659$).

Thus, we determined high percent of vitamin D deficit in the patients with pathologies of small intestine in the region with high insolation, and it was more expressed in children with celiacia and chronic enterocolitis. The level of alkali phosphatase and parathormone can serve to be a marker of vitamin D deficit in the patients with chronic diseases of intestine. The revealed deficit of vitamin D in the patients with malabsorption syndrome dictates the necessity of vitamin D supplementation in the patients with celiacia and severe forms of enterocolitis.

Conclusions:

1. Decrease of the ionized calcium amount occurs in all forms of the disease, and statistically reliable decrease of its level was noted in the patients with C and CE.

2. We determined high percent of vitamin D deficit in the patients with diseases of small intestine in the region with high insolation; 80% in the patients with celiacia, 57% in children with chronic enterocolitis, and 25% in the children with allergic enterocolitis.

3. The obtained results will serve the basis for the designing of the complex of therapeutic-diagnostic measures aiming normalization of the status of vitamin D and phosphorus-calcium exchange in organism with chronic diseases of small intestine.

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Differential diagnosis of articular syndrome in psoriasis

Abstract: Articular syndrome in psoriasis is an urgent problem to date. By the way, not always articular syndrome in psoriasis is a manifestation of the disease. And so, below is a case osteochondropathy patient with psoriasis.

Keywords: psoriasis, psoriatic arthritis, osteochondropathy.

In recent years, significantly increased the number of severe forms of psoriasis, one of which is psoriatic arthritis (PA). The development of the PA can be rapid or slowly progressive, but always accompanied by a decrease of quality of life and disability [1; 3].

The diagnosis of PA is not a problem when there are skin rashes. Difficulties in the diagnosis of PA arise in cases where the primary and joint damage there for some time without cutaneous manifestations of psoriasis [4; 6; 11]. PA occurs at an average of 5%–8% in patients with psoriasis, aged 30–50 years [4; 5; 6; 12]. In children, the PA is very rare.

The clinical picture of PA is represented by redness, swelling and tenderness over the affected joints, limited mobility of their stiffness. The process often asymmetrical. Mainly affects the distal interphalangeal joints of the hands and feet.

When X-ray PA reveal narrowing of the joint space, the edge patterns, focal destruction, osteoporosis, ankyloses of small joints. In the blood — ESR acceleration, sometimes leukocytosis, increase in gamma globulins, fibrinogen level, sialic acids, seromucoid, the appearance of C-reactive protein, rheum sample usually negative [5; 7].

The differential diagnosis of articular syndrome in psoriasis is usually carried out with rheumatism, rheumatoid arthritis, ankylosing spondylitis, infectious arthritis. However, there are rare arthritis.

Here are his own observation:

Patient A. dealt with complaints: on the skin rashes and pain in his left knee.

From history: psoriasis suffering for 10 years. Heredity is burdened brother mother suffers from psoriasis. Engaged in sports school football.

Status locales: Skin is a chronic inflammatory process in nature. Localized symmetrically on the scalp, on the extensor surfaces of the upper and lower extremities, on the lumbar region. Elements lesions are papules, plaques, with smooth sharp edges and flushing rim at the periphery, but on the surface elements are silver — white scales. Triad of Auspitts determined.

Left knee drowsy, contours are smoothed tibial tuberosity. On palpation tuberosity determined by pain and swelling. Extension movements of the knee causes pain.

Preliminary diagnosis: Psoriasis, progressive stage, winter type. PA.

Of laboratory data: KLA — 6% eosinophilia, blood chemistry revealed no pathology, P — factor is negative, the PSA is normal, OAM — without pathology, scatology — without pathology.

On radiographs of the left knee joint in 2 projections marked ossification nucleus, tibial tuberosity fragmented and consists of several small plots resemble jagged edges and separated light intervals.

Diagnosis: Osgood-Schlatter.

Consulted pediatric orthopedics — trauma. The diagnosis: Osgood-Schlatter.

The patient exhibited a final diagnosis:

The main: Psoriasis, progressive stage, the mixed type.

Related: Osgood-Schlatter.

Osgood-Schlatter disease is one of the most common forms of osteochondropathy, and a dystrophic lesions tibial tuberosity during the end of the growth of the skeletal system [9].

Risk factors for the disease Osgood-Schlatter are high load game — basketball, hockey, football, etc. The predominant age of Osgood-Schlatter from ten to fifteen or eighteen years of age, that is, during the ossification of the tibialapophysis. After the age of 18, when there is a merger with the whole array of the tibia, Osgood-Schlatter disease is not found. Among patients with predominantly dominated by strong men involved in sports. Therefore, the cause of the disease is considered an overload tibial tuberosity at elevated features 4 head thigh muscles. Patho-

logical process usually unilateral, but bilateral involvement occurs.

After a definitive diagnosis, patients underwent standard treatment of psoriasis and recommended limitation of physical activity for the period of illness excluded sports.

Treatment for Osgood-Schlatter disease is conservative and appointment procedures or thermal phonoelectrophoresis with a solution of procaine, drugs that improve the microcirculation (pentoxifylline), vitamins (group B), calcium and phosphorus, tight bandaging of joint, NSAIDs. Disease duration 1–1.5 years. Favorable prognosis [8; 9; 10].

The patient was discharged with clinical improvement of psoriasis.

Recommended: Seeing a dermatologist (psoriasis) and Pediatric Orthopedics — Traumatology (Osgood-Schlatter).

Table 1. The differential diagnosis of PA with Osgood-Schlatter.

Symptoms of the disease	Osgood-Schlatter	Psoriatic Arthritis
Age	age from 9 to 14–18 years	age from 20 to 50 years, with a sharp young age progression
Gender	Boys	Men and women with equal frequency
Complaints	Pain in the Knee	Joint Pain
Prevalence	Unilateral	UnilateralSymmetrical
Clinic	Local pain in the lower part of the knee. Knee pain while walking, pressing or squatting. Swelling of the knee, smoothing the contours of the tibial tubercle, defiguration. Palpation of the tuberosity — local pain and swelling. Active movements of the knee causes pain of varying intensity.	The presence of psoriasis skin characteristic localization. Pain in the affected joints Stiffness in the joints Joints hot to the touch Swollen joints, and the skin over them takes purple-bluish or bluish color On examination, the joints are marked with their swelling, defiguration, when making active movements tenderness, local temperature rise over the joints, onychodystrophy.
X-ray	Fragmentation tibial tuberosity; indistinct outline fragments, some of them are displaced upward and forward.	Joint space narrowing, edge patterns, focal destruction, osteoporosis, ankyloses of small joints.

Conclusion: Patients with articular syndrome need a thorough examination. When the diagnosis of adolescents need to eliminate all disease is accompanied by articular syndrome: — rheumatoid arthritis, psoriatic arthritis, infectious arthritis, and Osgood-Schlatter.

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Assessing the functional architecture of the brain with diffusion mri in paediatric patients

Abstract: The paper presents the results of the evaluation with MRI diffusion in the diagnosis of structural brain damage in children with symptomatic epilepsy in the background of developmental abnormalities of the brain and comparison of changes detected with routine MRI parameters. We studied parameters of MR diffusion weighted imaging in symptomatic epilepsy paediatric patients and determined the quantitative standards of numerical values of diffusion of white matter in children with symptomatic epilepsy in brain anomalies. The regions with abnormal white matter FA and ADC values not only matched to limbic circle zones, but also to areas of intra- and interhemispheric connections uniting the frontal, temporal, parietal and occipital lobes of the brain. Determining the damaged zones of white matter of brain in symptomatic epilepsy, regardless of etiology, is important to predict the prognosis of the disease and the likely possibility of cognitive impairment in children.

Keywords: Epilepsy, Fractional anisotropy, anisotropy, Average diffusion capacity, white matter, mean diffusion, statistical parametric mapping.

Introduction

According to the recent literature, malformations of the brain are detected in approximately 30% of cases in a population of children with epileptic seizures [1, 51–61]. These children have a wide range of embryo fetal lesions of the central nervous system (CNS), which plays key role in the pathogenesis of early childhood epilepsy [2, 1–15]. The introduction of MRI in clinical practice has greatly expanded the identification of various structural changes in brain tissue underlying the formation of the epileptic focus, which usually leads to the subsequent development of epilepsy. Congenital disorders of brain has a major part in epilepsy origin, which manifest themselves in early periods of childhood [3, 250–264]. Diffusion imaging is an MRI method that produces in vivo magnetic resonance images of biological tissues sensitized with the local characteristics of molecular diffusion, generally water [4, 5–20]. An increased number of neuronal cell bodies in the white matter (as in microdysgenesis) could disrupt the white matter tracts and cause a reduction in anisotropy. Anisotropy is usually highest in the major white matter tracts and lower in the tissue close to the cortex where fibres are crossing or fanning out [6, 206–215]. Several studies have shown reduced diffusivity during partial status epilepticus correlated with the cortical areas involved [7, 676–685]. The most important parameter of DWI MRI, characterized by the integration of the white matter is fractional anisotropy (FA), Average diffusion capacity (ADC) is also used as indicator to evaluate the results of diffusion tensor MRI.

The aim of this study was to determine the quantitative standards of numerical values of diffusion of white matter in children with symptomatic epilepsy in brain anomalies.

Materials and methods

MRI studies were conducted among 54 children with symptomatic epilepsy to developmental abnormalities of the

brain. Age grading ranged from 1 year to 14 years, mean age $5,9 \pm 0,56$ years. The debut of epileptic seizures observed from birth to 8 years old, the average age of debut $2,3 \pm 0,59$ years. The disease duration averaged $4,4 \pm 0,96$ years. The patients were examined and treated in the neurological department of the clinic of the Tashkent Pediatric Medical Institute and diagnostic center LLC “MDS-Service” for the period from 2012 to 2014. All children (54 children) was conducted routine MRI, of whom 26 held MR-diffusion (main group). The control group consisted of 20 healthy children with no clinical manifestations of epilepsy and no signs of epileptic activity on the EEG. (Total number of children studied were 74).

Conventional MRI scanning protocol. MRI studies were performed on a GE tomography with a magnetic field of 1.5 T using a head radio frequency coil consisting of 18 elements. The study protocol included a standardized program of MRI of the brain, as well as aiming neuroimaging the mediobasal temporal lobe with thin sections with the possibility of post processing and imaging in different planes. Among the special programs used fast spin-echo T2-weighted, perpendicular to the longitudinal axis of the hippocampus slice thickness of 2 mm, and 3D T1 SP6R — pulse sequences with the reform and obtaining images mediobasal temporal lobe perpendicular and parallel to the longitudinal axis of the hippocampus.

DWI scanning protocol. Scans were performed on a 1.5 T GE Ovation. Single-shot CSF-suppressed diffusion-weighted echoplanar imaging (EPI) was used [TR/TE/TI (repetition time/echo time/inversion time) 5000/78/1788 ms], acquisition matrix 96 x96, reconstruction matrix 128 x128, FOV (field of view) 24 cm, slice thickness 5 mm covering the whole brain. Diffusion scanning time was 19 min. Total scanning time including diffusion, localizer and high-resolution EPI

anatomical scan was 25 min. Images were transferred to a separate workstation for post-processing.

Results of the study

Neurological symptoms in 46.3% of the children (25 children) was characterized by central paresis, at 92.6% (50 children) were observed varying degrees of severity delayed mental and motor development. In our study, cortical dysplasia characterized by licencephaly (agyria) pachygyry, micropolygyry, shizencephaly and transmantil dysplasia. In this group of children were observed combined multifocal and generalized violations in electroencephalographic (EEG) studies. Based on the analysis of MRI data in children with licencephaly observed: complete diffuse agyria,

with the presence of fragmentary agyria individual convolutions in the frontal and temporal regions of the brain, sometimes medial or basal surface of the frontal lobes. Just diagnostic importance is straightforward nature of the border between gray and white matter of the brain, white matter hypoplasia, ventriculomegaly, and the expansion of the central sulcus Sylvian. We have studied the values of FA and MD in healthy children. Firstly we established individual normal values, then compared these findings to epilepsy patients and we have established a significant decrease in quantitative values of FA in frontal, temporal, parietal, and occipital region of the brain.

Below compared with the control group (Table. 1).

Таблица 1. – Findings of FA and MD in children with symptomatic epilepsy and brain anomalies

Etiology of symptomatic epilepsy	Frontal lobe white matter	Temporal lobe	Parietal lobe	Occipital lobe	Corpus callosum	Internal capsule
Healthy children (n=20) FA	0,50±0,004	0,51±0,004	0,50±0,004	0,51±0,004	0,52±0,004	0,52±0,004
Brain anomalies (n=26) FA	0,38±0,02*	0,36±0,002	0,37±0,03*	0,50±0,004	0,54±0,02*	0,56±0,004
Healthy children (n=20) MD	1,2±0,03	1,3±0,03	1,25±0,04	1,35±0,04	1,06±0,04	1,02±0,03
Brain anomalies (n=26) MD	1,5±0,06*	1,55±0,06	1,6±0,06*	1,65±0,06	1,36±0,05*	1,11±0,05

Note: * — the accuracy of the data compared with the norm (* — $P < 0.01$)

Source: Author.

To evaluate the results of MR diffusion used as indicator of the average diffusion capacity (ADC), which increase in value is due to a defect or loss of neurogenesis of cells with a consequent increase in the extracellular space. When analyzing the correlation between the indicators of the FA and MD in

children of main group the strong negative relationship in all areas were revealed, which is result of neurogenesis deficit, which in turn can be a predictor of symptomatic epilepsy with anomalies of the brain.

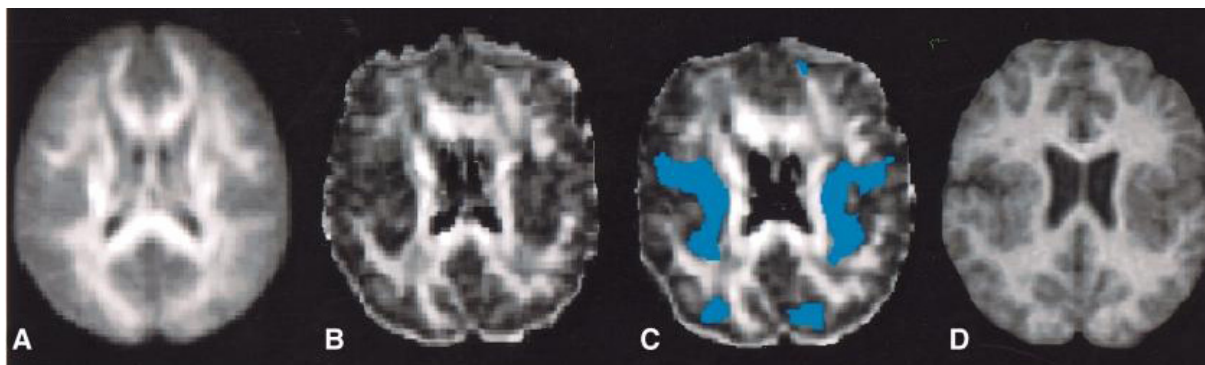


Fig. 1. Patient 1: bilateral frontoparietal gyral abnormalities with thickened cortex. (A) Normalized axial anisotropy maps at the same slice localization for the averaged 30 control subjects. (B) The patient. Note that the difference in the signal-to-noise ratio between the two maps is due to averaging of the 30 control subjects. (C) Regions of significantly decreased anisotropy identified with SPM are superimposed (blue) on the patient's normalized anisotropy map. (D) The equivalent slice of the patient's T_1 -weighted image. The regions of decreased anisotropy not only coincide with the localization of the gyral abnormalities with thickened cortex, but are also found in the normal-appearing occipital lobes. Note that right on the images is the patient's right.

Analyzing the data of MR diffusion in children with symptomatic epilepsy on the background abnormalities of brain development we have identified low levels of FA in frontal and parietal lobes ($0,38 \pm 0,02$ and $0,37 \pm 0,02$, respectively; $P < 0.01$) as compared with the normal values. Indicators of MD in chil-

dren with symptomatic epilepsy on a background of developmental abnormalities of the brain underwent the following changes: the frontal lobe figures were $1,50 \pm 0,06$ ($P < 0.01$) for the rear — $1,59 \pm 0,06$ ($P < 0.01$). There was a significant deviation of MD from normal values, 22.11% for the frontal

and 2.2% for the occipital. Thus, in children with symptomatic epilepsy on a background of developmental abnormalities of the brain there was a sharp decline of the FA for frontal and occipital lobes and a huge increase of the MD for the frontal lobes. According to other authors state integrity of the corpus callosum provides stability of cognitive and emotional status of the children. Thus, the presence of these changes of FA and MD to some extent indicates the “interest” of the various regions of the brain in promoting epileptic seizures, and is being as predictor of the developing of the disease.

Conclusion

We revealed that in children with symptomatic epilepsy, regardless of its etiology, the presence of discrete regions of the abnormal changes of the white matter of the brain was discovered, while the pathological changes of white matter were localized not only in the epileptogenic, but also in the opposite hemisphere. The decreased anisotropy in these areas of heterotopic grey matter is likely to be caused by the comparisons of anisotropy in the abnormally located grey matter in the patients with anisotropy in white matter in control subjects. More interestingly, anisotropy and diffusivity changes were found also outside the anomaly regions in normal-appearing

tissue. These findings suggest that brain anomaly is often more extensive than the visible lesion, with widespread subtle malformation.

The regions with abnormal white matter FA and MD values not only matched to zones of limbic circle, but also to areas of intra- and interhemispheric connections uniting the frontal, temporal, parietal and occipital lobes of the brain. Determining of specific clusters of lesions of the brain tracts in symptomatic epilepsy in children, regardless of etiology, is important to predict the prognosis of the disease and the likely possibility of cognitive impairment. Thus, this study showed that symptomatic epilepsy in children is characterized by a variety of changes in the white matter of the brain tracts that lead to the dissociation of certain regions of the brain, which subsequently causes further breaking connections between cortical and subcortical regions and interrupting transfer of information. MRI diffusion allows to extend the representation of micro structural changes in integrity of gray and white matter of brain in symptomatic epilepsy and clarify the structural and metabolic etiologic subtype of the disease according to the recommendations of the International League Against Epilepsy.

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Clinical and neurophysiological manifestations of epileptic encephalopathy in children

Abstract: Summarizing the data of clinical and EEG correlations in epileptic encephalopathy, can reasonably link the permanent presence of psychiatric and neurological manifestations of epileptic activity in functionally important regions of the brain.

We studied the clinical and neuroimaging manifestations of epileptic encephalopathy. Patients between the ages of 5 and 14 years was conducted clinical neurological examination, studied the state of intelligence in children using techniques Raven with a view to making diagnostic judgments about the level of formation of certain mental operations. An analysis of their EEG studies showed that the centrotemporal adhesions can cause severe speech, cognitive, mental, behavioural disorders in children without seizures. Thus, summarizing the clinical and electroencephalographic data correlations in epileptic encephalopathies and non paroxysmal epileptic disorders can reasonably link the permanent presence of psychiatric and neurological manifestations of epileptic activity in functionally important regions of the brain.

Keywords: Children, epileptic encephalopathy, elektroentsefalo graphics -performance

Introduction. Epilepsy and convulsive paroxysms are common pathology of the nervous system in children. As research studies revealed that the frequency of seizures in the general population is 17–20 per 1,000 people, while epilepsy rate are 5–10 per 1000 person [1, 416]. According to the literature the epileptic encephalopathy consists depending on the form of 5 to 40% of behavioural, psychiatric and neuropsychological disorders and to 3–10% of all epileptic disorders [4, 1–15]. The new classification of epileptic syndromes of the International League Against Epilepsy introduced new terminology “epileptic encephalopathy” [2, 358]. It includes chronic disorders in which the severe cerebral dysfunction caused by epileptic discharges, manifested in the electroencephalogram (EEG) as a epileptic activity [3, 37]. The syndromes and well known forms of “catastrophic epileptic encephalopathy” are grouped to this column, in which frequent and severe seizures combined with a delay or regression of neuropsychiatric symptoms (Otahara syndromes, West, Lennox — Gastaut, Dravet et al.). It also includes epileptic aphasia, the Landau — Kleffner and epilepsy with permanent complexes spike — waves during slow-wave sleep, clinically severe speech disorders and other cognitive functions, sometimes without epileptic seizures [5, 250–264]. When non paroxysmal epileptic disorders associated with the involvement of nonspecific median structures of the brain, manifested in the EEG, usually discharges bilaterally synchronous epileptic activity which is a violation of the functions of determining the level of functional activity of the brain, the focus of attention and the general regulation of behaviour, control activities [6, 5–20]. This explains the modal nonspecific clinical manifestations and determines the characteristics of EEG, such as bilateral simultaneous and widespread of the brain. Accordingly, the bilaterally synchronous epileptic form discharges (BSE) exhibit obsessive-compulsive disorder, autism, schizophrenic disorders, attention deficit hyperactivity disorder, depersonalization — derealization, depressive syndrome, behaviour disorders and sleep. Similar mental and behavioural disorders associated with BSE repeatedly described in the literature [7, 54–64]. Focal cortical epileptic discharges contribute to violations of the characteristic functional localization. The prefrontal cortex is the center of attention motivated, goal-setting, social communication, planning, realization and control of emotions and related aspects of behavior: the mental and physical contact, aggression, avoidance [4, 1–15]. It is the executive element, processing information from lying behind

the divisions, integrating incoming information stored in a memory, and on this basis provides the behaviour associated with the socialization [7, 54–64].

Hence the complex observed in epileptic dysfunction of the frontal lobes of mental disorders. Specific mental disorders in non paroxysmal fronto-equity Epilepsy is infantile autism and other common disorder, schizophrenic form disorder.

The aim of our study was to investigate the clinical and neuroimaging manifestations of epileptic encephalopathy in children.

Materials and methods. The study was conducted in the neurological department of the clinic of the Tashkent Paediatric Medical Institute among 69 children aged 3 to 14 years with a diagnosis of epileptic encephalopathy, of whom 22 children with no reports of seizures debut of epileptic seizures observed in a wide age range from 1 month to 10 years (mean $6,3 \pm 4,9$).

Patients between the ages of 5 and 14 years was underwent clinical neurological examination, also their state of intelligence using techniques Raven are studied with a view to making diagnostic judgments about the level of formation of certain mental operations. The mental development level is studied by using some tasks depending on the success of the decision of tasks of certain series (A, B, C, D, E). Bayley Mental Scale test is used to evaluate the mental development of Children aged 3–5 years.

In this study, we used clinical, neurological and instrumental methods of investigation (EEG).

Results of the study.

The patients were admitted to the hospital with complaints about the back log in the psycho-speech development (38.5%), enuresis (46.2%), logo neurosis (15.4%), mental and behavioural disorders (41.0%).

An objective examination of subclinical symptoms revealed following symptoms such as reflex gemisindroma without pathological signs, weak signs of oral automatism, a symptom chvostek, increased deep reflexes, muscular hypotonia.

Neurological status was characterized in 55.6% of patients with severe epileptic encephalopathy intellectual deficit, autism, gross psychomotor retardation. The 44.4% of patients had hyperactive behavior, the backlog in training at the school relative to their peers, pugnacity, disinhibition, cognitive impairment. Clinical and neurological examination was performed in 55.6% and showed scattered focal symptoms with

severe intellectual deficit. The 18.8% of studied children with epileptic encephalopathy diagnosed with Lennox-Gastaut syndrome, Landau-Kleffner syndrome — 1.4% and 7.8% of West syndrome.

Lennox-Gastaut (SLG) was characterized by polymorphism of seizures, cognitive impairment, specific changes in EEG and resistance to therapy. It was characterized by the following types of attacks: paroxysms of falls, tonic seizures, atypical absence seizures, and sudden falls. In 4 children with this pathology it is observed a brief shutdown of consciousness. The attacks include sudden flexion of the neck and torso, leg extension, reduction of facial muscles, the rotational movement of the eyeballs, apnoea, flushing of the face. All children with this syndrome were observed in psychomotor development, which is compounded with the onset of the disease. EEG pattern showed diffuse slow spike-wave activity and bilateral synchronous with a frequency of 1 Hz 2.5, with an emphasis on the frontal and temporal lobes.

In children with the syndrome of Vesta during the seizures there was a rapid slope of the body forward with bent head. All children seizures occurred when the child is asleep or before waking. The frequency of attacks reached tens and hundreds of times a day. All children showed severe impairment of psychomotor development. West syndrome was characterized by generalized high amplitude slow wave or low amplitude rhythms beta EEG band. In one case, the focal epileptic activity was recorded. Interictal EEG changes as hypsarrhythmia, which were characterized by continuous high-amplitude slow-arrhythmic activity with numerous spikes or sharp waves without substantial synchronization between the hemispheres and the various departments within the same hemisphere of the brain.

In our study, Landau-Kleffner syndrome was observed in only 1 child aged 4.5 years. This child on the background of the previously normal development has lost the ability to understand speech addressed to him and talk. It was characterized by a heavy defeat receptive (impressive, touch) aspects of speech. Hearing and nonverbal intelligence activities is not affected. The EEG showed paroxysmal changes bilaterally and in the temporal cortex.

In 22 children (31.9%) there was not any seizures in history. The mental status revealed anxiety, speech disorder, mutism, profound mental retardation disorders of speech development, at some stage, even featured a diagnosis of schizophrenia. These children were assigned to the II type of epileptic encephalopathy.

EEG pattern characterized by frontal foci of epileptic form activity. In 16 patients with behavioural disorders there were three severe mental development disorders such as autism, 1 patient — hallucinatory-catatonic disorders, in 2 — childhood schizophrenia. Thus, when the frontal epileptic foci dominant form of pathology behavioural, social and psychotic

circle. Violations of socialization prevalent in patients with left-sided foci. Especially characterized by a high frequency of frontal bilaterally synchronous discharges (56.7%) and in addition (15%) secondary bilateral synchronization in the frontal during lateralized focus, which speaks of the role of the involvement of the medial frontal limbic structures (cingulate and orbitofrontal cortex). Studies in children with behavioural and mental disorders without epileptic seizures in 31.8% of cases have been identified temporal epileptic foci. The clinical picture in the temporal bits divided into two main array: violation of speech functions in 3 patients with left-sided focus on the EEG; general, non-specific with respect to local development neuropsychological function disorders, personality, emotional and affective neurotic disorders in 4 patients with right tricks. Lateralization revealed in the analysis of disorders of speech and language functions: violation of semantic and pragmatic aspects of speech and language memory were observed more frequently in the left hemisphere focus, and any perception of sound pronunciation and intonation aspects of speech prevailed in the right-brain tricks. Thus, when the temporal foci clinical picture corresponds exactly to the functional specialization of the region of localization of epileptic disorders. An analysis of their own data EEG studies show that the centrottemporal adhesions can cause severe speech, cognitive, mental, behavioral disorders in children without seizures, which means that «rolandic focus is not so benign as once thought.» Thus, the described structural changes that can be saved and at the termination of epileptic activity, are responsible for the persistence of clinical disorders.

Conclusion.

Based on our observations, we can conclude that the main EEG phenomenon, along with high-amplitude activity was a gross violation of rhythm. High-amplitude activity was slow in nature, often combined with epileptic form that allowed to classify this as epileptic dysrhythmia. Such a flagrant violation of bioelectric rhythms indicate serious disorder that features selected structures are, as a rule, with the partial forms of epilepsy pacemakers epileptic activity. This fact determines the absence of seizures in patients with the above-mentioned violations of the psyche, which is particularly important, as is now the concept of the genetic mechanism of behavioural disorders and developmental disorders in such a group of patients, as well as dysfunction of the brain transmitter systems (dopaminergic and others.) In summarizing the clinical and electroencephalographic data correlations in epileptic encephalopathy and non paroxysmal epileptic disorders can reasonably link the permanent presence of psychiatric and neurological manifestations of epileptic activity in functionally important regions of the brain. The mechanisms of non paroxysmal epileptic disorders are common with mechanisms of epileptogenesis.

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State of reticular fibers in various forms of polypoid rhinosinusitis

Abstract: Nasal polyposis is a condition which brings physicians more questions than answers. We studied 45 patients with chronic polypoid rhinosinusitis in 2013, whom we performed surgery, followed by morphological and immunohistochemical studies of macropreparations. All types of polypoid tissue had been divided into “eosinophilic” and “neutrophilic” forms. The study showed that “eosinophilic” polypoid rhinosinusitis had greater swelling and degradation of reticular fibers in comparison with the “neutrophil” polypoid rhinosinusitis.

Keywords: chronic polypoid rhinosinusitis, morphological study, immunohistochemical study, reticular fibers.

Chronic polypoid rhinosinusitis (CPRS) — a chronic inflammatory disease of the mucous membrane of the nasal cavity and paranasal sinuses characterized by the formation and growth of recurrent polyps, consisting mainly of edematous tissue infiltrated by eosinophils and neutrophils [1; 2; 3].

Traditionally nasal epithelium considered as a passive barrier, covering the nasal cavity, which protects tissues from various pathogens and allergens [4]. At the same time gradually accumulated evidence that the epithelium — an active participant in the immunological response. In nasal polyposis, it conducts like an active participant in the pathogenesis and as a passive target in pathological processes [4; 6]. The basic structure of stroma of nasal polyps consists of connective reticular fibers. Reticular fibers (diameter 0.5–2 mm) is a product of the synthesis of reticular cells. They are found in the impregnation salts of silver, so called argyrophilic. These fibers are resistant to weak acids and bases and digested with trypsin [5; 6]. Actually reticular fibers are final formation, containing collagen type III. Reticular fibers mucosa provides elasticity of the mucous membrane of the nose and paranasal sinuses. By extensibility, these fibers are intermediate between collagen and elastic tissue [6].

Many authors give a leading role in the development of CPRS to eosinophils infiltrating the stroma polyp [1; 2], not taking into account the type of histological structure of other optional stromal cells, which infiltrated polypous-altered mucosa. Depending on the infiltration of the stroma of the mucous membrane polyps are divided into “infectious” (neutrophilic) and “allergic” (eosinophilic) [7]. This fact is justified

on the predominance of eosinophils during allergic inflammation and neutrophil — with non-allergic inflammation [7].

Based on the above, **the aim** of our study was to investigate the reticular fibers in various forms of chronic polypoid rhinosinusitis.

Material and methods. The material of this study were paraffin sections of surgical specimens, removed during endoscopic surgery of the nose and paranasal sinuses in 45 patients aged 18–77 years who were hospitalized to the ENT department of 3-rd clinic of the Tashkent Medical Academy (32 men and 13 women) in 2013. Morphological and immunohistochemical studies were conducted on paraffin-embedded surgical material with thickness of 3 mm. The morphological study was consists of painting by hematoxylin-eosin. With the help of morphometry we revealed polypoid forms by determining the prevalence of eosinophil and neutrophil infiltration. The immunohistochemistry with impregnation by silver staining was carried out with at Gordon-Suite method for determining the reticular fibers of the stroma of the nasal polyps. The results of the survey were evaluated with magnification of 40*10 on the light microscope. Statistical analyses were carried out on the Microsoft Excel 2010.

Results. Morphologic study of the mucous membrane of polyps in patients with CPRS stated the desquamation of ciliated epithelium, edema of the lamina propria, which was heavily infiltrated by eosinophils and neutrophils, plasma, goblet cells, blood vessels.

The morphological symmetry of postoperative material of 33 cases (73,3%) stated the prevalence of eosinophilic in-

filtration of the stroma of the mucous membranes of the nose and paranasal sinuses, 12 cases (26,7%) noted the predominance of neutrophilic infiltration of the stroma of the mucous

membranes of the nose and paranasal sinuses (Fig.1,2). In this regard, the patients were divided into two groups: patients with "eosinophilic" and "neutrophilic" rhinosinusitis.

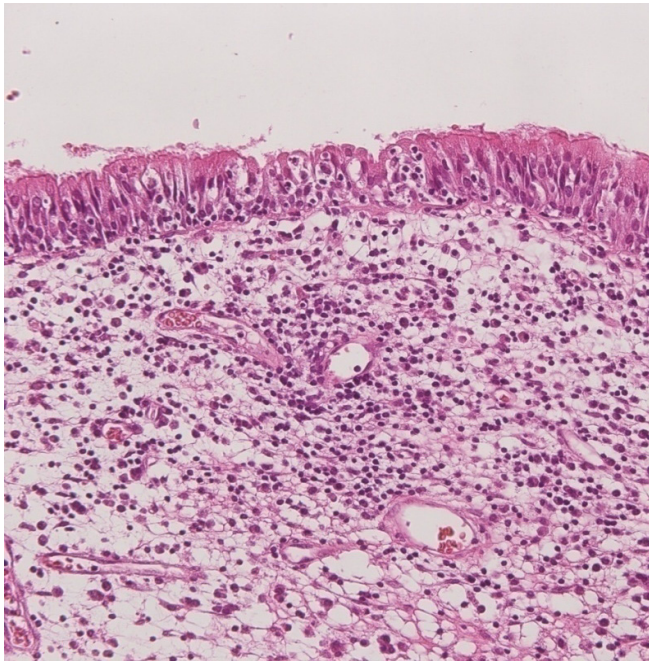


Fig. 1. The magnification of $\times 200$. Nasal polyps. Morphologic study determined the prevalence of neutrophilic infiltration of the stroma of the mucous membranes of the nose

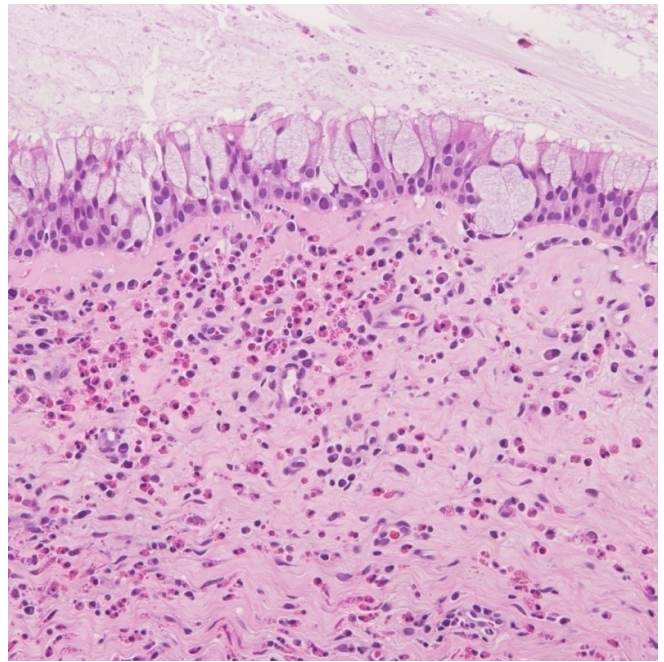


Fig. 2. The magnification of $\times 200$. Nasal polyps. Morphologic study determined the prevalence of eosinophilic infiltration of the stroma of the mucous membranes of the nose

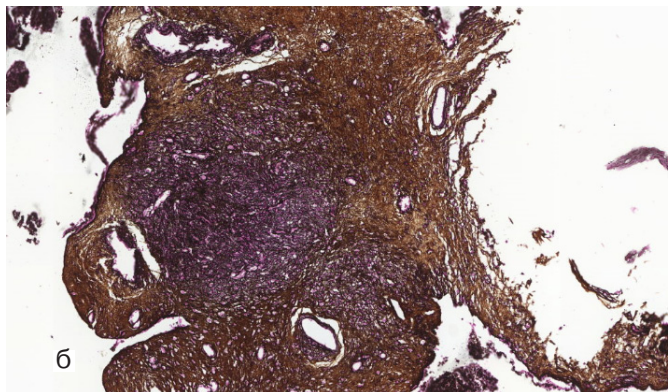
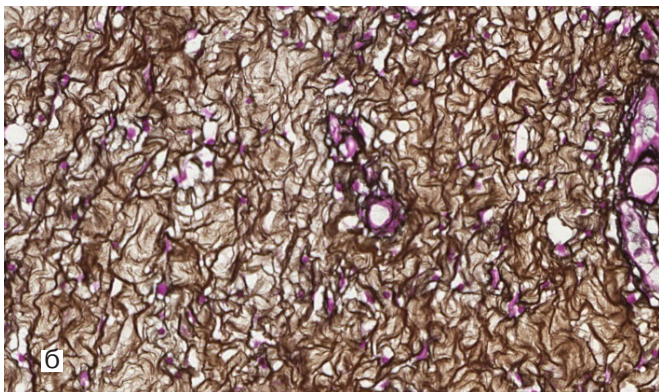
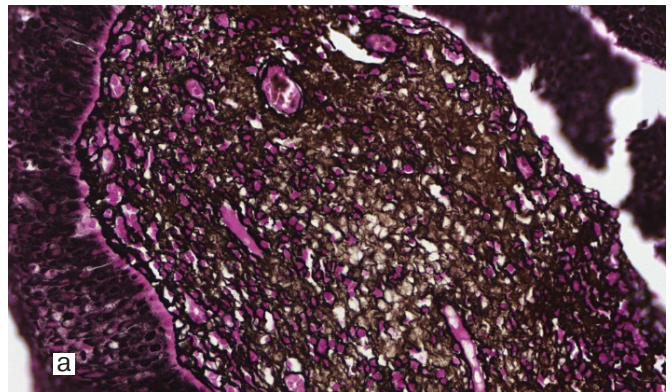
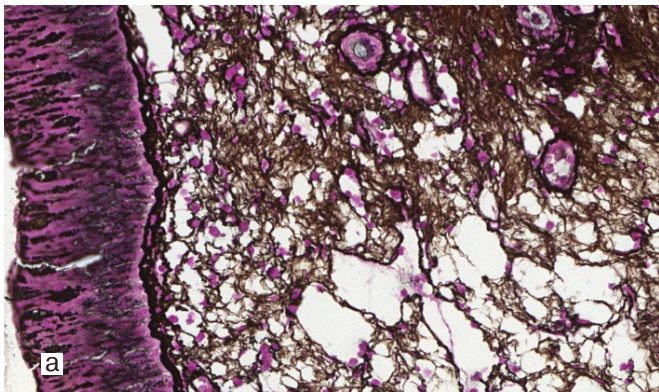


Fig. 3 (a, b). The magnification of $\times 200$. Painting polyps on Gordon's method in patients with "eosinophilic" polypoid rhinosinusitis

Fig. 4 (a, b). The magnification of $\times 200$. Painting polyps on Gordon's method in patients with "neutrophilic" polypoid rhinosinusitis

As stated above, the impregnation by silver staining was carried out with Gordon-Suite method for definitions of reticular fibers of the stroma of nasal polyps (Fig. 3, 4). With this type of paintings there were well visualized connecting reticular fibers.

In our investigation, «eosinophilic» polypoid rhinosinusitis marked edema, common in several vacuoles (Fig. 3). Edema includes infiltrated tissues and fluids. Reticular fibers were destroyed and degraded, with the swelling of the vascular endothelium. In «neutrophil» polypoid rhinosinusitis we observed the reticular fibers which were tightly interconnected (Fig. 4).

Discussion. Since ancient times, many scholars have presented different classification of nasal polyps. Kakoi and Hiraide (1987), in a series of 175 patients, subdivided polyps into 3 groups: edematous polyps (60%), cystic or glandular polyps (27%) and fibrous polyps (13%) [3]. Davidsson and Hellquist (1993) analyzed 95 patients and classified polyps histologically into four categories: edematous, eosinophilic or “allergic” polyps (86,3%), fibroinflammatory polyps (7,3%), polyps with seromucinous gland hyperplasia (5,3%) and polyps with stromal atypia (1,1%) [3]. Hellquist (1996) analyzed in detail the histological differences between the polyps found in his first study. As a result, his paper became the main reference in the literature on the morphological classification of nasal polyposis [3]. In the current study,

we found that the separation of nasal polyps to “eosinophilic” and “neutrophilic” form are reasonable and help determine the course of the disease. In our study by using morphological study we have seen many of the above forms of polypoid tissue, however they are not fully characterized for polypoid process which in our view can be presented in two forms: eosinophilic and neutrophilic polyps. These statements are perfectly in tune with the views of Shin S. H. (2014) and Tecimer S. H. (2015), who supported this opinion [6,7]. We therefore classified such polyps according to their most relevant features. Analyzing of our investigation, we could note that status of reticular fibers showed that for “eosinophilic” polyps proceeds more burdened and requires more careful attention in the diagnosis and treatment.

Thus, based on the survey data, **in the conclusions follow:**

1. In our study, all polypoid rhinosinusitis divided into eosinophilic and neutrophilic types according to their pathologic features. Identification of different forms of chronic polypoid rhinosinusitis is appropriate to determine the flow of the process followed by selection treatment of nasal polyps.

2. The “eosinophilic” polypoid rhinosinusitis observed more pronounced inflammatory reaction as swelling and degradation of the reticular fibers than “neutrophilic” polypoid rhinosinusitis.

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Characteristics of functional conditions of taste analyzer of tobacco cultivation employees

Abstract: On the basis of carried out complex investigations has been estimated that between tobacco cultivators it is observed disorder of taste analyzer as increasing, decreasing and dys-geusia of taste sensitivity. That is why

these disorders can serve as integral indications of negative influence of production factors of tobacco growing into the organism of employees.

Keywords: tobacco, sensitivity, threshold sense, acidic, salty, bitter, sweet, dysgeusia.

Tobacco industry is one of the highly developing branch of agricultural sector of CIS countries and presented by farmsteads, cultivating tobacco and producing its primary processing, fermentation plants, tobacco factories and fabrics. Principal unfavorable production factor, negatively influencing into the employees organism are: alkaloids (first of all nicotine), nitrogen bearing substances of non alkaloid groups (ammonia, asparagines, and glutamines), amines, essential oils and gums. It is established that content of nicotine in the tobacco oscillates from 2 to 2.3%, nitrogen bearing substances of non alkaloid groups — from 3 to 4.6%, essential oils to 2.7% from dry substance, mineral substances — from 7 to 22% [1; 2].

Pesticides (fozalon, herbicides, insecticides) may also enter into the composition of tobacco, which are used as supplements of plants from diseases, weeds and plant pests. It is considered that during the tobacco preparation periods during the case and dehumidification occurs decomposition of pesticides under the influence of high temperature and moisture. But there may be residual content of pesticides in charge product [3].

Meanwhile, in the literature there are data about, that changes in functional conditions of taste analyzer is one of the earlier harmful influence of many chemical substances into the human body [4; 5].

The aim of present research was learning of the condition of taste sensitivity in tobacco employees by the comparison with the control group of examined.

Materials and methods. We studied functional condition of the taste organ of 240 employees in Urgut tobacco cultivating district of Samarkand region, engaging with technological process in tobacco plantations (cultivation, breaking,

harvesting, drying, stringing), (main group of investigated) by the indicator excitability, (threshold of stimulation) taste analyzer and in 242 workers of Samarkand vegetable growing district, where relatively ecologically clean zone (control group of investigating). In determination of threshold stimulation were used methodic of drop irritations, offered GOST P ISO 3972–2005 [6].

Received data undergone to statistical data processing with the application package of Microsoft Excel program. Authenticity of the difference was determined by the Student criteria.

Results and discussion. As the results of carried out research (table), that between tobacco cultivations is observed high rate both absolute (from 4.9 to $38.8 \pm 4.4\%$), and differential ($65.4 \pm 3.9\%$) limens of taste. In particular, unchangeable absolute threshold of taste to sweet is observed in 13.4% of tobacco planter, to bitter — 18.3%, to acidic — in 21.9%, to salty in 41.5% of investigated.

More common changes of threshold sense of taste in type of its increasing (23.2%), decreasing (41.5%) and lack (17%), dysgeusia (4.9%), took place during the investigation of taste analyzer to the sweet. Less threshold of taste perception has been changed to bitter (increasing — 19.5%, decreasing — 36.6%, inversion — 10.9%, lack of taste sensibility — 14.6%, to the acidic (increasing 10.9%, lack of taste sensibility 14.6%, and to acidic (increased 10.9% and lack of sensibility — 9.8%). The least disturbances of the taste sensibility has been observed during the investigation of taste sensibility to salty (increasing of threshold of the taste in 3.4%, decreasing in — 36.6%, dysgeusia in — 14.6%, lack of threshold of taste in — 4.9% of investigated).

Table 1. Rate of disturbance of taste analyzer in tobacco planters (main group) in comparison with the control group ($M \pm m$, to 100 investigated)

Taste substance	Workers' group	Condition of threshold sense					Changes of differential threshold
		norm	increased	decreased	dysgeusia	lack	
Sweet	Main	13.4 ± 3.7	23.2 ± 4.8	41.5 ± 5.4	4.9 ± 1.2	17.0 ± 4.3	65.4 ± 3.9
	Control	88.6 ± 4.2	–	11.4 ± 4.0	–	–	–
	P	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Salty	Main	41.5 ± 4.1	3.4 ± 0.5	36.3 ± 4.3	14.6 ± 2.0	4.9 ± 1.0	–
	Control	96.2 ± 5.6	–	3.8 ± 0.7	–	–	–
	P	<0.01	<0.001	<0.001	<0.001	<0.001	
Acidic	Main	21.9 ± 3.7	10.9 ± 2.1	38.8 ± 4.4	19.5 ± 2.9	9.8 ± 1.5	–
	Control	92.3 ± 4.6	–	7.7 ± 1.8	–	–	–
	P	<0.001	<0.001	<0.001	<0.001	<0.001	
Bitter	Main	18.3 ± 3.3	19.5 ± 2.4	36.6 ± 4.2	10.9 ± 1.6	14.6 ± 2.0	–
	Control	34.3 ± 3.7	–	5.7 ± 1.0	–	–	–
	P	<0.001	<0.001	<0.001	<0.001	<0.001	

Decreasing of the threshold of the taste took place in a small part of employees in the control group as well (to sweet in — 11.4%, to salty in — 3.8%, to acidic in — 7.7, to bitter in — 5.7%). Changes of differential taste threshold was observed only in the men of the main group and rather high rate (in 65.4% of workers). In other words, changes of absolute taste threshold in tobacco planters in many cases combine with the changes of the differential threshold of the taste.

Very characteristic dependence from professional experience discovered during the rate analysis of disorder of taste analyzer in tobacco plant workers in different experience groups. Analysis of this material showed, that disturbance rate of the absolute taste threshold of taste analyzer with the increasing of work experience in tobacco industry grows considerable.

In particular, constant absolute sensitivity of the taste threshold to the sweet in comparing groups observed in proportion in 11 (18.1%), in 10 (17.2%), in 10 (15.3%) investigated (in 4th experienced group cases of constant taste threshold to the sweet have not been observed), to salty in 39 (65.3%), in 28 (48.4%), in 16 (24.6%), in 10 (17.5%) workers, to acidic in 22 (36.6%), in 20 (34.4%), in 15 (23.2%) workers (in 4th experienced group cases of constant taste threshold to the acidic have not been observed), to bitter in 22 (36.6%), in 14 (24.1%), in 10 (15.3%), in 10 (17.5%) investigated. In tobacco growing with 5 years work experience in many cases took place increasing of taste threshold of the sweet- in 39 (65.3%), acidic — in 27 (45.3%) and bitter in 28 (46.8%). Increasing of threshold irritation to salty noticed less in 11 (18.1%).

As with the increasing of work experience rate of disorder of taste sensitivity like increasing of absolute threshold decreases (increasing of taste threshold have been observed only to the sweet in men with work experience from 5 to 9 years, and in older experienced groups have not been observed at all).

By the extension of work experience increases the rate of decreasing of taste sensitivity right up to absolute losing taste sense. In employees with more than 5 years work experience begins perverted sensitivity of taste irritations to the salty and acidic. The frequency of this type of disorder achieves the dimension in workers of 4th work expediency group, at

that all types of taste irritators: to acidic in 26 (45.6%), the sweet — in 12 (21.1%), the salty — in 11 (19.2%), and bitter in 10 (17.5%).

The frequency of the taste analyzer disorders in tobacco growing by the indicator of threshold irritation against from the work experience in tobacco growing (in brackets indicated percentage of the investigated). It is necessary to note, that in 3rd group (10–15 years) begins expose of taste lack sensitivity to the sweet in 15 (23.2%), to the bitter — in 11 (16.9%), and to salty 10 (15.3%), in fourth work experience group (more than 16 years) to all types of taste irritators.

The most often lack of sensitivity in fourth work experience took place to the acidic in 26 (45.8%), to the sweet in 20 (35.1%) and to acidic in 20 (35.1%), the least to the salty in 10 (17.5%). Frequency of disorder of differentiated taste threshold increases as well with the longitude of work experience: in 16 (26.6%), in the first work group, in 22 (37.9%) — in the second, in 41 (63.0%), in the third in 47 (82.4%) in the fourth.

So between tobacco growing regions with work experience more than 5 years with high frequency it is observed disorder of functional condition of taste analyzer in the type of increasing (18.1–65.3%) of absolute threshold, and by increasing of the work experience (more than 5 years) decreasing, dysgeusia and the lack of taste sensitivity (16.6–48.4%).

Especially important by our point of view is the fact that disorder of taste sensitivity with high rate observed in those tobacco growing, which are not seen visible disorders of general health condition. At the same time with the taste threshold sensitivity we determined the disorder of differential threshold. ($65.4 \pm 3.9\%$). It is known [7] that processes of determination of the differentiated threshold are connected both the changes as peripheral and central departments of taste analyzer.

The conclusions: 1. That is why determination of differential taste threshold disorder in practical healthy workers allows to consider taste disorder one of the earlier signs of toxic lesion of central nervous system. 2. This by our opinion, should have determined value in the early diagnostics of the determination of harmful affects of productive factors of tobacco growing into the organism of workers.

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Simultaneous laparoscopic surgery in gynecology and surgery

Abstract: The presence of many patients with combined pathology, which according to the WHO is 30–40%, confronts surgeons and gynecologists the problem of possibility of simultaneous correction of this pathology. Relevant is the question of the necessity and safety of invasive techniques, both classic and minimally invasive, using the endosurgical techniques.

Keywords: simultaneous laparoscopic surgery, calculous cholecystitis.

Relevance. Simultaneous operations due to their technical, economic, and psychological benefits were the subject of a comprehensive study over a long period and currently do not cause debates in the literature [8]. Despite this rare diagnosis of comorbidities in the preoperative period can be explained by the fact that the identification of only one of the diseases usually satisfies the doctor and the patient stops further inspection [4]. One of the most common diseases, which are performed Combined operations using endoscopic techniques in gynecology is calculous cholecystitis [2].

The purpose of study. The aim of our study was to study performing simultaneous operations with a combination of gynecological pathology and cholecystitis laparoscopic access.

Material and methods. In the department of Endoscopic Surgery of Samarkand city for the period of 1996–2014, to 508 patients (I group) were conducted simultaneous operations in gynecological and surgical pathology, and to 1548 patients (II group) was performed isolated laparoscopic cholecystectomy. Both groups of patients matched for age: the average age of the patients was respectively $39,4 \pm 2,8$ and $40,2 \pm 4,5$ years (the difference is statistically insignificant, $P < 0,01$), presented by women of childbearing age.

Group I of patients was distributed as follows. Laparoscopic cholecystectomy combined with surgical sterilization was performed in 588 women. In 10 cases, the intervention extended by hernia repair of an umbilical hernia. In 110 patients cholecystitis was combined with competing genital disease as cystoma ovary. In 20 cases the operation was combined with conservative myomectomy. The follicular ovarian cyst was the cause of simultaneous operations in 22 patients.

In group II, all operations are produced by laparoscopic access of the standard 4 points. To all gynecological patients before surgery was performed ultrasonography of the liver and gallbladder, and all patients with calculous cholecystitis were examined by gynecologist for the presence of gynecological pathology. Examination and preparation of patients for surgery was conducted on an outpatient basis.

Results and discussion. All operations were performed on laparoscopic equipment the company «Karl Storz» (Germany) under Intubation anesthesia. In group I, the most frequently performed laparoscopic cholecystectomy with surgical sterilization (588 patients). Moreover, surgical sterilization was performed in the presence of 3 or more children of different sexes, aged over 35 years and with the written informed consent of both spouses.

Laparoscopic surgical sterilization was carried from the same points as in the LCE without additional puncture. Statistically significant increase in the duration of the operation is not revealed ($p < 0,001$).

When conducting simultaneous operations in addition to standard points for the production of LCE was performed additional 5 mm puncture in the left and right iliac region. We can not agree with the opinion of some authors [3] that for simultaneous operations at LCE right 5 mm trocar is placed at the level of the anterior spine of the right iliac region, as it complicates cholecystectomy. At the same time the extreme right port set for cholecystectomy, it allows manipulation of the uterine appendages.

In addition to the LCE was made laparoscopic salpingo-oophorectomy for ovarian cystoma about 110 patients. Of them 22 — regarding cystoma dermoid ovarian wherein preparations removed from the abdominal cavity through the rear colpotomy hole order to prevent the contents of the abdominal cavity of teratomas. In these cases through the posterior vaginal fornix was injected 11 mm trocar to avoid the loss of pnevmoperitoniuma. After removal of the surgical material the posterior fornix was sutured on the part of vagina by nodal dexon seams with the installation of pelvis drainage.

LCE was combined with resection of ovarian regarding follicular cysts and secondary infertility in 22 patients.

LCE with surgical sterilization and plasticity of the umbilical ring regarding umbilical hernia was performed in 10 cases. In the presence of this pathology intervention began with the isolation and dissection of the hernia sac.

Trocar for the laparoscope was set into the abdominal cavity, after sealing the previously imposed on the fascia nodal silk sutures. Operation was completed by plastics umbilical ring at Mayo. According to I. E. Hatkova, A. A. Nikolaenko, V. S. Datsenko [4] it is better to remove the gallbladder from abdominal cavity through the hernial ring. In our opinion, better when gall bladder removed from the the abdominal cavity through a median 11 mm trocar, because removing it through the hernial ring in the navel ring can lead to infection with the development of further recurrence of hernia.

Conclusion

1. It is necessary to work out indications for conservative and opera-tive treatment and establish the extent of surgery when performing simultaneous operations.

2. In order to reduce the duration of hospital stay in the preoperative period is necessary to maximize the survey on an outpatient basis.

3. Collaborate in one surgery and gynecology department enables us to apply new types of surgical intervention and, in particular, to produce different profiles of simultaneous operation, to reduce the time patients stay in the hospital several times.

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Phytochemical characterization of *rhodiola heterodonta* dry extract

Abstract: The *Rhodiola heterodonta* 75% ethanolic extract was dried and dry substrate chemical constituents were characterized. Identification of main phytochemicals in dry extrac carried out using Agilent 1260 Infinity HPLC system equipped with triple quadrupole mass-detector 6420. The phenylethanoids — rosavin, rosarin, salidroside, tyrosol, heterodontoside, viridoside and mongrhoside as a compounds stipulating pharmacological activities, on a level with epigallocatechin-gallate and rhodiocyanoside A were quantified.

Keywords: Dry extract of *Rhodiola heterodonta*, phytochemical characterization, Identification, salidroside.

Introduction

The herbal compositions of *Rhodiola* ssp and extract from these extensively used in folk medicine plants are high effective remedy with broad desired activities such as adaptogenic, immune stimulation etc. In mountain area of Central Asia grows *Rhodiola heterodonta* [1]. Close pharmacological properties of this plant with more known *Rhodiola rosea* (golden root) and easy accessibility for industrial scale creation of herbal

medicinals are reason for it phytochemical investigation.

Aim of this work was identification of salidrrsoid in *dry Rhodiola heterodonta* rhizome extract.

Results and discussion

The dry extract of *Rhodiola heterodonta* prepared as described [2] was studied for determination characteristic constituents. Main biological active constituents — phenylethanoids were determined using LC–MS (Fig.1)

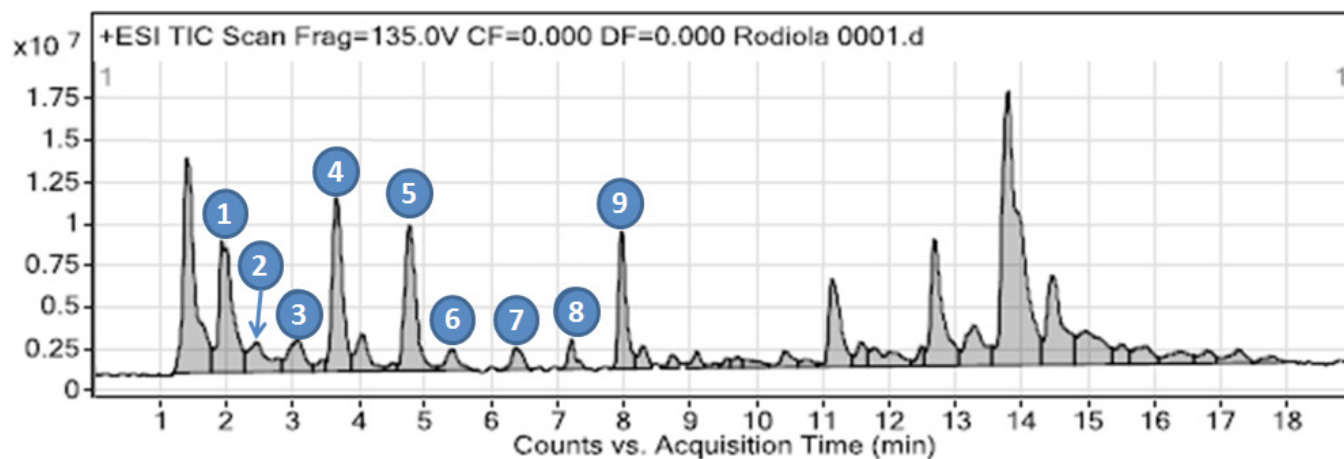
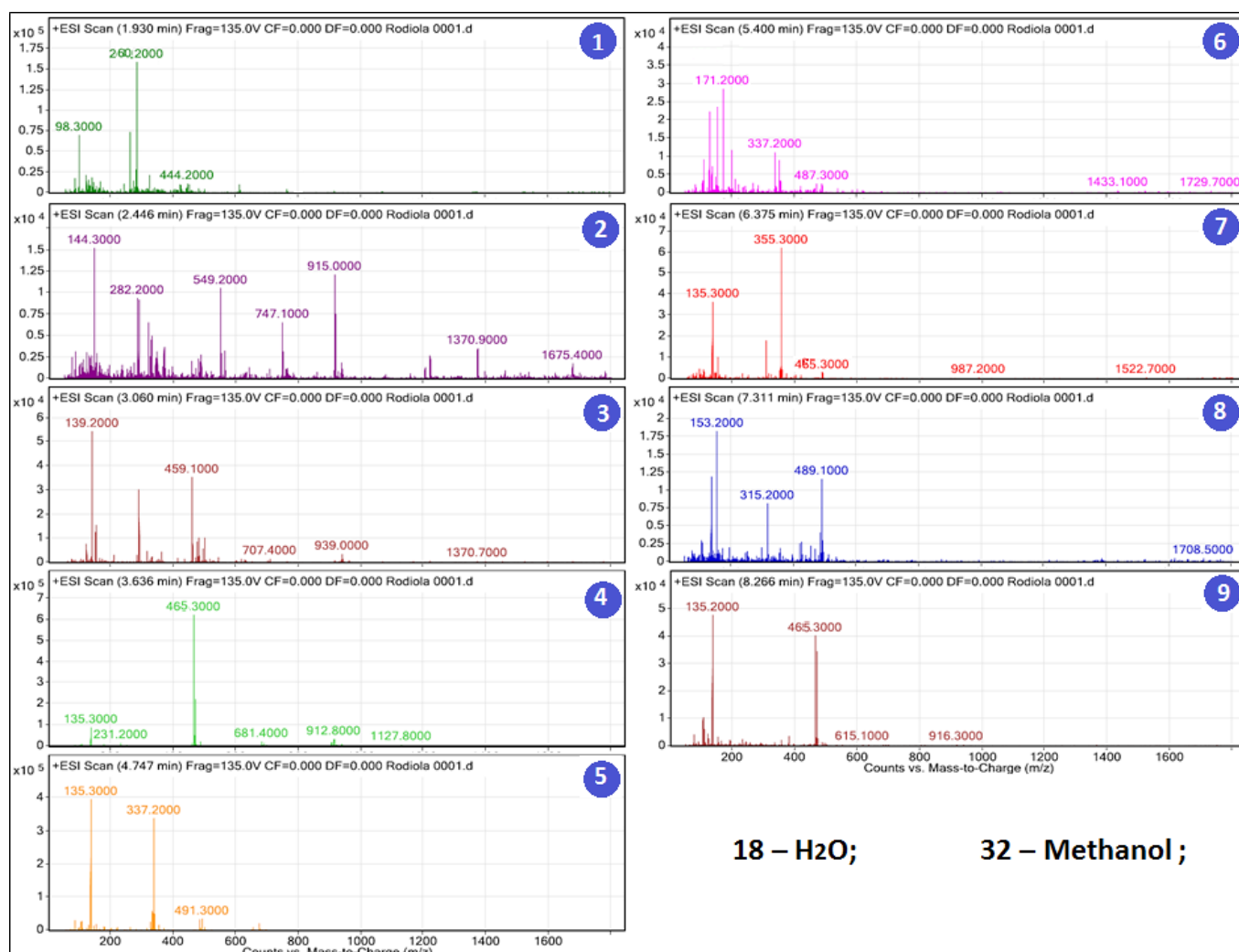


Fig. 1. Total ion chromatogram of dry *Rhodiola heterodonta* extract, Positive ESI mode



18 – H₂O;

32 – Methanol;

Fig. 2. Mass spectrums for peaks of dry *R. heterodonta* chromatogram. Peak numbers same as in Fig. 1

Identification of phenylethanoids in MS-scanning mode (Fig.2) allows identifying 9 compounds in dry extract. These compounds are:

- (1) –1.93 min 260 [M+H]⁺, rhodiocyanoside A, M=259;
- (2) –2.44 min 915 [M+H]⁺, dimer of EGCG, M=914;
- (3) –3.14 min 459 [M+H]⁺, rosavin⁺, M=458;
- (4) –3.68 min 465 [M+2 (18)+H]⁺, rosarin, M=428;
- (5) –4.75 min 337 [M+2 (18)+H]⁺, salidroside, M=300;
- (6) –5.40 min 171 [M+32+H]⁺, tyrosol, M=138;

(7) –6.38 min 465 [M+18+H]⁺, heterodontoside, M=446;

(8) –7.31 min 315 [M+H]⁺, viridoside, M=314;

(9) –8.26 min 465 [M+18+H]⁺, mongrhoside, M=446.

Quantitative determination of identified compounds was carried out by RP-HPLC (Fig.3). Studied *Rhodiola heterodonta* extract contains 14.50 ±2.5% of total phenylethanoids and cyanoglycoside (rhodiocyanoside), rosarian, salydroside and mongrhoside were main phenyl

ethanoids in dry extract. Salydroside content was $3.65 \pm 0.50\%$
Content of oligomeric proanthocyanidins (epigallocatechin

gallate — EGCG and dimer of EGCG) was at trace amount
($0.75 \pm 0.07\%$).

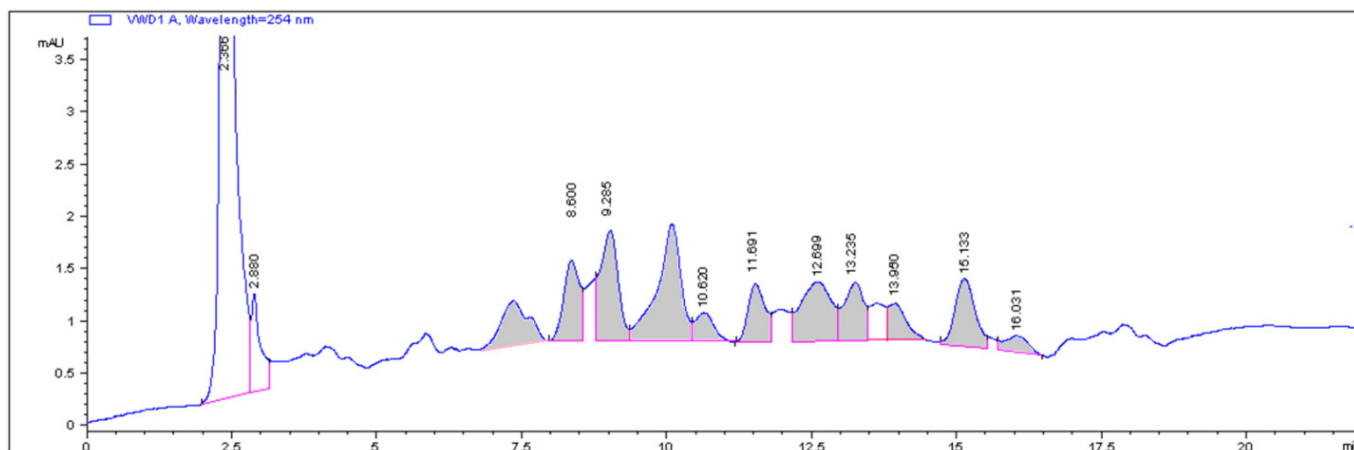


Fig.3. HPLC of dry *R. heterodonta* extract

Conclusion

The chemical constituents of dry *Rhodiola heterodonta* extract determining of its complex biological activities was determined. It is shown, that in dry extract preserved all of attributable for studied source constituents which are

responsible for adaptogenic and other complex activities. At the same time epigallocatechin gallate and related compounds were determined at trace level, possible of their instability in drying conditions, therefore this fraction of dry extract contribute to total bioactivity minimally.

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The value of the factors of endothelial dysfunction in the development of abruption placentae

Abstract: Interpretation of the value factors of endothelial dysfunction in the development of abruption placenta.

Keywords: endothelial dysfunction, premature detachment of normally located placenta.

Vasculature of the placenta has plasticity and dynamic changes during pregnancy. During vasculogenesis new capillaries are formed by migration and differentiation progenitor endothelial cells. These processes are controlled by these vascular factors such as vascular endothelial growth factor (VEGF), fibroblast growth factor (bFGF) and its receptors VEGF-R and FGF-R.

It is established that endothelial cells express receptors VEGF-R, whereas VEGF, trophoblast cells express providing differentiation, migration and proliferation of endothelial cells, the formation of new vasculature. Motherboard vessels transformed to provide the utero-placental blood circulation. Trophoblast invasion occurs deep in the maternal spiral arteries, which are completely destroyed, and

the placental labyrinth represents the open end of the spiral arteries. Further development of the placenta vasculature by angiogenesis is [1]. In the endogenous regulation of angiogenesis growth factors involved such as bFGF, VEGF, placental growth factor (PLGF). The principal sources of these factors in the placenta can be both endothelial cells themselves, or placental macrophages. VEGF has angiogenic effect, stimulating migration, proliferation, and proteolytic activity cells. PLGF potentiates endothelial proliferation stimulating action VEGF, and increases vascular permeability. In the later stages of angiogenesis, macrophages, fibroblasts and smooth muscle cells secrete angiogenic factors which inhibit the migration and proliferation of endothelial cells without affecting their viability [5].

Thus, for the normal development and function of the placenta important balance between the various mechanisms of angiogenesis, and the balance between the processes of angiogenesis and apoptosis, which is supported by the relation of proangiogenic and antiangiogenic factors secreted by both the endothelial cells and the cells microenvironment. Changing the balance of cytokines and growth factors, vascular endothelial cells in the microenvironment is the basis of pathological placentation disorders, gestational age at different stages of pregnancy and preterm delivery [2; 3].

Currently, there are a number of studies showing the marked decrease of VEGF and PLGF in preeclampsia, and noted a direct correlation depending on the severity of a pathological condition. [2] In addition, studies of several authors the opportunity of forecasting and early diagnosis of severe placental insufficiency with monitoring the blood levels of markers of endothelial dysfunction, placental proteins maternal placental membranes, apoptosis and cell proliferation [4].

Objective: In this connection, the aim of our study was to determine the role of vascular endothelial growth factor and placental, and von Will brand factor and fibronectin in the development of detachment normally situated placenta in pregnant women without hypertensive syndrome.

Material and methods

We examined 90 pregnant women and their newborns. The main group consisted of 60 pregnant women without hypertensive syndrome and premature detachment of normally situated placenta (PONRP) and their newborns. The control group consisted of 30 healthy pregnant women and their newborns.

Determined vascular endothelial factor (VEGF) and placental growth factor (PLGF), fibronectin and von Willebrand factor (vFW) in the blood of pregnant women and umbilical cord blood of newborns.

Research VEGF, PLGF and fibronectin was performed by ELISA using enzyme immunoassay analyzer AT 858 (LTD, China) using reagents: VEGF (VECTOR BEST) Novosibirsk, FER, fibronectin «ELISA» Germany (DRGPLGFELISAEIA-4529). Von Willebrand factor was determined on the aggregometer "Biola."

Results and discussion

We noted that among women with inflammatory diseases PONRP genitalia occurred in 24 (40.0%). Moreover, chlamydia, herpes simplex virus (HSV), cytomegalovirus (CMV), mycoplasma occurred in 52 (86.7%). Also, among women with PONRP, artificial abortion were in 10 (16.7%) pregnans. Technie pregnancy in 50 (83.3%) of women proceeded against the background of the threat of termination of pregnancy. Thus, the threat I had half of pregnancy in 28 (46,7%), II half of pregnancy — in 22 (36.7%). In addition, acute respiratory infection on the background of pregnancy was in 22 (36.7%) women. Fetoplacental insufficiency (FPI) was in 27 (45.0%).

Thus, pregnant women with gestational PONRP proceeds against the background of the threat of termination of pregnancy I and II half (83.3%), FPI (45.0%). Chlamydia, HSV, CMV, mycoplasmas are found in 86.7%, as well as viral respiratory infection y 36.7%, which is likely to be risk factors for placental abruption. When determining VEGF levels in pregnant women with PONRP determined significance to increase to $14,2 \pm 0,73$ pg/ml ($P < 0.001$) compared to the control group. Determined sensitivity VEGF — 94.3% and specificity — 91.5%

Also, increasing the vFW to $103,6 \pm 6,06\%$ ($p < 0.001$), and fibronectin to $392,8 \pm 16,26$ pg/ml ($P < 0.001$). In determining the sensitivity vFW was 90.9%, specificity — 88.9%, and fibronectin — 92.9% and 91.8% respectively.

However, level PLGF was significantly decreased in the intervention group compared with the control group to $182,8 \pm 8,24$ pg/ml ($P < 0.001$). PLGF sensitivity was 92.6%, specificity — 87.0%. The umbilical cord blood from newborns established a sister picture changes. A significant increase in VEGF to $12,6 \pm 0,71$ pg/ml ($P < 0,001$), vFW — $91,8 \pm 5,86\%$ ($p < 0.001$), fibronectin — to $319,5 \pm 12,68$ pg/ml ($P < 0.001$) and decrease PLGF to $173,6 \pm 9,34$ pg/ml ($P < 0.001$). According to the literature [3; 4] PONRP activation vascular and placental growth factor, which leads to an increase in VEGF and decrease PLGF in the blood of pregnant women with PONRP compared to healthy pregnant women, which indicates the failure of the endothelium of blood vessels in the walls of the uterus and placenta, possibly contributing to the manifestation of the clinic PONRP. In this connection, it is possible to assume the possibility of using these indicators. As diagnostic criteria for the diagnosis of PONRP.

Questions the value of growth factors in the development of various pathological conditions of pregnancy has long debated in the scientific literature [2; 4]. Changing the balance of endogenous regulators of angiogenesis and compounds that control vascular tone placenta obviously contributes to the violation of blood between mother and fetus and. therefore, it affects the entire course of metabolic processes in between. There is an imbalance on the concentration of vasoactive substances (vasodilators and vasoconstrictors), between which in normal conditions there is a relationship and a balance. The shift of the latter may lead to an increase or decrease in vascular tone, aggregation, disaggregation of blood cells, increase or decrease in the number

of vascular cells [1; 5]. Great value for a normal pregnancy and an important pathogenetic role in the development of its complications plays von Willebrand factor. Its main function is to regulate the adhesion of platelets to the damaged vessel walls: it is the link between platelets and thrombogenic surface, and is the focal mechanism of the three units of the hemostasis system -vascular, platelet, coagulation. During pregnancy, increases the concentration of the von Willebrand factor. During pregnancy, it increases the concentration of the von Willebrand factor. Impaired production of von Willebrand factor associated with abnormal endothelial cells that plays an important role in the thrombogenicity and tromboresistance vessels [2].

Nearby studies found that women with preeclampsia and PONRP revealed an increase in blood levels of adhesive protein von Willebrand factor, and fibronectin. However, at risk for the development of thromboembolic complications should include pregnant women with pre-eclampsia, heart diseases, kidney disease, liver disease, obesity, diabetes, varicose veins, you need to survey markers of endothelial dysfunction Villebrand factor and fibronectin, direct markers of intravascular coagulation, natural coagulants and others [4;

5]. Thus, according to the results of the research and analysis of the literature, we can recommend the use of markers of endothelial dysfunction, such as vascular endothelial growth factor and placental, and von Willebrand factor, and fibronectin for the prediction of placental abruption, which will enable early diagnosis and develop an adequate tactics Management of patients.

Findings Risk factors for the development of placental abruption include: infection, sexually transmitted infections (chlamydia, herpes simplex virus, cytomegalovirus, mycoplasma), threatened miscarriage I and II pregnancy, fetoplacental insufficiency.

Premature detachment of the placenta develops in the background of severe endothelial dysfunction, which is accompanied by an increase in the blood of pregnant vascular endothelial growth factor of 1.5 times and a reduction placental growth factor of 1.9 times.

Violation imbalance findings endothelial dysfunction is accompanied by severe thrombosis, which is accompanied by an increase in von Willebrand factor of 1.4 times and 1.7 times of fibronectin.

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The reaction of systemic inflammatory response in premature detachment of normally situated placenta

Abstract: The basis of the development of abruption placentas in nulliparous women without hypertensive response syndrome is a systemic inflammatory response. Reaction of systemic inflammatory response characterized by increased TNF- α enhance in 2,6raz, IL-1 β in 3 times, IL-6, 8-fold, as well as index ratios TNFa/IL-10 at 4.1 times and reduces IL-10 in 1,5 times.

Keywords: endothelial dysfunction, cytokine, placenta, interleukin.

In recent years, numerous studies scientists are increasingly point to the importance of the systemic inflammatory re-

sponse in the development of pregnancy complications, such as the habitual pregnancy loss, preterm delivery, placental in-

sufficiency syndrome, intrauterine growth retardation, intrauterine infection, preeclampsia [1; 5; 8]. Factors implementing systemic inflammatory response (SVR) are proinflammatory cytokines, products of oxidative stress, lipids, neutrophils and platelets. The development of the inflammatory cascade leading to disruption of placenta and subsequent pregnancy complications. The increasing concentration of proinflammatory cytokines such as tumor necrosis factor (TNF- α), interferon- γ (IFN- γ) associated with preterm birth, preeclampsia.

Reduction of anti-inflammatory cytokines: interleukin-4 (IL-4), IL-10 — with spontaneous abortion in the I trimester of pregnancy [2; 7; 10].

One of the leading factors of starting the SVR in pregnant women today believes the infection. Long, asymptomatic persistence of infectious agents in the body can affect human reproduction. The presence of chronic infection is diagnosed, many women with infertility and miscarriage. As a result of an imbalance between the body's defense mechanisms and the infectious agent is a change of the immune status, which leads eventually to the reactivation of the infection and the development of autoimmune disorders [3; 4; 9].

The main issues of development of the inflammatory response are under the control of pro-inflammatory cytokines produced by neutrophils, macrophages, T-cells. Proinflammatory cytokines are necessary for the elimination of pathogens from entering the body through a hotbed of neutrophils, macrophages, complement components, launching phagocytic, and bactericidal activity of others. Cytokines are involved in the process of implantation of trophoblast invasion, decidualization, and the development of the placenta and the immune tolerance of pregnancy. The protective role of pro-inflammatory cytokines is shown at their local work in the inflammation. On the other hand, generalized their products is the cause of damage to the organ and tissue levels. This activation is the initial link in the pathogenesis of endothelial lesions, synthesis of antiphospholipid antibodies and adhesion molecules with the subsequent development of thrombophilia and placental insufficiency in pregnancy [4; 6; 8].

Objective: Study the character of changes in the level of cytokines and tumor necrosis factor in nulliparous women with premature detachment of normally situated placenta (PDNSP), without hypertensive syndrome.

Materials and methods

We observed 65 pregnant women with gestational age 28–37 weeks. With PDNSP. Of these, the 1st group included 45 nulliparous pregnant women with mild PDNSP Group 2 (control) consisted of 20 healthy pregnant women with physiological pregnancy. Age of pregnant women was 19 to 34 years. Exclusion criteria were: severe extra genital pathology, multiple pregnancy, abnormalities of the uterus and uterine fibroids, hypertensive syndrome. For the study took 5.0 ml of blood in pregnant women from the cubital vein PONRP. In the blood serum of persons of both groups by ELISA examined the level of cytokines (IL-1 β , IL-6, IL-10) and tumor necrosis factor alpha (TNF- α) in the enzyme immunoassay analyzer (Shanghai Kehua Laboratory System Co.Ltd; KHB st-360) using a set of test systems (JSC «Vector-Best», Russia). Statistical analysis of the results was carried out on a PC using the software package universal «Excel» and «Statistica v.6» using standard parametric and nonparametric methods.

Results and discussion

Analysis of somatic diseases among pregnant women in the 1st group showed that iron deficiency was 20 (45%), thyroid disease 12 (26.6%), chronic tonsillitis 8 (17.8%), chronic pyelonephritis 9 (20%). Healthy women with PDNSP accounted for 12 (26.6%). Noteworthy gynecological diseases among pregnant women with PDNSP inflammatory diseases of the pelvic organs were 13 (28.8%).

Moreover, carriers of infection, sexually transmitted Chlamydia, herpes simplex virus, cytomegalovirus accounted for 14 (31%). Analysis of obstetric history showed the following. The threat of interruptions I and II half of pregnancy occurred in 15 (33.3%) of pregnant women. Clinic PDNSP without labor occurred in 28 (62.3%), 6 (13.3%) — in the latent phase and in 11 (24.4%) — in the process of childbirth.

Table 1. – The cytokines in the blood of pregnant women with PDNSP

Cytokines pg/ml	Group 1 (n = 45)	Group 2 (n = 20)
IL-1 β	80,4 \pm 4,57*	27,1 \pm 2,33
IL-6	58,2 \pm 3,37*	7,3 \pm 0,52
TNF- α	69,7 \pm 4,12*	26,7 \pm 2,57
IL-10	6,3 \pm 0,40*	9,8 \pm 0,89
TNF- α /IL-10	11,1	2,7

Note: * — the differences with respect to the data of the control group p -value <0.001.

As can be seen from the table, all the pro-inflammatory cytokines in pregnant women in the first group was significantly increased compared with the control group. The greatest increase achieved by IL-6, TNF- α , compared with the control group. Thus, the content of IL-1 β first group: 58,2 \pm 3,37 pg/ml; TNF- α 69,7 \pm 4,12; IL-1 β in-

creased to 80,4 \pm 4,57; in comparison with the 2nd group, P <0.001. Whereas anti-IL-10, decreased slightly in the 1st group of pregnant women with PDNSP compared with the control group: 6,3 \pm 0,40 pg/ml and 9,8 \pm 0,89 respectively. In this way, PDNSP essentially initiates changes in cytokine levels in maternal blood. For pregnant women with PDNSP

an increase of proinflammatory cytokines compared with the control group: IL-1 β 3,0 times; IL-6 to 8.0-fold; FNO- α 2.6 times.

We also evaluated the relationships TNF α /IL-10. Thus, when the index PDNSP blood of pregnant increased 4.1 times. There is a single cytokine network placenta involved in reproductive processes throughout pregnancy ensuring the safety and development of the fetus. Disturbances in the intercellular signaling accompanies pathological course of pregnancy. When fetal growth retardation, pathogenesis of which is also associated with inadequate trophoblast invasion in the spiral arteries of the uterus wall, the amniotic fluid increases the level of TNF- α , thereby decreasing the content of granulocyte colony stimulating factor, granulocyte-macrophage colony stimulating factor, IL-1 β .

TNF- α is a multifunctional cytokine with proinflammatory immunoregulatory properties. Its stable concentration of this cytokine notes throughout a normal pregnancy can positively affect its development. On the other hand, under the influence of TNF- α activated NK cells (NK-cells), are capable of lysing trophoblast. TNF- α promotes production of IL-1, -6, and has a strong chemo tactic effect on monocytes, participates in inflammatory responses, induces expression of adhesion molecules on the surface of vascular endothelial cells, which leads to increased adhesion of neutrophils, monocytes to the vascular wall.

TNF- α activates the blood coagulation system, leading to the development of disseminated intravascular coagulation, occurrence of local micro thrombosis in placentation with infarction and subsequent detachment of the placenta. IL-1, and TNF- α stimulate the release of arachidonic acid, and enhance the production of prostaglandins myometrium. IL-6 is the main mediator of the acute phase proteins of inflammation. Under the influence of the infection can lead to increased product development of prostaglandins and premature labor. Women with pregnancy habitual no carrying revealed high levels of IL-6 in the cervical canal.

Maintaining IL-1 at a low level is one of the factors contributing to the preservation of pregnancy. Deficiency of IL-1 β , as a proangiogenic cytokine, may lead to disruption of placental angiogenesis in the early stages of gestation, and as a consequence, spontaneous miscarriage [6; 11; 12].

Interleukin-10 as an anti-inflammatory cytokine is able

to inhibit the cell-mediated immune responses, has a protective effect on the pregnancy. A reduction in the level of IL-10 women to terminate a pregnancy [5; 6].

It is known that increasing the ratio of TNF- α /IL-10 in women with chronic forms of DIC in serum and in scrapings of the endometrium. However, changes in the level of IL-10 in the serum of pregnant women with DIC syndrome is not established. Also, the set offset balance TNF- α /IL-10 in the direction of proinflammatory cytokines. Increased levels of cytokines in the I trimester of pregnancy, even at physiological her current can be regarded as one of the significant risk factors for placental insufficiency FI [10; 12].

Thus, through the development PDNSP nulliparous women who do not have hypertension syndrome probably is the activation of the systemic inflammatory response reactions. Perhaps this is due to the presence of foci of infection and carriers of sexually transmitted infections or with activation of autoimmune processes in the organization of pregnancy. There is a change in the content of cytokines and their ratio, which is accompanied by increase in pro-inflammatory cytokines: TNF α , IL-1 β , IK-6, reduced inflammatory cytokine IL-10 as well as the increase in index ratio TNF α /IL-10. Of course, a change in the established cytokine status in the organization of women with PDNSP will be the trigger for subsequent biochemical molecular processes.

Thus, in accordance with modern concepts of pregnancy complications prognosis determined by the characteristics of immune reactions. In the course of pregnancy can affect both overly strong immune response, and lack of pro-inflammatory reactions. On this basis, the study of cytokine balance is important for the assessment of the immune response and the outcome of pregnancy for both mother and fetus.

Conclusions:

— The basis of the development of abruption placentas in nulliparous women without hypertensive response syndrome is a systemic inflammatory response.

— Reaction of systemic inflammatory response characterized by increased TNF- α enhance in 2,6raz, IL-1 β in 3 times, IL-6, 8-fold, as well as index ratios TNF α /IL-10 at 4.1 times and reduces IL-10 in 1,5 times.

— Changes in the cytokine balance can serve as markers of the development of abruption placentas still at the preclinical level.

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Clinical characteristics of invasive pneumococcal disease in children in Uzbekistan

Abstract: Clinical course of pneumococcal meningitis I s characterized by brain edema, infectious and toxic shock and severe course. It remains one of the main pediatric pathologies with outcomes. Characteristic clinical and laboratory feature of pneumococcal pneumonia is lobar process with frequent right lung lesion and development of pleuritis (6/16,2%), increased number of leucocytes (62,2%) and C-reactive protein (43,7%). Isolated pneumococcal serotypes are included in modern pneumococcal vaccines, which justifies the demand to implement pneumococcal infection vaccination for children in preventive vaccination schedule of Uzbekistan.

Keywords: invasive pneumococcal diseases, pneumococcus, serotypes, children.

Streptococcus pneumoniae (*S. pneumoniae*, pneumococcus) is one of the frequents agents of community-acquired pneu-

monia, meningitis, bacteremia, and acute otitis media among children and adults. According to the WHO, about 155 million

cases of community acquired pneumonia are registered worldwide annually and about 1,4 million lethal cases among children under 5 years old, which constitutes 18% of lethal cases in this age group [1; 2; 3]. Diseases caused by *S.pneumoniae* are divided into invasive and non-invasive based on the severity of course criteria. Invasive pneumococcal infection includes bacteremia, meningitis, pneumonia and other pathological conditions when a causative agent is extracted from organs and tissues which are normally sterile (blood, cerebrospinal fluid, less common synovial, pleural or pericardial fluid [4; 5]).

«The golden standard» of diagnosing invasive pneumococcal infection (IPI) is extraction of pneumococcus from sterile body fluids (cerebrospinal fluid, blood, pleural fluid) by using bacteriological method [4; 5].

Taking into account above mentioned, the goal of our study was to analyze clinical course, study the antibacterial sensitivity of isolated *S.pneumoniae* serotypes from children with invasive forms of pneumococcal infection.

Study materials and methods. Children with purulent meningitis (n=210) and pneumonia (n=265) aged 3 month to 14 years old and hospitalized to specialized hospitals of Tashkent were studied. Study materials were blood, cerebrospinal fluid and pleural fluid. The study was conducted in specialized microbiological laboratories of Tashkent city infectious diseases hospital № 1 and of the Research Institute of Epidemiology, Microbiology and Infectious Diseases, which have specially trained personnel.

To study clinical features of pneumococcal meningitis and pneumococcal pneumonia, data gathered about the patient were considered and analyzed: age, sex, admission date, discharge date, treatment duration, place of residence, characteristic clinical features and disease outcome. Medical history, clinical and laboratory data characterizing main clinical symptoms of the disease, cerebrospinal fluid, blood count, C-reactive protein level, chest X-ray images were analyzed.

Bacteriological plating of materials taken from patients (cerebrospinal fluid, blood and pleural fluid) was conducted on chocolate and blood agar plates (HiMedia, India), previously taken from refrigerator and heated in thermostat for not less than 30 minutes at a temperature of 37 °C [5; 6].

Determination of serogroups of *S.pneumoniae* strains was conducted by using 14 and 21 groups diagnostic Pneumotest-Latex serums (Statens Serum Institute, Denmark).

Statistical data processing was performed on personal computer by using descriptive statistics methods on «Microsoft Excel» program.

Results. Out of 210 children with purulent meningitis 98 samples (46.6%) of *S.pneumoniae* were diagnosed, out of 265 pneumonia patients 37 samples (13.9%) of *S.pneumoniae* were detected (33 strains from blood, 4 strains from pleural fluid). None of the patients was vaccinated against pneumococcal infection.

Clinical features of pneumococcal pneumonia. In the studied group of patients with pneumococcal pneumonia (n=37) morbidity was more frequently registered in the

1–3 years old age group (42,8%), which coincides with the beginning of visiting preschool. Proportion of children going to kinder gardens and schools made 63,7%.

Clinical symptoms of pneumococcal pneumonia were characterized by toxic syndrome and respiratory failure, local physical changes, infiltrative changes on X-Ray and CT.

Among examined children moderately severe form was found in 17 patients (45,9%) and severe form was found in 20 children (54,1%). The disease severity course was determined by various toxic manifestations (cardio respiratory, hyperthermic and abdominal syndromes). 10 children (27,0%) had uncomplicated pneumonia and 27 patients (73,0%) had pneumonia with complications. Complications were characterized by respiratory insufficiency, toxic manifestations and 6 patients were diagnosed with pleuritis.

Haemogram analysis showed anemia in 24 children (64,8%). Leucocytosis was detected in 23 children (62,2%), hyper leucocytosis was registered in patients with pleuritis. Leucopenia was registered in 11 children (29,7%). C-reactive protein level over 10 mg/l was registered in 43,7% of patients.

All patients underwent chest X-ray studies. According to clinical and diagnostic indications 6 patients underwent lung CT study. Depending on the lung tissue lesion size, the patients with lobar process were predominant (19/51.3%), focal processes were detected in 6 cases (16.3%), this group mostly included patients up to 3 years old; segmental processes were observed in 12 cases (32.4%). Six patients were diagnosed with pleuritis.

Pneumococcal meningitis. Age-specific analysis of patients with pneumococcal meningitis (n=98) showed that children in the age range 6 months – 1 year composed 1.8%, 1 to 5 years old — 29.7%, 5 to 14 years old — 68.5%, which probably reflects age specific structure of children treated in this hospital. Diseases that had been the primary source of pneumococcal infection have been detected in 57.2% patients. Thus, pneumonia was detected in 35.1%, septicemia (1.8%), otitis media (12.0%), sinusitis (8.3%) cases. Proportion of patients with unfavorable medical history (skull and cerebral traumas, multiple respiratory diseases, previous meningitis) composed 24.3% of cases.

Clinical course of pneumococcal meningitis is characterized severe course: 83.3% of children had severe and 16.7% of children had extremely severe form of meningitis. In 76.3% of cases the beginning was acute, in the background of acute Respiratory viral infection (83.2%) and manifested by increased body temperature, severe headaches, vomiting and acute weakness. As it is shown on picture 1, severity was caused by toxic syndrome (hyperthermia-100%, multiple vomiting- 76.1%, rush- 2.7%), neurological symptoms (meningeal symptoms — 100%, pathological reflexes — 34.5%, focal neurological symptoms- 34.5%, convulsive syndrome –36.3%).

Complications observed in patients in most cases were brain edema (72.2%) and infectious and toxic shock. Meningoencephalitis was detected in 29.6% of patients and was predominant among children under 5 years old. The disease

course was severe- prominent meningeal syndrome, brain-stem and focal symptoms, damage of II, VI, VII, XII pairs of cranial nerves, convulsive syndrome.

It is known that presence of skull and cranial injuries as well as liquorrhea in medical history are important factors in the development of pneumococcal meningitis [8]. Among observed patients only one had recurrent pneumococcal meningitis related to post traumatic liquorrhea. From medical history: every year during five years, sometimes twice a year the patient had purulent meningitis of pneumococcal etiology, caused by penetration of causative agent from upper respiratory tract to subarachnoid space.

Outcomes of pneumococcal meningitis depended on the age of patients, thus 74 patients (75.5%) were discharged upon recovery; hypertensive-hydrocephalic syndrome was mostly observed in children under 5 years (3/3.1%), cerebral ataxia was observed in 2 cases (2.1%), asthenic-neurological syndrome in 12 cases (12.2%), symptomatic epilepsy — in 2 cases (2.0%), neurosensory hearing loss in 4 cases (4.1%), lethal outcome was observed in one case due to purulent meningoencephalitis, complicated by brain coma, pneumonia and septicemia.

Treatment. Most important role in the etiological treatment of pneumococcal meningitis and pneumonia places antibacterial treatment. Medications of choice were penicillin, cefotaxime, ceftriaxone, reserve medications included vancomycin, rifampicin. One monotherapy course was sufficient in 31.7% of cases, two courses were done in 50.5% of cases, the rest 17.8% of cases patients underwent repeated course with changing antibiotic.

Bacteriological examination data. Based on bacteriological examination 98 strains of *S.pneumoniae* in liquor, 33 strains of *S. pneumoniae* in blood and 4 strains of *S.pneumoniae* in pleural fluid were detected.

It was possible to perform serotyping for 83 pneumococcal strains and detect the following serotypes: 1, 5, 6A, 6B, 17F, 19F, NT. The proportion of notypeable (NT) strains made 19.3%.

When comparing serotypes, comprising 13-valence vaccine (PCV-13), with *S.pneumoniae* serotypes detected in patients, conjugated vaccines include about 71.1% of detected pneumococci.

Detected serotypes of pneumococci strains are included in modern pneumococcal vaccines, which justify the necessity of implementing vaccination against pneumococcal infection in the preventive vaccination schedule of the Republic of Uzbekistan.

Conclusion:

1. In our study, pneumococcal meningitis was more common in children over 5 years (68.5%). Clinical manifestations of pneumococcal meningitis are characterized by a very severe course, brain edema and an infectious-toxic shock and remain one of the major infectious pathologies in children with aggravating consequences and outcomes.

2. Characteristic clinical and laboratory sign of pneumococcal pneumonia is a presence of a lobar process, with frequent right lung lesion and development of purulent pleuritis (6/16.2%), increased level of white blood cells (62.2%), and C-reactive protein (43.7%).

3. Identified pneumococcal serotypes are included in the modern pneumococcal vaccines, which justifies the necessity to implement in the preventive vaccination schedule of the Republic of Uzbekistan, vaccination of children against pneumococcal infection.

4. To raise awareness of general population on the safety and efficacy of pneumococcal vaccines.

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Polymorphism C677T of gene MTHFR as a factor risk for developing of preterm birth at uzbek women

Abstract: In purpose of to study of relation of MTGFR gene polymorphism (C677T) for preterm birth DNA of 235 women, which 121 of them with preterm birth in the anamnesis (main group) and 114 somatically healthy women with a physiological current of pregnancy (control group) have been investigated. Results showed that dominating risk factor of preterm birth among inherited thrombophilia is the homozygote mutation C677 T of MTHFR gene (in 73,3% of cases), leading to reducing of enzyme activity of protein with homosystein elevation.

Keywords: preterm birth, thrombophilia, gene polimorphizm, pregnant, MTHFR

Introduction. Achievements of the XX-th century in the field of molecular medicine, biology and medical genetics have allowed to estimate from essentially new positions патогенез such complication of pregnancy as preterm birth (PB) which remain an actual problem of modern obstetrics [2; 3; 5].

Nowadays PB and reproductive health of woman are considered as a major medical and the social problem which is under closely attention of experts from leading scientific centers in the world [1, 2, 3]. On the basis of numerous researches there was established variety of the factors increasing risk of preterm birth at women. And among of them the special role is taken away to the congenital thrombophilia — hemostasis failure, which leading toward thrombi formation in uterine-placental vessels [6; 8; 9].

The most important direction in research of thrombophilia considers studying of thrombophilic conditions at pregnant women, the analysis an influence of hemostasis system failure at risk of development on thrombosis and thromboembolia during pregnancy and labor, and also, definition of degree of participation of those or other genetic markers of thrombophilia in development on obstetrical and gynecologic complications [9; 10; 12].

Perhaps, abruptness and rapidity of development a thrombosis in placental vessels at thrombophila are the principal causes a placental insufficiency which not allowing in most cases to prevent severe consequences of thrombophilic complications at pregnant women. There have defined enough wide spectrum a genetic markers of thrombophilia, and dominating among of them in which is believed a genes of hemostasis system and homocystein exchange, in particularly, FV gene polymorphism (G1691 A) of blood coagulation and methylenetetrahydrofolate reductase (MTHFR) gene mutation (C677T) [1; 2; 3; 5; 7; 8].

However, MRHFR gene mutation is one of the most frequent reasons of inhereditary forms of thrombophilia at obstetrical practice. Therefore the scientist's form over the world have being deeply interested to investigate the role of this gene on the developing most obstetrical and perinatal complica-

tions, also on developing pregnancy loss and PB and there are a great number of published research works devoted to study of associations an allele variants of MTHFR gene on PB. So, according to dates published by R. L. Bick and all., (1998), there is the legible communication between heterozygous MTHFR gene mutation and PB which risk of its development increases in 2 times.

B. Brenner and all. [6, 7] have revealed this mutation at 46% of women with PB. At the same time W. H. Kutteh [3; 4; 6; 8] has not found out communication between MTHFR gene mutation (C677 T) and recurrent miscarriage. Later S. C. Guba and all. (1999), V. Kakkar and all. [11; 13] have shown obvious communication between the heterozygous mutation and recurrent miscarriage, and the risk thus rises on 2 times.

However gestation represents multistage process of interaction of mother and a fetus, hence the fruit also can influence to the stages of gestation process.

Aim of this work was estimation of association of MTGFR gene polymorphism (C677T) for developing of preterm birth among Uzbek population.

Materials and methods. For this case-control study from February 2011 to January 2014, 26 females with preterm birth were matched with 50 healthy parturients which delivered on term as controls. The study was carried out on clinical base of the Republican specialized scientific-practice medical centre of obstetrics and gynecology Ministry of public health of Republic of Uzbekistan. In this research were included women who have had preterm birth, more than 2 unexplained recurrent miscarriages, antenatal fetal death and stillbirth in anamnesis. The women described in this study were enrolled in this study between February 2011 and December 2013 and subsequently followed prospectively. DNA of 235 women, from them 121 with preterm birth in anamnesis and 114 somatically healthy women with a physiological current of pregnancy which have made control group have been investigated. Age of the observed women varied from 21 up to 35 years. To statement of the clinical diagnosis applied clinic, hemostasiologic and functional methods.

Revealing thrombophilia spent to laboratories of molecular-genetic researches of scientific research institute of haematology and blood transfusion under the management of PhD. K. T. Boboeva. There was determined presence of polymorphism genes of haemostasis system. DNA molecule was allocated by a standard technique [13] with some updating. Amplification of the polymorphic locus (USA) spent with use polymerase Chain reaction on programmed termocycler of firms «Applied Biosystems».

The statistical analysis of results is spent with use of a package of statistical programs **OpenEpi 2009, Version 2.3**.

Frequency of variants of allele and genotypes (f) calculated by the following formula:

$$f = n/2N \text{ and } f = n/N (F1),$$

Where: n — occurrence of a variant (allele or a genotype), N — sample volume.

Degree of associations estimated in values of indicators of a proportion of chances odds ratio, OR, by following formula:

$$OR = (a \times d) / (b \times c) (F2),$$

Where: a — frequency of allele (genotype) in sample of patients, b — frequency of allele (genotype) in control sample, c — the sum of frequencies of the other alleles (genotypes) in sample of patients, d — the sum of frequencies of the other alleles (genotypes) in control sample [11].

Results of research and their discussion. At the first stage our research we have carried out molecular-genetic investigations for frequency revealing of thrombophilia and its structures among of women belongs to uzbek population omen with preterm and on term birth. Thrombophilic mutations among patients of the basic group with PB are found out at 75 (62%) of them, and among women with a physiological current of pregnancy and on term birth — in 32,4% cases. Studying of dynamics of markers of thrombophilia has shown, that the most prevalence its form in general population of women with PB believed is MTHFR gene polymorphism (C677T) which is diagnosed at 63 (84,0%) patients, from them at 8 (12,7%) — homozygous, at 55 (87,3%) — the heterozygote form.

The mutation of the factor V Leiden is found out at 9 (7,4%) women with PB, and all of them have appeared carriers a heterozygote genotype. The rare mutation for Asian population G20210A of a gene prothrombin is revealed all at 3 (2,3%) women with PB, all of them also had a heterozygote genotype. Results of our work partially concurred with data of some authors [4; 6; 9; 10; 13]. The Most widespread in the European populations thrombophilic factors — polymorphism C677 T of 5,10-MTHFR gene, Leiden mutation of the factor V G1691A, a prothrombin gene mutation G20210A with the same frequency occurred among the women surveyed by us.

Thus, high frequency of inherited thrombophilia at our patients has allowed us to consider it as the major etio-pathogenetic factor of development of PB that dictates necessity of a choice of the optimal and safety preventive therapy directed on compensating of genetic infringements.

Because of the polymorphism C677T of MTHFR gene was occurred at the greatest frequency among of women with PB, they all have been undergone to the following investigation phase. We have interested on whether presence of polymorphism C677T of MTGFR gene for the term of occurrence of preterm birth and, if yes, then how much it influences. With that purpose the patients of the basic group have been divided into subgroups depending on term gestation at occurrence of PB. So, 1st subgroup was made by 67 women with very early (22–27 week) and early PB (28–33 week), 57 women have included into 2nd subgroup with PB on term gestation from 34 till 37 weeks.

According to the received data, a mutation C677 T of MTHFR gene has been revealed at 63 (52,1%) women in the basic group, 55 (45,4%) from of them had heterozygous and 8 (6,6%) — a homozygous genotype of the given mutation. According to research problems we had been carried out the detailed analysis of influence of each of specified mutant allele and genotypes of the given marker on development PB in women from the main group.

Allele C and T distribution in the main group corresponded to 70,7 and 29,35% (tab. 2) accordingly. Frequency of these alleles in control group has made accordingly 81,6 and 18,4%. Thus distinctions on frequency of occurrence mutant allele in groups of patients were statistically authentic ($\chi^2=7,66$; $P=0,003$; $OR=1,9$; 95% CI 1,19–2,839).

At patients from the main group there has been fixed significantly decrease in functional normal genotype C677 C on 1,3 times in comparison with the control ($\chi^2=6,87$; $P=0,004$) (tab. 2). The reduction of frequency of occurrence of variant C677 C of gene MTGFR revealed by us in the main group allows to assume about possible «stability» of persons with this genotype to development of PB.

Significant associations were observed between functionally weakened hetero- and homozygous genotypes with occurrence of PB. Thus the most distinct association have revealed in frequency of occurrence homozygote T677T of the given polymorphism. At women of this group frequency of the given genotype was on 4 times higher, than in the control (6,6 against 1,7%, $\chi^2=3,4$; $P=0,03$; $OR=4,0$; 95% CI 0,82–19,08). Rather unexpected there was an increase in a fraction heterozygous carriers of mutations C677 T among of patients of the main group. At carriers of heterozygous mutation frequency of PB was on 1,7 times more than at patients with absence of this mutation (43,6 against 33,3%). Thus, despite on rather low risk level of development of PB ($OR=1,7$; 95% CI 0,98–2,83), the obtained data have appeared statistically significant ($\chi^2=3,6$; $P=0,03$).

There also have been revealed statistically significant distinctions (tab. 3, 4) at comparison of frequencies of genotypes and alleles between subgroups of women with PB and patients of control group. The frequency of 677C and 677T allele at patients of 1st subgroup has made accordingly 68,7 and 31,3%, and in control group — 81,6 and 18,4%.

Prevalence carriers of allele 677T of MTHFR gene among women with very early and early PB in comparison

with women with physiologically pregnancy there has appeared statistically significant ($\chi^2=7,6$; $P=0,003$; $OR=2,3$; 95% CI 1,22–3,32).

The analysis of distribution of functionally defective genotypes in these comparative samples has shown, that at individuals with presence of heterozygous genotype C/T an indicator of a parity of chances of development PB is equal to 1,5 (accordingly 43,6 and 33,3%, $OR=1,5$; 95% CI 0,83–2,92).

However at statistical data processing of reliability it is not received ($\chi^2=1,91$; $P=0,08$).

Predictably, frequency of homozygous genotype T/T in a subgroup patients with PB was authentically high (9,4%), than in control group (1,7%). The calculated indicator of risk of development PB at carriers of the given genotype has appeared significantly high ($\chi^2=5,55$; $P=0,01$; $OR=5,8$; 95% CI 1,134–29,61).

The similar situation has been found out also at the comparative analysis of frequency of distribution 677C and 677T allele among surveyed 2nd subgroup and control group. Frequency of mutant allele carriage in a subgroup of women with PB was statistically significantly higher, than in control group (27,2 against 18,4%, $\chi^2=3,48$; $P=0,03$; $OR=1,6$; 95% CI 0,97–2,81).

At research carrying out there is received an unexpected enough result: distribution of a homozygous genotype in studied samples authentically did not differ. And there was marked some increase of frequency of the given genotype at patients of 2nd subgroup (3,5%) in comparison with control group (1,7%). Thus the risk of development of PB also was high ($OR=2,0$; 95% CI 0,279–14,84). However such distinction has appeared statistically insignificant ($\chi^2=0,51$; $P=0,2$), that, probably, is connected with low frequency of the given variant of MTHFR gene mutation and with small number of sample.

At the analysis of frequency distribution of a genotype of the given gene we managed to reveal statistically significant accumulation of frequency heterozygous C677 T a genotype of MTHFR gene at the patients who have transferred PB. At carriage of this adverse genotype the risk of occurrence of thrombophilic complications at patients with PB more than on 1,8 times higher, than at women with absence of the given genotype ($\chi^2=3,2$; $P=0,04$; $OR=1,8$; 95% CI 0,94–3,45).

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Table 1. – The frequency of alleles and genotype distribution of C677T polymorphism of MTGFR gene among of patients with preterm birth ad control group

	N	The frequency of allele		The frequency of genotype distribution					
		C	T	CC		CT		TT	
		aбс.	%	aбс.	%	aбс.	%	aбс.	%
Main group:	121	70,7	29,3	58	48,0	55	45,4	8	6,6
a) Very early and early PB	64	68,7	31,3	30	47,0	28	43,6	6	9,4
b) PB	57	72,8	27,2	28	49,1	27	47,4	2	3,5
Control	114	81,6	18,4	74	65,0	38	33,3	2	1,7

In summary it is necessary to underline, that distinction in total frequency of adverse genotypes of mutation C677 T of MTHFR gene in studied subgroups has appeared statistically uncertain (53,0% against 51,0%, $\chi^2=0,06$; $P=0,4$).

Thus, results of our researches have allowed to make following conclusions: in pathogenesis of PB at women the major place belongs to missence mutation C677 T of MTHFR gene connected with replacement of nucleotide cytosine with the nucleotide thymine at position 677 (especially homozygous genotype T/T), leading to reducing of enzyme activity of protein with elevation of homosystein in plasma.

Hyperhomosysteinemia is connected with endothelial impairment which it is accompanied by synthesis reducing of nitric oxide, activation of markers endothelial dysfunction with increase of inflammatory factors and decrease of anti-inflammatory interleukin-10 [2]. As a result of this process in the organism of women there is formed latent thrombophilia, which under the influence of provoking factors (pregnancy, contraceptives, a trauma, operative interventions, smoking, etc.) leads to development various obstetrical complications including PB.

Conclusion. In the structure of the reasons of development of preterm birth at women a frequency of inherited thrombophilia makes 62%. A dominating risk factor of preterm birth among inherited thrombophilia is the homozygote mutation C677 T of MTHFR gene (in 73,3% of cases), leading to reducing of enzyme activity of protein with homosystein elevation. And it can be considered as independent risk factor of development of obstetrical complications. Polymorphic marker C677 T of inherited thrombophilia of MTHFR gene is significantly associated with development of PB at women. Thus especially strongly carriage of homozygous T/T genotype which more than on 5,5 times significantly increases occurrence of very early PB at women ($\chi^2=5,55$; $P=0,01$; $OR=5,8$; 95% CI 1,134 29,6). Timely revealing of the given mutations and carrying out of preventive standard methods of prophylaxis prior to gestation will allow to improve pregnancy outcomes and to reduce of perinatal disease and death rate, and also will be as preventive maintenance of maternal mortality and morbidity rate.

Table 2. – Difference of allele and genotypes of C677T polymorph marker of MTGFR gene in main and control group

Alleles and genotypes	The frequency of allele and genotypes in surveying groups		Statistically distinction
	Main group n=121	Control group n=114	
Allele C	70,7	81,6	$\chi^2=7,66$; P=0,003; OR=1,9; 95% CI 1,19–2,839
Allele T	29,3	18,4	
Genotype CC	48,0	65,0	$\chi^2=6,87$; P=0,004
Genotype CT	45,4	33,3	$\chi^2=3,6$; P=0,03; OR=1,7; 95% CI 0,98–2,83
Genotype TT	6,6	1,7	$\chi^2=3,4$; P=0,03; OR=4,0; 95% CI 0,82–19,08

Table 3. – Distinction of alleles and genotypes of polymorph marker C677T of MTGFR gene in patients from 1st subgroup and control group

Alleles and genotypes	The frequency of allele and genotypes in surveyed groups		Statistically distinction
	Very early and early PB, n=64	Control n=114	
Allele C	68,7	81,6	$\chi^2=7,6$; P=0,003; OR=2,3; 95% CI 1,22–3,32
Allele T	31,3	18,4	
Genotype CC	47,0	65,0	$\chi^2=5,49$; P=0,01
Genotype CT	43,6	33,3	$\chi^2=1,91$; P=0,08; OR=1,5; 95% CI 0,83–2,92
Genotype TT	9,4	1,7	$\chi^2=5,55$; P=0,01; OR=5,8; 95% CI 1,134–29,61

Table 4. – Distinction of alleles and genotypes of polymorph marker C677T of MTGFR gene in patients from 2nd subgroup and control group

Alleles and genotypes	The frequency of allele and genotypes in surveyed groups		Statistically distinction
	PB, n=57	Control, n=114	
Allele C	72,8	81,6	$\chi^2=3,48$; P=0,03; OR=1,6; 95% CI 0,97–2,81
Allele T	27,2	18,4	
Genotype CC	49,1	65,0	$\chi^2=3,9$; P=0,02
Genotype CT	47,4	33,3	$\chi^2=3,2$; P=0,04; OR=1,8; 95% CI 0,94–3,45
Genotype TT	3,5	1,7	$\chi^2=0,51$; P=0,2; OR=2,0; 95% CI 0,279–14,84

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Characteristic peculiarities of antibiotic sensitivity of pneumococcus, isolated in children with pneumonia

Abstract: The basis of this article was the data of checking of 52 children with pneumonia in the age from 2 months to 9 years. We determined the pattern of clinical strains of the agents collected in Tashkent. Among the revealed isolates the prevailing one was pneumococcus taking 15.4%. The results of the study showed that, there is weak antibiotic sensitivity to amoxicillin/clavulanate, azithromycin and metronidazole, and in some cases it is absent. High sensitivity of pneumococcus is preserved to injection cephalosporins, but cephalosporins are not recommended for wide application in extra hospital pneumonia in children. For maintaining of antibiotic sensitivity of the agents it is rational to apply them in extra hospital pneumonia.

Keywords: pneumonia, children, *Streptococcus pneumoniae*, sensitivity to antibiotics.

Topicality. *Streptococcus pneumoniae* is one of the leading agents of infections of respiratory ways [2; 8]. The main problem of the therapy of pneumococcal infections is appearance and spread of penicillin resistant pneumococcus in several countries, and strains resistant to macrolide antibiotics [1; 3]. In relation to this, it is necessary to have local epidemiological data about the resistance of pneumococcus to various antibacterial agents.

The study of *S. pneumoniae* sensitivity has certain difficulties, such as common recommendations require application of special nutritious media, unavailable for the majority of laboratories [5]. It was one of the main reasons of the absence of wide-range studies of pneumococcal sensitivity to antibiotics in our country.

Pneumococcal pneumonia is one of the most often forms of acute inflammation of lungs among extra hospital pneumonia. The problem of diagnostics and therapy of pneumococcal pneumonia is still one of the most topical issues in the modern health care. In spite of constant perfection of diagnostic methods and availability of modern very effective antibacterial agents, pneumococcal pneumonia still occupies a leading place in the structure of morbidity and lethality from infectious diseases in developed countries [1; 6].

Pneumococcus (*S. Pneumoniae*) is one of the most often bacterial agents of respiratory infections, and it causes severe pneumonia in children of young age [3]. In USA every year more than 40 thousand people die of pneumococcal infection [8]. The important problem, linked with pneumococcal infections, is growth of antibiotic resistance of the agents isolated in the patients with invasive infections [2; 4].

It should be noted that, resistance of *S. pneumoniae* significantly differs in various countries. The most problematic regions are Hong Kong, SAR, countries of the Western Europe, South-East Asia and North America, where the resistance to penicillin and/or erythromycin reaches 40–80% [5; 7].

Thus, study of *S. Pneumoniae* sensitivity to antibacterial agents at the modern stage is topical problem in pediatrics.

Objective of this study is definition of *S. Pneumoniae* sensitivity to antibacterial agents used in present time for children with pneumonia in clinic.

Materials and methods. The study was performed in 52 children with pneumonia, who came to clinic of TashPMI and Urban clinical children's hospital № 1 in Tashkent. The age of the children varied from 2 months to 9 years old. Status of the children was considered to be severe (9 children) and average severity (43 children).

Bacteriologic planting of nasopharyngeal mucous was performed by the following method: material from nasal cavity was taken with the help of dry sterile cotton wad inserted deep inside nasal cavity.

Cultural diagnostics of pneumococcus was performed in compliance with common scheme of material study in bacterial infections of respiratory ways. In the planting on nutritious media and further incubation for 24 hour in 37 °C on dense nutritious media pneumococcus formed soft, small, transparent colonies. Cups were checked visually.

On blood agar *Streptococcus pneumoniae* were present in the form of small, flat, transparent colonies surrounded with green zone of α -hemolysis. Tinctorial properties of pneumococcus were studied using microscopy with Gram staining. For the differentiation of *Str. pneumoniae* from *Str. Viridans* we performed test for bile lysis of pneumococcus.

The estimation of sensitivity of *Streptococcus pneumoniae* isolated colonies to antibacterial agents was performed by means of disc-diffusion method, based on the suppression of growth of the studied culture in case of diffusion from carrier of antibacterial agent to dense nutritious media. The isolated strains of microorganisms were classified according to the degree of sensitivity to high sensitive, sensitive, moderate resistant or resistant ones.

Results of the study. Totally within the period from January till May 2015 we isolated 8 strains of *S. pneumoniae* in 52 patients (15.4%).

We determined sensitivity of the isolated strains of pneumococcus to antibiotics applied in clinics of Tashkent city. Results of the studies showed that, antibiotic sensitivity to amoxicillin/clavulanate tended to decrease — 3 (37.5%) out of 8 achieved samples had weak or no sensitivity to that antibiotic.

87.5% of the patients had weak sensitivity to azithromycin, and no sensitivity to metronidazole.

It should be noted that, high sensitivity of pneumococcus

to injection cephalosporins is preserved, but cephalosporins are not recommended for wide application in extra hospital pneumonia in children. For maintenance of antibiotic sensitivity of the agents it is rational to limit their application in cases of extra hospital pneumonia.

Thus, pneumococcus is still the most often agent of bacterial respiratory infections in children. Important method of epidemiologic control of pneumococcal infections is the study of the spectrum of the agents circulating in certain territory. In this work we determined the pattern of clinical strains of the agents collected in Tashkent city in 2015. Among the detected isolates the prevailing one was pneumococcus, taking 15.4%.

Our study revealed an uneasy tendency of increase of pneumococcus resistance to macrolides and metronidazole. That result coincides with global tendency of fast growing prevalence of resistant pneumococcus, and resistance to macrolides increased from 5% to 25% [2].

Thus, our results once again demonstrate the necessity of constant monitoring of the prevalence of antibiotic resistant strains of pneumococcus and study of its sensitivity for perfection of empiric antibacterial therapy.

In conclusion, the performed study presents important information about the prevalence of pneumococcus in clinical samples in cases of pneumonia in children. These data can be used as starting point for the monitoring of antibiotic resistance of *S. pneumoniae* in our country.

Conclusions:

1. For the provision of adequate empiric antibacterial therapy of pneumonia it is rational to perform local monitoring of *S. pneumoniae* resistance to antibiotics.
2. For the improvement of etiologic diagnostics in children it is recommended to use molecular detection methods and identification of pathogens together with cultural methods.

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Low molecular weight heparin on prevention of postoperative thromboembolic complications at women with uterine myoma concerned to high risk

Abstract: In purpose of to evaluate of low-molecular weight heparin (LMWH) efficiency on prevention of postoperative thrombotic complications at women with uterine myoma concerning to the high risk 60 women aged above 40 years with uterine myoma, which admitted for the operative treatment, have been underwent to the studying. . All operated women have been administered LMWH Clexan in a daily dosage of 0,4 ml once a day subcutaneously in the field of abdomen till 10 days.

Keywords: uterine myoma, a haemostasis, deep veins thrombosis, low-molecular weight heparin.

Introduction. The problem of prevention of thromboembolic complications of operative gynecology is a rather actual one. Frequency of deep veins thrombosis (BME) after various gynecologic operations varies within 11–37%, and pulmonary thromboembolism (PTE) developed due to DVT is one of the reasons of postoperative lethal outcomes in 18–22% cases [3, 5, 6, 7]. Venous thromboembolism (VTE) is an important and potentially preventable complication of major gynecologic surgery, and the common frequency of postoperative thromboembolic complications with rates of DVT, PTE, and fatal PTE (19–20%) are comparable to those seen after general surgical procedures [1; 2; 3; 4; 5; 8].

Despite the quality which has increased during last two decades period of the operative gynecologic care, DVT of lower limbs and PTE generated by it take a leading place among postoperative complications in gynecologic patients and it's still recognized as an important problem of operative gynecology.

All gynecologic patients who are especially undergoing the operative treatment, to some extent, are thrombotically dangerous, as in majority of them hypercoagulation alterations in haemostasis system are indicated and venous circulation failure in the lower limbs and a pelvic can be observed (Ozolini L. A., 1999, Russia).

The purpose of the present study is to evaluate of low-molecular weight heparin (LMWH) Clexan efficiency in prevention of postoperative thrombotic complications at women with uterine.

Materials and methods. 60 women (group I) aged above 40 years old (average age was 45 ± 4 years) with uterine myoma who admitted for the operative treatment Republican specialized scientific-practice medical center of obstetrics and gynecology (RSSPMC of O&G) have been examined. All patients have undergone the total hysterectomy. The average size of both uterus and fibroid were 12 weeks (min. 8 weeks; max. 24 weeks). At 7 (37%) of surveyed women there is revealed a fast-growing uterine myoma. Prominent features of reproduc-

tive function of women of the given contingent of patients has shown, that 7 (35%) among of them were multiparas, and 11 (55%) were multigravidas, hence, recurrent artificial abortions are revealed at 6 (30%), spontaneous abortions at 7 (35%) women. In the structure of extragenital diseases there are most often observed pathologies had appeared cardiovascular disease in 12 (60%), obesity in 4 (20%), anemia in 6 (30%), varicose veins of the lower limbs at in (15%), a gastrointestinal tract disease in 3 (15%) patients with uterine myoma.

In majority patients there are most often revealed some concurrent diseases such as obesity, hypertension, anemia and varicose veins of lower limbs. Most often occurring accompanied gynecologic pathologies at investigated patients with uterine myoma were ovarian cysts and cystomas, cervical erosion, endocervicitis, endoservicosis, ovuli naboti which because of all patients were exposed to the operative intervention in volume of extirpation of uterus with its appendages and without of them.

For comparison of LMWH efficiency there were conducted a retrospective studying of 158 case histories of patients (II group) at the similar age with investigated group, which undergone to the abdominal hysterectomy due to uterine myoma at Department of operative gynecology of RSSPMC of O&G of Uzbekistan during the period from 2005 up to 2008 years.

All patients from the retrospective analysis on purpose preventing of postoperative thrombotic complications had been administered unfractionated heparin (UFH) subcutaneously in dosage on 5000 IE 3 times a day. The results of analyzing a reproductive function, the structure of accompanied extragenital and gynecological diseases, clinical-anamnesis dates in both investigated group were almost similar. For the comparison of haemostasiological results there was studied haemostasis system of 20 rather somatically healthy women (control group) at the reproductive age without any accompanied gynecologic diseases.

The estimation of haemostasis state was conducted in dynamics prior to and on 1st, 3rd, 7th days on the postoperative period at haemostasiological laboratory of RSSPMC O&G. And there were used a reactants of firm Barnaul (Russia) which included in itself definition of: activated partial thromplastine time (APTT), prothrombin time (PT), prothrombin ratio (PR), the International normalized ratio (INR), amount of soluble fibrin — monomer complexes (SFMC), and fibrinogen, platelets count (PLC). Definition of PR and INR were realized by using following formulas:

$$\text{PR} = \text{PT of patient} / \text{PT of control serum} \quad (1)$$

PT of control serum is equal on 15 in haemostasiological laboratory of RSSPMC of O&G.

$$\text{INR} = \text{PR}^{\text{ISI}} \quad (2)$$

ISI — international sensibility index, for the thromboplastin which we have used it was equal to 1,2.

Results and discussion. We have included all women to high degrees of risk for the prophylactic of postoperative thromboembolic complications. Group I has been administered LMWH Clexan in a daily dosage of 0,4 ml once a day subcutaneously in the area of abdomen up to 10 days. On the applying the spinal anesthesia preoperative dose of Clexan has been injected before 12 hours and at the general anesthesia 2 hours prior to operation. The subsequent doses have been started at once after 8 hours of the performed intervention. After the full mobilization of patients as a preparation of system enzyme therapy — Wobenzim (Mucous farm, Germany), in a daily dosage by 3 tablets three times a day before meals up to four weeks have been prescribed to them.

Results of the analysis a coagulogram which had being carried in dynamics at group II of patients were distinctly dif-

fered from I, and results of comparison with I and control groups were statistically accurate ($p < 0,05$). At patients of group II on the 3rd and 7th days of the postoperative period the concentration of fibrinogen had statistically accurately increased, results of SFMC analysis was characterized by the progressing the reliable increase in the amount of the latter on the 1st, 3rd, 7th days (Table 3). In contrast to group II, at patients from group II against underground of the carried complex preventive measures carried on the 3rd, 7th days of the postoperative period any significant hypercoagulation changes were have not revealed (Table 2).

As it is shown in Table 3, the analysis of the conducted haemostasiological study results is at women from group II characterized with increasing in quantity of SFMC and fibrinogen in comparison with control group and its initial level before operation. At these patients on admission to the hospital initial average level of SFMC (N up to 3,5mg%) was $4,0 \pm 1,0$ mg%, in comparison with control group ($2,8 \pm 1,3$ mg%) was to 42,8% more (on the reliability $p < 0,05$); on the 1st, 3rd, 7th days of postoperative period there was detected increase of its quantity ($5,3 \pm 1,3$ mg of%, $6,3 \pm 1,6$ mg%, $7,3 \pm 0,8$ mg% accordingly), the highest average curve occurred on 7-day ($7,5 \pm 0,6$ mg%) and in comparison with its initial level was authentically increased to 82,5% ($p < 0,05$), and against the control group it was on 2,7 times more. Fibrinogen concentration has begun to increase about on 3rd day ($3,7 \pm 0,7$ g/l) and the highest average curve were observed on 7th day ($4,3 \pm 0,7$ g/l) after hysterectomy. As increase SFMC at these patients confirmed about thrombinemia, joining increased amount of fibrinogen (N 2–4 g/l) in the 7-day confirms intensifying coagulation of investigated patients in the postoperative period (Table 3).

Table 1. – Haemostasis state indices in women from control group (n=20)

Parameters	Meanings	Parameters	Meanings
Fibrinogen (2–4 g/l)	$2,3 \pm 0,5$	PR	$1,02 \pm 0,3$
APTT (32–42 sec)	$37,7 \pm 3,1$	INR	1,2
PT (14–17 sec)	$15,3 \pm 0,7$	SFMC (up to 3,5mg%)	$2,8 \pm 1,3$

Table 2. – Haemostasis state indices in women with uterine myoma before and after hysterectomy received LMWH Clexan (I group n=60)

Parameters	Prior to	1 st day	3 rd day	7 th day
Fibrinogen (g/l)	$2,5 \pm 0,5$	$2,6 \pm 0,6$	$2,7 \pm 0,6$	$2,8 \pm 0,7$
APTT (sec)	$35,3 \pm 2,1$	$36,5 \pm 2,4$	$37,5 \pm 2,8$	$37,2 \pm 3,1$
PT (sec)	$15,4 \pm 0,9$	$16,2 \pm 0,8$	$16,8 \pm 1,4$	$16,6 \pm 1,4$
PR (IU)	$1,03 \pm 0,07$	$1,07 \pm 0,06$	$1,05 \pm 0,05$	$1,05 \pm 0,05$
INR	$1,0 \pm 0,1$	$1,1 \pm 0,2$	$1,1 \pm 0,2$	$1,1 \pm 0,2$
SFMC (mg%)	$3,8 \pm 0,6$	$2,6 \pm 2,1$	$3,4 \pm 2,9$	$3,3 \pm 2,8$
T ($10^9/l$)	$218,2 \pm 33,6$	$217,2 \pm 32,7$	$227,2 \pm 33,8$	$220 \pm 30,5$

Table 3. – Haemostasis state indices in women with uterine myoma before and after hysterectomy received UFH (II group n=158)

Parameters	Prior to	1 st day	3 rd day	7 th day
I	2	3	4	5
Fibrinogen (g/l)	$2,8 \pm 0,6$	$3,0 \pm 0,6$	$3,7 \pm 0,7$	$4,3 \pm 0,7^*$
APTT (sec)	$37,7 \pm 5,2$	$37,4 \pm 5,2$	$35,3 \pm 4,4$	$31,8 \pm 6,3^*$
PT sec	$15,6 \pm 1,2$	$15,9 \pm 1,2$	$15,9 \pm 0,9$	$15,9 \pm 1,0$

1	2	3	4	5
PRIU	1,0±0,1	1,1±0,1	1,1±0,1	1,1±0,1
INR	1,0±0,1	1,1±0,1	1,1±0,1	1,1±0,1
SFMC mg%	4,1±1,1	5,3±1,4	6,5±1,6	7,5±0,6*
T 10 ⁹ /l	210,7±44,5	202,3±27,4	229,7±76,7	215,0±35,4

The analysis of results APTT which conducted in dynamics has demonstrated, that as distinctly from patients administered LMWH, in patients from group II on 7th day was detected shortening of its meaning (on the average 33,8±6,3 sec) which testified to alteration of blood coagulation towards hypercoagulation. Despite on conducting thromboprophylaxis with UFH on the 7th day of postoperative period there were observed an activation of initial mechanisms of the internal cascade of haemostasis in these patients.

The analysis of dynamics of laboratory parameters on the 7th day of postoperative period at patients of group II concerning to the high risk has shown, at these patients in comparison with patients concerning to the high risk of thromboembolic complications development under exposing abdominal hysterectomy against carrying out thromboprophylaxis with UFH haemostasiological pattern characterized of prethrombotic state which demands carrying out an optimal complex thromboprophylaxis. This is accompanied with synchronic increasing of SFMC and fibrinogen concentration with simultaneously shortening a time of APTT.

On the contrary, at carrying out thromboprophylaxis with LMWH there was demonstrated another haemostasiological pattern at control laboratory analysis which conducted in dynamics (Table 2). In comparison from patients of the retrospective analysis (group II), increasing amount of SFMC was insignificant, and it's the highest average curve in patients of group I was detected on 3rd day (3,4±2,9 mg%) in the postoperative period, in comparison with initial level was reduced on 10,5% (prior to operation 3,8±0,6 mg%). Significant increase of SFMC in the postoperative period during the studying of haemostasiogram analyses in patients from retro-

spective studying have detected especially in those patients who had accompanying extragenital pathologies, such as arterial hypertension, obesity, moderate anemia, varicose veins disease. Have especially been expressed at what had some accompanying pathologies.

Postoperative decrease of PLC was detected in patients from group II in the 3rd day of postoperative period (229,0±66,7x10⁹/l), which explaining by heparin induced thrombocytopenia causing with administering of UFH, however LMWH does not influence of amount of platelets. Other parameters were within the limits of norm at all patients from I and II investigated groups (Table 1).

Conclusion.

1. Received dates from studying have demonstrated, that traditional preventive maintenance of thromboembolic complications with administering UFH does not allow to result coagulation potential of patients with uterine myoma concerning to the high risk of development of thromboembolic complication at carrying out of abdominal hysterectomy even in an initial level which at them was before operative treatment.

2. Receiving LMWH simultaneously with complex measures for preventive maintenance postoperative thromboembolic complications with the account of degree of risk allows to decrease a little of thrombotic complications in women with uterine leiomyoma. Thus, administrating of Wobenzim as a desaggregate therapy simultaneously with LMWH leads to the improvement of haemostasiological conditions, also, prevents and reduces not only developing of post operative thromboembolic complications, but reduces haemorrhagic complications caused by administering of antithrombotic therapy.

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Some pathogenesis aspects hypertension induced by pregnancy

Abstract: The study included 139 pregnant women aged between 17 and 27 years (21.3 ± 4.22 years). HIP was diagnosed in 119 women after 20 weeks of pregnancy. 20 patients (control group) were with physiological course of pregnancy. Results of the study showed that in pregnant women at risk of hypertensive disorders, especially after 20–22 weeks of gestation and later, lymphocytes ability to platelets adhesion is rose, the concentrations of pro-inflammatory cytokines and NO level are increased. The direct relationship between DBP high level with degree of LPA, CECs, NO, IL- $I\beta$ and TNF- α cytokines at gestation period of 20–22 weeks indicates their importance in the pathogenesis of hypertensive disorders in pregnant women.

Keywords: hypertension induced by pregnancy, lymphocyte-platelet adhesion, interleukins, transforming necrosis factor — α , endothelial dysfunction.

Introduction. The problem of hypertensive disorders is extremely urgent in clinical and social terms, for leads to high reproductive losses. Hypertensive disorders, occupying a leading position in the structure of the pathology of pregnancy, has a significant influence on the course and outcome of pregnancy and is a major cause of perinatal mortality and maternal mortality [4; 9]. Functional systems, structures of cell membranes, activity of the haemostasis system, as well as the endothelial state and its secretory function play the special role in this process [1; 8]. The realization of defence mechanisms because of damaged blood vessels at the level of the whole organism is accompanied by increased activity of platelet adhesion to lymphocytes, which was called the phenomenon of lymphocyte-platelet adhesion [6; 18]. The LPA phenomenon plays the important role in the development of protective and reparative processes [6]. Platelets were established to promote migration of lymphocytes and their fixation on the surface of damaged vascular wall that allows them to withstand the shear force of blood flow [3]. Platelets release a number of anti-inflammatory and growth factors. Damage of the vascular endothelium by aggression factors and hypoxia hampers expression of most of the known adhesion molecules [2]. As a result, cell migration and cooperation in certain areas of fixation of the vascular wall are disrupted. In this regard, platelet functions are enhanced. Platelets provide contact of lymphocytes and collagen fibers, partly compensate missing antigen-preventing function, helps to promote lymphocytes deeper the damaged part of the vascular system [10]. Because of disturbance of the processes of lymphocyte contact with collagen fibers, the reaction of stabilization in the lesions is decreased, vascular permeability is increased, haemostasis on the lesion site is developed, the system of immune response is initiated, as well as the conditions for angiogenesis and tissue proliferation are appeared. Changes in the state of vascular endothelium, platelet adhesion to lymphocytes and features of mechanisms in the systemic circulation of mother are poor studied.

Objective: To determine the significance of lymphocyte-platelet adhesion (LPA), pro-inflammatory cytokines and en-

dothelial dysfunction in the development of hypertension induced by pregnancy (HIP).

Material and Methods. The study included 139 pregnant women aged between 17 and 27 years (21.3 ± 4.22 years). HIP was diagnosed in 119 women after 20 weeks of pregnancy. 20 patients (control group) were with physiological course of pregnancy. Exclusion criteria for the study were: (1) chronic hypertension, (2) somatic diseases (coronary heart disease, hypertension, diabetes, renal and hepatic pathologies). The distribution of patients by groups was carried out according to the level of blood pressure (BP) in accordance with ICD-10 (Geneva, WHO, 2002). The 1st group consisted of 39 women, whose systolic BP (SBP) increased up to 140 mm Hg and diastolic BP (DBP) rose to 90 mm Hg after 20 weeks of pregnancy. The 2nd group included 47 women with SBP over 140 to 160 mm Hg and DBP greater than 90 to 100 mm Hg. In the 3rd group were 33 patients with SBP more than 160 mm Hg and DBP greater than 100 mm Hg. In women of control group at this time of observation SBP was mean 105.8 ± 3.26 mm Hg and DBP was mean 68.7 ± 2.84 mm Hg.

The survey was conducted at the moment of detection pregnancy from 7 to 10 weeks and in dynamics of I, II and III trimesters of gestation. HIP was verified at absence of distinct clinical symptoms that characteristic for arterial hypertension, and negative kidney samples: protein content in urine less than 0.002 g/l, glomerular filtration rate — 155.8 ml/min, the normal levels of creatinine and urea. In the dynamics of gestation, the number of desquamated endothelial cells circulating in the systemic circulation (CECs) was counted by Aladovec J. (1978) method in the modification by Petrishev N. N. and Vlasov T. D. [7]. Nitrates levels were determined by Metelskaya V. A. and Gumanova M. G. method [5]. The adhesion of platelets was assessed by their ability to form co-aggregates with lymphocytes as described by Vitkovskiy Y. A. et al. [11] by determining the percentage of lymphocytes aggregates with thrombocytes (lymphocyte-platelet plugs). The concentrations of IL- $I\beta$ and TNF- α were measured by immunoenzymatic method ELISA on computerized immunoenzymatic

analyzer (IEA-AT-858 LTD, China) with reagents of "Vector-Best" company (Novosibirsk, Russia).

Statistical and regression analysis was performed using Statistica 6.0 for Windows. Student's t-test and Pearson's correlation coefficient (r) was assessed. Significant differences were considered at $P \leq 0.05$.

Results and Discussion. We have found that pregnant women with HIP that developed in terms of 7–10 weeks of gestation had no damage of the endothelial cells and increase in their number in blood, in comparison with control. Along with this, in 5 (10.8%) patients of the 2nd group and in 8 (24.2%) patients of the 3rd group, the number of CECs exceeded the average levels. With increasing gestational age to 22 weeks the number of CECs in women of the 1st, 2nd and 3rd groups increased, respectively, in 1.5, 1.9 and 2.2 times ($P < 0.01$ and $P < 0.001$), reaching a maximum at term of more than 22 weeks. Thus, the number of desquamated CECs was over the control values in 1.6, 2.0 and 2.6 times, respectively.

Increase in the number of CECs circulating in blood is a highly specific marker of endothelial dysfunction (ED) [14]. NO expression due to initiation of inducible form of NO-synthase (iNOS) in response to depression of activity of the basal level of endothelial NO-synthase (eNOS) can contribute to vascular wall damage [8; 9]. At the same time, at 7–10 weeks of gestation, in pregnant women of main group NO level in the systemic circulation was within the upper limit of control. In 5 (10.6%) and 8 (24.2%) patients of the 2nd and 3rd groups, respectively, were found elevated CECs and NO levels. After 20–22 weeks of gestation, changes in NO-system were exacerbated: in the 1st group these indices were 1.2-fold ($P < 0.05$) and 1.3-fold ($P < 0.01$) higher control levels; in the 2nd group — 1.3-fold ($P < 0.01$) and 1.4-fold ($P < 0.001$); in the 3rd group — 1.7-fold and 1.9-fold ($P < 0.001$), respectively. Evidently, increase of NO level with increasing of gestational age in pregnant women with HIP is due to peculiarities of restructuring of the membrane structures of endothelial cells as a consequence of exposure of environmental factors [22; 25]. This influences on the repair processes in the vascular endothelium of pregnant women with predisposition to HIP. Since NO is involved in the implementation of various pathophysiological processes, including cell cooperation, NO expression in pregnant women prone to HIP can enhance the aggregation of blood cells. It was established that NO expression stimulates formation of tissue factor of activation of coagulation haemostasis [1; 9; 16]. NO overexpression has the ability to support vasospasm in microcirculation of the body of pregnant women for a long time [25]. As a result, tissue hypoxia is exacerbated; area of possible development of DE at the system and polyorgan levels is expanded [12]. Deceleration of blood flow in organs and tissues against vasospasm and thrombosis reduces potential of shift that, subsequently, reduces eNOS activity and initiates iNOS activity and NO formation [17].

There was found a strong direct relationship between the amount of CECs and NO level in blood of pregnant wom-

en of main group ($r = 0.77$; $P < 0.01$). Hence, damage of the endothelium leads to NO increase, inducing, thereby, processes of endothelial damage and increasing CECs in blood stream. It was believed that pro-inflammatory cytokines that stimulate iNOS formation in neutrophils, macrophages, endothelial cells and vascular smooth muscle cells contribute to this process [11]. We confirm this fact in our research, which has found increase of NO and CECs levels in the circulating blood. At the same time, in patients of the 1st, 2nd and 3rd groups in terms of 7–10 weeks of gestation these indices were within the control values. After 20–22 weeks, IL-1 β and TNF- α contents in the 1st group were higher in 1.4 and 1.5 times ($P < 0.01$), in the 2nd group — in 1.8 and 1.7 times ($P < 0.001$), in the 3rd group — in 2.0 and 1.9 times ($P < 0.001$), respectively, in comparison with control. Activation of macrophages, which are capable to produce active pro-inflammatory cytokines, has an important place in the initiation of IL-1 β and TNF- α [20]. The impact of the latter on the endothelium exacerbates endothelial damage, thereby, increasing the number of CECs and NO level in blood, activating processes of aggregation, adhesion and hemostasis. We have established a strong direct relationship between CECs in pregnant women after 20–22 weeks of gestation and IL-1 β and TNF- α levels ($r = 0.81$ and $r = 0.86$; $P < 0.001$).

Thus, damage of the endothelium and other tissues during pregnancy is the triggering factor of ED and cytokine production. In this case, there was a strong relationship between the concentrations of IL-1 β , TNF- α and NO in blood of pregnant women predisposed to GH ($r = 0.81$ and $r = 0.90$; $P < 0.001$, respectively). Previous studies *in vitro* showed that NO expression may be one of the mechanisms of the phenomenon of leukocyte aggression [5]. Probably, NO expression leads to stimulation of cells of the immune system and facilitates the production of the studied pro-inflammatory cytokines. Increase of the concentrations of IL-1 β and TNF- α leads to activation of the haemostatic system, consequently, reducing the potential of shift, stimulating iNOS activity and, as a result, increasing NO level. Our studies are consistent with previous findings. After 7–10 weeks of gestation, all pregnant women of main group marked increase of adhesiveness of platelets to lymphocytes, which was within the upper limit of control. After 20–22 weeks of gestation, lymphocyte-platelet plugs increased in the 1st, 2nd and 3rd groups in 1.2 ($P < 0.05$), 1.3 ($P < 0.01$) and 1.4 ($P < 0.001$) times, respectively, with trend to increase significantly at later terms.

In pregnant women with predisposition to HIP we found a direct strong relationship between adhesive ability of lymphocytes, blood platelets and CECs in the circulating blood ($r = 0.88$; $P < 0.001$). Therefore, high concentration of pro-inflammatory cytokines, between which and the percentage of lymphocyte-plate co-aggregates was marked a strong direct relationship ($r = 0.83$ – 0.88 ; $P < 0.01$) as well, is believed to be the starting mechanism of these processes in the development of GH. Earlier established fact of *in vitro* LPA amplification by IL-1 β and TNF- α confirms our findings [3; 13; 15]. It was

reported that lymphocytes in interaction with antigens enhance production of IL-1 β and TNF- α by immunocompetent cells in the mechanisms of protecting reaction [3], while NO expression increases the percentage of LPA [20]. In pregnant women with a tendency to the development of HIP after 20–22 weeks of gestation we revealed a strong direct relationship between adhesion ability of lymphocytes, blood platelets and NO concentration ($r=0.85$; $P<0.001$). At the same time, a clear direct relationship between high percentage of LPA and DBP levels after 20–22 weeks of gestation was found ($r=0.89$; $P<0.001$). In the period of 7–10 weeks, this relationship was absent ($r=0.18$; $P<0.005$).

Thus, autoimmune processes in the endothelium of maternal blood vessels may be one of possible mechanisms of hypertensive disorders in pregnant women.

Conclusions.

1. In pregnant women at risk of hypertensive disorders, especially after 20–22 weeks of gestation and later, lymphocytes ability to platelets adhesion is rose, the concentrations of pro-inflammatory cytokines and NO level are increased.

2. The direct relationship between DBP high level with degree of LPA, CECs, NO, IL-1 β and TNF- α cytokines at gestation period of 20–22 weeks indicates their importance in the pathogenesis of hypertensive disorders in pregnant women.

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Awareness about high blood pressure, care for own health and prevention of high blood pressure among HIV-positive population in Ferghana valley

Abstract: An epidemic research was organized and carried out, in which representative choice from HIV-positive people from Namangan and Ferghana regions at the age of from 20 to 50 and older with the amount of 341 people.

In studying HIV-positive people the following methods were used: survey, instrumental, biochemical, and immunologic. A special application form was used for detecting cardiovascular illnesses and high-blood pressure and their risk factors among HIV-positive people.

The low awareness of HIV-positive people about high-blood pressure was detected. In different age groups awareness level of researched population was detected in such degrees: at the age of 20–24 –47,5%, 25–29 –48,3%, 30–34 –52,1%, 35–39–56,4%, 40–44–59,0 ($p<0,05$), 45–49–60,0% ($p<0,05$), ≥ 50 –70,0% ($<0,05$) and 20–50–53,7%.

Awareness of HIV-positive people about main risk factors turned out to be quite low in sequence: obesity — 50,7%, hypercholesterolemia — 29,3%, insufficient physical activeness–53,1%, smoking–57,7%, consuming alcohol–62,2%, stresses–33,4% and bad eating habits–51,3%.

Among HIV-positive people, a low level of responsibility for own health is found (10,7%), as well as a low level of preparedness for participating in preventive measures regarding high-blood pressure HBP (12,%). In 87,7% of the cases among HIV-positive people, there is insufficient awareness about the effectiveness of preventive measures regarding high-blood pressure, as well as the lack of confidence in ideas of preventive recommendations for preventing health problems and promoting a healthy life style.

Keywords: awareness, care for own health, prevention, HIV-positive peoples, high blood pressure, epidemiological research.

Introduction.

Currently cardiovascular diseases are the main problem in state, medical and public organizations in developed countries because of high illness rate, disabilities and mortality among population, epidemic researches showed that in most countries of Western Europe, North America, Australia, Japan, etc. the number of mortality and disabilities because of cardiovascular diseases have decreased due to prevention measures [1; 2], while in Russia and post-Soviet countries this number has been increasing in the last 10–15 years [3].

Atherosclerotic cardiovascular disease (CVD), a leading cause of morbidity and mortality in the general population, is an increasing concern for human immunodeficiency virus (HIV)–infected patients. HIV-infected individuals are exposed to accelerated vascular aging [4], and this issue has become even more relevant since antiretroviral therapy has impressively extended the life span of HIV-infected individuals [5; 6]. Hypertension is a treatable major established risk factor for CVD and a common condition in HIV infection, with a prevalence ranging 13%–36% [7; 8; 9; 10]. New-onset hypertension occurred with an incidence of 29.8 per 1,000 person-years in a recent report from Norway [11]. The suggestion that antiretroviral therapy and/or HIV infection may be associated with higher blood pressure (BP) has been repeatedly raised [12; 13; 14]. More important, recent data suggest that both elevated and borderline high BP are associated with a substantially greater relative risk of acute myocardial infarction in HIV-positive compared with HIV-negative subjects [15]. Thus, identifying and appropriately managing hypertension is a clinically relevant issue in HIV-infected patients.

The awareness of people on arterial hypertension in Uzbekistan remains low.

In recent years “caring for own health and prevention from high blood pressure (HBP)” is becoming one of the crucial epidemic indicators, showing peculiarities of popula-

tion tendencies [16; 17]. However, such researches among HIV-positive population, especially in Uzbekistan hasn't been conducted.

Research Aim. Studying awareness about high blood pressure, care for own health and preventing high-blood pressure among HIV-positive people of Ferghana valley in Uzbekistan.

Material and methods.

On the basis of the list of HIV-positive people in Namanagan and Ferghana regional centers struggling AIDS a representative choice list was formed for an epidemic research, qualified by gender and age with the method of overall picking. The total number of researched group was 341 people.

In studying HIV-positive people the following methods were used: survey, instrumental, biochemical and immunologic, was used special application form for detecting cardiovascular illnesses and High-blood pressure and their risk factors (RF) among HIV-positive people. Moreover the application form of first study of patient's condition and HIV stage, which contains the following: 1) verifying HIV diagnosis and if possible, finding out when the patient was infected; 2) detailed, personal, family and medical case history; 3) physical examination; 4) laboratory and other researches; 5) inspecting specialist, if necessary; 6) detecting clinical and immunologic stage of the illness.

All the examining was done by the personnel knowing epidemic methods in cardiology: Blood pressure was recorded using of mercury sphygmomanometer. The participants were seated quietly for at least 5 minutes in rest prior to BP measurement. Two BP readings we taken for each individual at an interval of 5 minutes and the average was considered as the final BP for that individual. For classification of systemic hypertension, the Joint National Committee 7 (JNC VII) criterion was used. Those who had Systolic Blood Pressure (SBP) ≥ 140 and or Diastolic Blood Pressure (DBP) ≥ 90 mmHg were diagnosed to have hypertension.

At the time of filling the application in anthropometry was made: weighing the body was carried out in medical scales with the accuracy of up to 0,1 kg., the height was measured on the ruler with the accuracy of up to 0,5 sm. ECG was done in 12 sections with evaluation in accordance with Minnesota code position.

Immunologic examinations were done with the help of medical specialists from laboratories of regional centre of struggling against AIDS. The strategy 3 was used (one testing with 2 confirming results)/WHO, UNAIDS and SDS, 2001/.

Statistical management of received results were made with appliance of t-criteria of Student and by using Excel-2007 software. While comparing intensive indicators were used X-square criteria (X^2), criteria of Pearson and Kolmogorov-Smirnov, as well as proportional risk of Cox.

Results.

The low awareness of HIV-positive people about HBP was detected (table 1). So in different age groups awareness level of researched population was detected in such degrees: at the age of 20–24–47,5%, 25–29–48,3%, 30–34–52,1%, 35–39–56,4%, 40–44–59,0 ($p<0,05$), 45–49–60,0% ($p<0,05$), ≥ 50 –70,0% ($<0,05$) and 20–50–53,7%.

It should be stated that with the age awareness of HIV-positive people drops significantly — from 47,5% to 70,0% or by 22,5%, that's to say 1,5 times ($<0,05$).

Received results of ours differ from the ones of other researchers' with noticeable variability [18; 19].

Consequently, it will be urgent according reorganizations in the structure of medical aid among HIV-positive people with special and important accent to the ways of giving information about AH to this contingent of population.

Table 1. – Awareness HIV-positive people among Ferghana valley population about high blood pressure

Age groups, years	The number of the examined	Awareness about HBP	
		ABS	%
20–24 (I)	40	19	47,5
25–29 (II)	89	43	48,3
30–34 (III)	73	38	52,1
35–39 (IV)	55	31	56,4
40–44 (V)	39	23	59,0
45–49 (VI)	25	15	60,0
Older than 50 (VII)	20	14	70,0
20–50	341		
t-criteria based statistics (p)	< 0,05	V–I, VI–I, VII–I	
	< 0,01	–	
	< 0,001	–	

While studying awareness of HIV-positive people about risk factors of AH depending on the age also was seen the

same picture that is to say that awareness about risk factors was quite low (table 2).

Table 2. – Awareness of HIV-positive people of Ferghana valley about HBP risk factors (abs./%-accord)

AH risk factors	Age years								P		
	20–24 n=40	25–29 n=89	30–34 n=73	35–39 n=55	40–44 n=39	45–49 n=25	≥ 50 n=20	$\leq 20-50$ n=341			
	n/% (1)	n/% (2)	n/% (3)	n/% (4)	n/% (5)	n/% (6)	n/% (7)	n/%	<0,05	<0,01	<0,001
Obesity	19/47,5	45/50,6	37/50,6	28/50,9	20/51,3	13/52,0	11/55,0	173/50,7	7–1	–	–
High CL in blood	7/17,5	25/28,0	21/28,8	17/30,9	13/33,3	9/36,0	8/40,0	100/29,3	3–1 4–1 5–1	6–1 7–1	–
IPA	20/50,0	47/52,8	38/52,1	29/52,7	21/53,8	14/56,0	12/60,0	181/53,1	7–1	–	–
Smoking	22/55,0	50/56,2	42/57,5	32/58,1	23/58,9	15/60,0	13/65,0	197/57,7	7–1	–	–
CA	25/62,5	53/59,6	45/61,6	34/61,8	25/64,1	16/64,0	14/70,0	212/62,2	7–2	–	–
Stresses	12/30,0	28/31,5	24/32,9	19/34,5	14/35,9	9/36,0	8/40,0	114/33,4	7–1	–	–
Bad eating habits	18/45,0	44/49,4	37/50,6	29/52,7	21/53,8	14/56,0	12/60,0	175/51,3	6–1 7–1	–	–

As we can see from Table 2, awareness of HIV-positive people about main risk factors turned out to be quite low in sequence: obesity — 50,7%, hypercholesterolemia — 29,3%,

insufficient physical activeness (IPA) — 53,1%, smoking — 57,7%, consuming alcohol (CA) — 62,2%, stresses — 33,4% and bad eating habits — 51,3%.

Depending on the age awareness of HIV-positive people about main RF increases in such frequencies: about obesity — from 47,5% (at the age up to 40), up to 55,0% (at ≥50), that is 1,5 times or 7,5% (<0,05); about hypercholesterolemia — from 17,5% to 40% or 2,5 times, that is 22,5% (<0,01); about insufficient physical activeness — from 50,0% to 60,0% or 10% (<0,05); about smoking — from 55,0% to 65,0% or 10% (<0,05); about consuming alcohol — from 59,6% to 70% or 10,4% (<0,05); about stresses — from 30,0% to 40% or 10% (<0,05) and about bad eating habits — from 45,0% (at the age of up to 25) to 60,0% (at the age of ≥ 50) or 15,0% (<0,05).

The maximum awareness of HIV-positive people was detected regarding smoking, insufficient physical activeness, consuming alcohol, irregular eating and obesity. Thus, HIV-

positive people, prefer more significant RF of AH (obesity, irregular eating, IPA, smoking, and drinking alcohol), leaving behind other factors (hypercholesterolemia and stresses).

It seems that in various mass media the increase of information in this aspect and arranged measures of different structures among HIV-positive people are needed.

Other researches also showed such opinions and suggest that measures for preventing HBP, cardiovascular diseases and chronic non infectious diseases should begin from raising awareness on this problem [20; 21; 22].

Analyses of results show that for HIV-positive people 4 levels of answers are common. (table. 3): good health — 6,1%, satisfactory — 40,6% (<0.01), bad-48,7% and excellent — 4,6%.

Table 3. – Attitude of HIV-positive people to their health (results of epidemic research)

Answer levels of examined HIV-positive people		Expanding of health indicators	
		abs	%
Good health (1)		20	6,1
Satisfactory health (2)		138	40,6
Bad health (3)		167	48,7
Excellent health (4)		16	4,6
P	<0,05	2-1, 2-4, 3-1, 3-4	
	<0,01		
	<0,001		

Table 4 presents the results of our analyses, dedicated to studying expanding of health indicators of HIV-positive

people in different age groups.

Table 4. – Attitude of HIV-positive people to their health in various age groups (abs%-accord.)

HIV-positive people's opinion	Age groups, years								P		
	Up to 24 n=40	25-29 n=89	30-34 n=73	35-39 n=55	40-44 n=39	45-49 n=25	≥50 n=89	20-50 n=89	<0,05	<0,01	<0,001
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)			
Good health	7 (17,5)	6 (6,7)	4 (5,4)	2 (3,6)	1 (2,6)	0,0	0,0	20 (6,1)	3-5	1-2 2-5	1-6 1-7 1-5 1-4
Satisfactory health	30 (75,0)	40 (60,6)	42 (57,6)	18 (32,7)	5 (12,8)	2 (8,0)	1 (5,0)	138 (40,6)	1-3	1-4	1-7 1-6 1-5
Bad health	34 (85,8)	46 (51,7)	47 (64,3)	19 (34,5)	8 (20,5)	7 (28,0)	6 (30,0)	167 (48,7)	1-2 1-3	1-4	1-5 1-6
Excellent health	6 (15,0)	5 (5,6)	3 (4,1)	1 (1,8)	1 (2,6)	0,0	0,0	16 ()	2-5	1-3 1-2	1-7 1-6 1-5 1-4

As we can see from the given data for HIV-positive people 4 levels of answers are common in various age groups: good health — 17,5% (at the age of up to 24), 6,7% (25-29), 5,4% (30-34) 3,6% (35-39), 2,6% (40-44) and 0,0% (≥45); satisfactory health — 75,0% (≤24 years), 51,7% (25-29), 64,3% (30-34), 34,5% (35-39), 20,5% (40-44), 28,0% (45-49) and 30,0% (≥50) and excellent

health — 15,0%, 5,6%, 4,1%, 1,8%, 2,6% and 0,0% — accordingly.

Consequently, on their age the best attitude towards own health is among HIV-positive people in the group of up to 24 and 25-34 years.

The next task was studying attitude to preventing measures related to HBP.

Table 5. – IV-positive people's attitude to preventing recommendations about HBP

№	HIV-positive people's opinions said	Relation of HIV-positive people and population (n=341)	
		Abs.	%
1.	Very positive	42	12,3
2.	Partially yes, may take part	101	29,6
3.	Never involved in preventing	162	47,5
4.	No, not useful	23	6,7
5.	Cannot answer	13	3,8

According to the results of our research (Table.5), 12,3% of HIV-positive people showed their opinion to preventing measures regarding HBP answering 12,3% — “Very positive”, 29,6% — “Partially, possible to participate”, 47,5% — “Never participated in preventing”, 6,7% — “No, not useful” and 3,8% — “Cannot answer”. On the whole, 87,7% HIV-positive people have insufficient awareness about effectiveness of preventing measures regarding AH. Perhaps, this situation must gain attention of both researchers and practitioners.

Conclusion. 1. Screening method of early diagnosis, detecting and correction of HBP and its risk factors may be

widely used in making regional and large-scale researches on detecting real needs for preventing measures regarding HBP among HIV-positive people.

2. Among HIV-positive people low level of responsibility for own health is stated (10,7%) and low level of preparedness for participating in preventive measures regarding HBP (12,%). In 87,7% of cases among HIV-positive people there is insufficient awareness about effectiveness of preventing measures regarding HBP and lack of confidence in ideas of preventive recommendations about preventing health problems and healthy life style.

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Efficiency of vaccination of children who undergone severe bacterial infections

Abstract: When immunization of children after the disease against vaccine-preventable diseases in the standard calendar dates of preventive vaccinations, there was a high frequency of seronegative results (20.8%) and low titer (31.3%) of antibody against diphtheria. Children who underwent sepsis, in the development of seronegative results and low titers of antibodies against diphtheria play an important role in ante, intranatal factors and particular in postnatal that are the state of health of vaccinated child.

Keywords: children, sepsis, risk factors, vaccination, diphtheria, tetanus

The health status of children who need vaccination is an important part of the list of factors, determining the state of immunity and epidemiological safety for the controlled vaccination of childhood infections [2]. Due to the practical impossibility of massive individual monitoring of the effectiveness of immunization, lack of objective methods of predicting outcomes, it remains unaccounted quite a large group of children, not producing or quickly losing protective level of immunity after the standard of immunization schemes [3; 6].

Transferred at an early age severe bacterial infections is crucial in the future formation of the immune system, in particular forming the ability to adequately respond to any antigenic exposure, including vaccination [5]. On this basis, the aim of the research was to study the results of immunization of children who had sepsis, soon after clinical recovery.

Materials and methods. The study involved children who had sepsis at the age of 1 month to 1 year 6 months (before vaccination and n=46 after vaccination n=144) immu-

nized 3 times DPT vaccine until 6 months from the revaccination at 1 year 4 months according to the national calendar of preventive vaccinations. Selection and formation of groups conducted specifically on the principle of “a couple of copies”. At the design were included only cases of sepsis with laboratory confirmed of etiology. Status of children after transferred or carried sepsis was evaluated according to physical and neurological status, the dynamics of the curve of body weight and laboratory studies. In this category of children was used the classification of Ostrovsky and AT Vorobyov, 1978. The control group consisted healthy children of the same age (n=45), immunized with DTP vaccine in the standard times of the national calendar of preventive vaccinations — 3-fold to 6 months with revaccination at 1 year 4 months (according to the rules and regulations on organization and conducting the immunization of infectious diseases of Republic of Uzbekistan) [4].

To solve complex tasks was conducted serological methods of research. To study the response of immune cells to

antigenic stimulus and the formation of specific immunity to all children who have had sepsis, and subsequent vaccinated according to the calendar of preventive vaccinations against diphtheria and tetanus, serological studies were conducted — determining the level of antibodies against tetanus and diphtheria toxin serum using the direct hemagglutination reaction with diphtheria and tetanus diagnosticums. Seronegative considered persons having antibody titers less than 1:20, protecting against diphtheria antibody titers considered RPGA 1:40 and more. The titers of antitoxins 1:20–1:40 considered low, 1:80–1:160 average, 1:320 and higher considered as characterizing the high level of security.

Analytical studies. The data of complex examination of patients were processed using a special computer program. In the analysis of the data were used modern mathematical methods of statistical processing of data from clinical studies — clinical trials “case-control” with the estimate of the relative of chance (OR) and the relative risk (RR), to establish which were evaluated the ante, intra and postnatal factors. For predicting inadequate response to vaccination, as well as study the contribution of each risk factor or a complex in the development of a system used by the inadequate response prediction is the method of mathematical and statistical analysis [1].

Results. In the study of post-vaccination immunity in children, immunized after transferred or carried sepsis, following data were obtained. Seronegative results (20,8%) and low titers (31,3%) diphtheria antitoxic antibodies were detected in children who undergone sepsis is 2.1 times more likely, than in healthy children of the same age ($P < 0,05$). The detection rate of average titers was 1.4 times lower than in the control group. High titers were detected in children of the main group in 2,1 times less often. The geometric mean of titers of antibodies to diphtheria toxoid was $50,7 \pm 1,7$ in the basic $1:153,7 \pm 113,7$ and in the control group ($P < 0,01$). The detection rate of seronegative results to tetanus in 2,1 times higher in children undergone sepsis in comparison with healthy children ($P < 0,05$). Geometric mean of titers of antibodies against tetanus was in the main group $151,1 \pm 11,9$ and in the control group $310,7 \pm 12,7$ ($P < 0,01$).

Taking into account the results of post-vaccination immunity, in this category of children, we were analyzed the risk factors contributing to the development of protective and not protective antibody titers against diphtheria. For this purpose the children of the main group were divided into two groups: 1st subgroup – children who undergone sepsis with seronegative and low titers of antibodies to diphtheria ($n=75$) and 2nd subgroup - children who undergone sepsis with medium and high titers of antibodies to diphtheria ($n=69$).

Analysis of the ante, intranatal period in 1st subgroup identified most reliably significant risk factors for inadequate (seronegative and low) immune response. Pathology in labor occurred in 76.3% of the mothers in surveyed group, relative chance of developing no protective antibody titers increased in 7.2 times, and a relative risk in 2.2 times. Taking medicines

during pregnancy was diagnosed in 45.4% of mothers - OR and RR inadequate immune response increased in 2.23 and in 1.75 times. Mastitis after delivery were recorded significantly more frequently in mothers of children subgroup I - OR and RR seronegative and low immune response increased in 2.7 and in 2.47 times. The relative risk of developing chance and no protective antibody titers were less pronounced in the presence of a history of the following factors: in cases of anemia OR and RR increased in 2.6 and in 1.6 times; at chronic inflammatory diseases of the mother OR and RR increased in 2.3 and 1.43 times; with SARS, acute respiratory infections during pregnancy OR and RR increased in 2.1 and in 1.63 times, respectively; when genital infections OR and RR increased in 2.0 and 1.84 times.

Statistical evaluation of the relative opportunities and risks of inadequate post-vaccination response in the analysis of the postnatal period in children who undergone sepsis, with no protective antibody titers revealed the most significant risk factors. Protein energy malnutrition was observed in 13.9% of children in 1 subgroup, OR and RR seronegative or low titers of antibodies to diphtheria increased in 10.47 and in 9.5 times, respectively. Disorders of the gastrointestinal tract (anorexia, dysfunction functional nature) in 77.8% of children - OR and RR inadequate immune response increases in 7,3 in 2,43 times. Neurodevelopmental disability was observed in 73.3% of children - OR and RR increased to 7.22 and 2.66 times. In surveyed children, a violation of the calendar of preventive vaccinations was in 68.0% of children - OR and RR increased to 4.85 and 2.2 times. Changes in the functional state of the CNS (reduction of physiological reflexes) was observed in 61.8%, about the chances and risks does not produce protective antibody titers increased to 4.84 and 2.49 times. Functional disorders of the cardiovascular system in children subgroup 1 were recorded at 32.0% - OR and RR increased to 4.16 and 2.16 times, respectively. Anemia was observed in 56.0% of children - OR and RR increased by 3.6 and 2.15 times.

The lower relative risk of chance and not protective immune response to vaccination in children who underwent sepsis was observed with the following risk factors: frequent SARS and acute respiratory disease OR and RR increased by 3.4 and 2.1 times; artificial feeding OR and RR increased to 2.83 and 1.84 times; mixed feeding OR and RR increased by 2.6 and 2.1 times; thymomegaly OR and RR increased to 2.17 and 1.8 times.

Discussion. Thus, children with a history of severe bacterial infections are not able to adequately respond to the vaccination, using standard approaches. The definition of “inadequate response” includes, along with post-vaccination reactions and complications, immune response, does not protect against infectious diseases, to prevent that the vaccine is used. Vaccination of children is limited to the scope of the requirements of immunization schedule, a variety of regulations and instructions. The calendar of vaccinations with the average doses of vaccines and rigid framework equalizes of immunization conditions the

most immunization vaccine recipients and is designed to the average by the immunological activity of the child.

According to our research in the vaccination of children undergone sepsis assessment of immunity against vaccine-preventable diseases has revealed the inadequacy of the immune response to antigens introduced in all surveyed groups of children, reflected in the high frequency and low titers of seronegative results. As a consequence, this category of children can make risk data on the incidence of infections, breaking prosperous epidemiological situation in the population. This dictates the need for control over the intensity of post-vaccination immunity to these infections in these children, as they are not allocated to the risk by an inadequate (not effective) vaccination.

The effectiveness of vaccination of this category of children is caused by the influence of many factors - ante-intranatal and postnatal, registration which is necessary for a rational choice of further tactics of different immunization antigens. The necessary and the main condition for effective immunization of this category of vaccinated children is the

individual approach. The immunological individualization of vaccination is correction of the immune response to vaccines using different means and methods for immunization with the aim of producing a sufficient immune at each immunized human. It is possible to use different doses and schedules of vaccination and additional means of immunomodulation of the immune response for this correction. The findings suggest the need to develop approaches to improve the activity of the pediatric service by individualization immunization in this category of children.

Conclusions.

1. Immunization of children who undergone sepsis against diphtheria and tetanus in the standard calendar dates of preventive vaccinations, there was a high frequency of seronegative results and low antibody titers.

2. The children who undergone from sepsis it was identified the most significant range of risk factors influencing the formation of seronegative and the low responses to vaccination.

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Microbiological landscape at pyo-inflammatory disease

Abstract: In the postnatal period there is an activation of opportunistic microflora owing to weakening of protective forces of an organism. Developing of inflammatory postnatal diseases is promoted by the following factors: change of a biocenosis of a vagina, a condition of an immunodeficiency at women by the end of pregnancy, character of a course of childbirth, existence of a wound surface (soft fabrics of the patrimonial channel, a uterus); horioamnionit in childbirth.

Keywords: pyo-inflammatory disease, microorganisms, pregnancy.

Pyo-septic diseases (PSD) continue to be one of the actual problems of modern obstetrics. The introduction of obstetric practice over half a century ago, antibiotics contributed to a sharp reduction in the frequency of postpartum infectious diseases. However, in the last decade around the world are seeing an increase of postnatal infections. The frequency of septic diseases in postpartum women up to 10% of all obstetric and

gynecological nosology. After cesarean section operation 60% of postpartum women there some form of septic diseases.

From septic obstetric complications worldwide die every year about 150000 women. Septic complications in the postpartum period, as the cause of maternal mortality continue to lead, ranking 1–2 place, sharing it with obstetric hemorrhage [1; 3].

Predisposes to the development of an infectious process, many pregnancy complications: anemia, preeclampsia, placenta previa, pyelonephritis. The above-mentioned invasive methods of investigation status of the fetus, surgical correction of cervical incompetence increase the risk of postpartum infectious diseases.

In 9 out of 10 cases of puerperal infection as such transmission path does not exist, since the activation of its own pathogenic flora. In other cases, infection occurs outside hospital strains resistant in violation of the rules of aseptic and antiseptic. It should be emphasized as a relatively new way of infection — intra-amniotic associated with the introduction of invasive obstetric practice research methods (amniocentesis fetoscopy, cordocentesis).

The aim of our study was to investigate microbiocenosis vagina and cervix in pregnant and postpartum women with the pyo-septic diseases (PSD) and working conditions the starting antibiotic therapy in pregnant and postpartum women at high risk of generalization of infection.

Materials and methods: The research is based on clinical and laboratory examination of 122 pregnant and postpartum women with NHS with varying degrees of generalization of infection were divided two groups:

— 1 group consisted of 98 women with Pyo-septic diseases treatment for our proposed algorithm, comprehensive diagnosis and treatment;

— In the 2nd group — 24 women treated with PSD traditional ways.

Microscopy was carried out by a conventional method, staining smears performed Gram. Linked immunenzyme analysis (ISA) was performed on «Labsystem Multiskan MCC/340» (Finland), which allow op-mined by specific antibodies IgG and IgM-antibody using the immunenzyme test system of the company “Vector-Best” (Russia) and «Human» (Germany).

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Results and discussion:

The criteria for evaluation of contamination were selected the following indicators: the average amount of leukocytes in the field of view, the type of flora, abundant flora.

The growth of microorganisms was observed in 1-group — 95 (96.9%) of pregnant women, all pregnant women 2 groups, indicating that the growth of contamination of the vagina and of course on the state of the microbial landscape of the cervical canal, which affects the process of intrauterine infection of the fetus.

In the first group from the contents of the lower tract secretions were identified 248 strains of microorganisms.

The two groups were seeded mainly facultative anaerobes. Most of the family group consisted of intestinal bacteria: E.coli in 55 crops, enterokokki- 35, Klebsiella-25. It should be noted that these pathogens were sown in patients with PSD combined urinary tract infection (UTI) in the acute phase or patients are chronic carriers.. These women pointed to episodes of UTI before and during the current pregnancy. Taking into account the history of the previous and current pregnancy and the type of agent in septic conditions make it easier to assign the appropriate antibiotic, and also monitor the progress of treatment, especially if the woman came out of the house in the postpartum or postoperative periods.

The second frequency band is also common pathogens in gold amounted to 21 (21.1%) and Staphylococcus koagulanzanegative in 27 (28.4%) cases. These pathogens were often found in patients who received acute respiratory infections, with community-acquired pneumonia, with prenatal outpouring of water and made up 21.1% and 16.6% and 16.6% and 12.5% respectively in the two groups.

Also non-haemolytic streptococci were sown in two groups with a shutter 29.4% and 8.3%, α — haemolytic streptococcus 20% and 12.5%, streptococc group B occurs at 11.5% and 8.3% in the two groups, respectively. In the analysis of pathological cases, it was found that these bacteria are found mainly in patients admitted to the postpartum period, where a history of childbirth, women indicated prenatal outpouring of water, as well as during their current pregnancy was complicated by repeated threats of abortion, polyhydramnios or oligohydramnios, indicating the presence of recurrent infections.

Yeast fungi of the genus *Candida Albicans* were sown in 23.1% and 16.7% of crops. These were mostly patients who conducted several courses of antibiotic therapy, were either no or little-tive effectiveness. Given the presence of the pathogen, we will include in the complex treatment of fungicides and probiotics.

97 and 59 women were tested for infection TORCH-infection enzyme immunoassay method. In cases where a patient with PSD picture of the had viral aggression, we were determined to confirm the diagnosis IgM form in other cases, were tested for chronic (IgG).

According to the frequency of occurrence of the TORCH infections stood herpes simplex virus (HSV), which has been identified in the two groups of 80.4% and 69.4%, respectively. The chronic form of chlamydia and ureaplasma almost 3 times more than was revealed in patients of group 1 compared with group 2. Gardnerella deemed opportunis-

tic infections in group 1 was detected in 27,8 of cases, and in group 2 was not possible.

These results demonstrate the comparability of treatment groups, the ratio of both unions, and seeded on the contents of the sheath main types of microorganisms.

Doing opinion on the above results, it would point to the diversity of microbiological pathogens landscape PSD and that timely diagnosis of pathogens along with other diagnostic methods can help reduce rates and improve the efficiency of therapy.

The study allowed us to estimate the nature and extent of infection with inflammatory processes in childbirth and the postpartum period.

The literature shows the high frequency of infection of the birth canal and endometrium-specific (*Ch. Trachomatis*, *M. Genitalium*, *U. urealyticum*, Herpes virus and Cytomegalovirus) agents, and is set to a non-specific uslovnopa-pathogenicity coccal flora (*Staphylococcus epidermidis*, *Staphylococcus aureus*, *Enterococcus faecalis*) as the main etiological factors of inflammatory complications in the puerperium. The role of anaerobic and viral infections should be considered when selecting antibacterial and antiviral therapy in the event of complications [4; 6].

In the absence of clinical effect and worsening laboratory parameters within 48 hours from the start of therapy, added another antibiotic, often by the time the results were ready bacterial seeding, we added to the use of antibiotics or other substitutes for all antibiotics.

They were mostly of the fluoroquinolone drugs or aminoglycoside series with 4-generation cephalosporins, and viral lesions added antiviral drugs.

In group 1, which sought to provide treatment to all patients, referring to the study of bacterial and immunenzyme analysis diagnostic data, resulting in comparison with patients in group 2, remission septic complications advanced on 24–78 or more hours earlier than in the group where for various reasons, were treated without or with a delay of bacterial seeding.

Conclusion.

Determination of microbial landscape of the major strains of septic states in integration tests early diagnostics allow readings to review and, if necessary, to determine the timing of termination of pregnancy, and when the patient arrives at the hospital with the PSD, define the starting antibiotic therapy, which is the main obstacle generalization of infection which leads to a reduction in length of stay in hospital.

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Biomarkers the forecasts are based on purulent-septic conditions in the postpartum period

Abstract: TNF- α according characterizes the degree of generalization of infection and the main marker for monitoring the course of the inflammatory process. In our studies, it was 2 times larger than the data of the control group. High concentrations of serum TNF- α , along with IL-6 and IL-8 testify to high risk of development of sepsis.

Keywords: Biomarker, purulent-septic, postpartum period.

In the pathogenesis of pyo-septic diseases (PSD) pregnant are important changes in the reactivity of the immune

system, in particular the content of a number of cytokines on systemic and local levels [1; 2; 7; 9]. Of great interest are

the results of a study of pro- and anti-inflammatory cytokines and the possibility of using these data for diagnosis and treatment in obstetrics PSD [2; 13; 12; 14].

Purpose of the study.

Study parameters proinflammatory cytokines IL-6, IL-8, TNF- α and anti-inflammatory cytokine IL-4 in the sera of patients as a possible test for determining the degree of risk of infection, as well as their interconnection.

Material and methods.

A total of 65 women surveyed, communities, 45 of them with purulent-septic conditions and 27 healthy. Of the 45 women of the main group of births resulted in 22 (48.9%) after vaginal delivery, cesarean section done 23 (51.1%). In the control group in 22 (81.5%) were spontaneous labor, 5 (18.5%) — caesarean section.

To determine the level of cytokines in the serum used enzyme-linked immunoenzyme method (EIA). The results were subjected to statistical analysis using applications Excel.

Results and discussion. Group 1-patients we are seeing a high concentration of serum cytokine IL-6, which has increased 19 times ($38,6 \pm 3,71$) ($P < 0,001$) in comparison with those in the control group, amounting to an average of $2,7 \pm 0,13$. In the analysis in 45 women with none were not a result of normal, in contrast to the 8 samples were within 103pg/ml, which is 50 times the data- healthy women

The concentration of IL-8 was $43,4 \pm 7,725$ pg/ml ($P < 0,001$), exceeding 6 times more than in the control group, where health indicators wives communities were within $6,9 \pm 0,25$ pg/ml.

The concentration of serum TNF- α levels were on average only 2 times higher than the control group, amounting to $13,1 \pm 1,47$ pg/ml ($P < 0,001$). At 7 serum samples of patients with PSD index was above 37.5 pg/ml in the two samples above 15 pg/ml, the rest within 9–13 pg/ml.

Taking into account that IL-4 being inflammatory cytokine, its concentration also along with pro-inflammatory cytokines, we significantly increased up to $28,7 \pm 0,82$ pg/ml ($P < 0,001$) and 8.7 pg/l greater than the data of the control group ($20,2 \pm 0,38$). Of the 45 samples from 17 patients with pyo-septic diseases IL-4 values were high, averaging 34.5 pg/ml, 14 within 25,5–27,8 pg/ml, the rest was in the same range of values as in healthy women.

Currently, there is a look at the following immunomodulating reactions in response to the introduction of the infectious agent. Initially marked local reaction immunity. Increased levels of proinflammatory cytokines at the site of inflammation, then compensatory increases the concentration of anti-inflammatory agents. Furthermore, if local damage are severe enough, there is a significant increase in pro-inflammatory agents and their penetration into the blood. At the level of the whole organism proinflammatory cytokines mobilize the action of all authorities to fight the infection by activating the production of non-specific anti-inflammatory agents, occurring in the first 1–2 days, later supplemented by the activation of anti-inflammatory agents and achieved the balance of these

systems, as was observed in our study, where at increasing concentrations of serum cytokines IL-6,8, TNF- α , raised IL-4.

Analysis of the data showed that initially appeared as a high level of pro-inflammatory cytokines IL-6, IL-8 and TNF in all patients, indicating the presence of an infectious process expressed in the body, capable of generalization of inflammation.

TNF- α according to some authors [2; 6; 9] characterizes the degree of generalization of infection and the main marker for monitoring the course of the inflammatory process. In our studies, it was 2 times larger than the data of the control group. High concentrations of serum TNF- α , along with IL-6 and IL-8 in 7 samples coincided with the PSD clinic patients postpartum period, where he was diagnosed with sepsis or sepsis syndrome is the presence of 2 or 3 multiple organ disorders.

The immune system of the organism in addition to producing the activating cytokines also starts to produce serum cytokine IL-4,, the average content of which was $28,7 \pm 0,82$ pg/ml ($P < 0,001$). High concentrations of IL-4, in contrast to the pro-inflammatory cytokines restrict dissemination of the immune response to, on the one hand, to inactivate the foreign agent, and the other — to prevent development of septic shock and autoimmune pathological reactions, which coincides with the literature [12; 14] that It observed in 33 samples where clinically ill received in the initial stages of SIRS only insignificant-tive changes in the uterus.

In such cases, the appropriate response of the immune system (with a timely combination therapy with immunomodulators) in response to an inflammatory process of the activation of pro-inflammatory cytokines that occurs in the first 1–2 days, later supplemented by the activation of anti-inflammatory agents, and reaches equilibrium of those systems. In our studies, in the 27 samples were also obtained high concentration of serum IL-4, which relates to anti-inflammatory cytokines.

Initially, the high concentration of IL-4 testified prosperous during the inflammatory process, without the generalization of infection.

In 3 cases where the rates of IL-6 and IL-8 were high but serum concentration of TNF- α and IL-4, low, clinically matched picture of septic shock and further generalization of infection, because the excessive increase in the activity of proinflammatory cytokines and the absence of effective opposition from the anti-inflammatory agents quickly (which can happen with immunodeficiency), for 1 to 2 days increases the severity of systemic reactions to inflammation, which develop into more severe forms of the GSS, which also coincided with the investigations of a number of authors [12; 13].

Our data demonstrate significant relationship between elevated serum levels of IL-6 and IL-8 and outcome of the disease: during the entire period of observation at a concentration of not surviving patients remained consistently high,

whereas the favorable outcome of patients experienced a uniform reduction of both cytokines to deadline monitoring. The same dependence observed with IL-4 and TNF- α , remained low in patients with severe forms of the pyo-septic complication (sepsis syndrome and septic shock) and death.

Conclusions:

1. Elevated levels of proinflammatory cytokines source such as IL-6, IL-8 and TNF- α , and expression of their subsequent decline in patients with PSD, may reflect a change in focus of the immune response during treatment by switching

to a cell initially dominant humoral that should be considered as a favorable prognostic indicator.

2. The initial reduced concentration of serum TNF- α and IL-4 suggests expressed cytokine imbalance that same clinic severe sepsis, often with fatal consequences.

3. The lack of decline in IL-6 and IL-8, while increasing the concentration of IL-8, shows significant changes in serum concentrations of cytokines induced and perhaps a sign of growing depletion of the immune system and, consequently, its areactivity.

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Mental characteristics of teenagers with graves' disease in Uzbekistan

Abstract: Thyrotoxicosis affects the intelligence in teenagers. IQ level of children with Graves' disease (77.8%) were below average (OR = 22.8, 95% CI = 2.8-244.8, p = 0.001) and in 22.2% mild dementia was diagnosed.

Keywords: intelligence quotient (IQ), Graves' disease, teenagers.

Nowadays, on state scale and in scientific literature increased attention to issues of health and intellectual

potential of children and teenagers is observed, especially in iodine deficiency regions due to high urgency and social

meaningfulness [3].

Depending on iodine deficiency, incidence of new cases of Graves' disease (GD) in different countries varies from 5-7 to 30-200 per 100,000 people a year [2, 8]. In pediatrics GD is a rare endocrinopathy. Its incidence is 0.1 case per 100,000 preschool children and up to 1-3 cases per 100,000 teenagers [12; 15; 16]. Uzbekistan is a region with severe iodine deficiency [4; 10]. According to 2014 market report of endocrine service of clinics in Uzbekistan, 56 children and 113 teenagers, which is 0.64 and 6.02 cases per 100,000 people accordingly, were diagnosed with diffuse toxic goiter (DTG).

In GD somatogenic exposure on psyche is conditioned by redundant amount of thyroid hormones circulating in blood and activation of sympathetic nervous system via indirect action of catecholamines [11]. Toxins accumulating in blood and hypoxia influence the brain directly which lead to disturbances of neuropsychic [14]. At the same time low prevalence of GD in children considerably limits possibility of carrying out large control studies in this age group [5, 6]. Nevertheless, scientific publications with high level of validity which actually prove associative connection of thyrotoxicosis and high risk of mental disorders development appeared only recently [9; 13]. It should be noted, however, that the majority of existing works deal with psycho-cognitive state of adults with GD (i.e., older than 18 years old) not with those of children and teenagers.

Research objective: to study IQ in children and teenagers with GD.

Materials and methods

18 teenagers with GD were observed in Republican Specialized Scientific and Practical Medical Center of Endocrinology under the Ministry of Health of the Republic of Uzbekistan (RSSPMC of Endocrinology), Tashkent, Uzbekistan. Comparison group included 15 healthy children (control group). Diagnosis of thyroid gland pathology was made basing on clinical data (examination, palpation), laboratory research, radioimmunoassay (TSH, free T3, free T4, Ab-TPO), aspiration fine-needle biopsy (if necessary), and thyroid gland ultrasound. From the moment of diagnosis, all GD children underwent standard adequate thyrostatic therapy by preparations registered on the territory of the republic of Uzbekistan.

In order to determine IQ level *House-Tree-Person* test (HTP) developed by John Buck in 1948 was used [1]. The choice of abovementioned items for drawing is reasoned by the fact that they are familiar to every subject and easy to draw while rang correlation coefficient with other tests for intellect evaluation is 0.4-0.75 [1]. In HTP level of mental development is determined from the point of view of basic information (detail), spatial correlations (proportions and perspective), formed concept (basing on arrangement and quality of a picture in general), reproduction of memory images and their combination on 2 or 3 measured drawings. Due to simplicity of expression mean (drawing), subjects,

who may find it difficult to express orally, can show on pictures their hidden mental abilities or their potential. This matches with the data of traditional diagnostics of intelligence with the help of a drawing [8]. HTP test taken by teenagers in this research reflects the level of their mastering of key concepts and hence indicates level of mental developments sufficiently apart from acquired knowledge and skills [7].

Subjects were offered with a standard white blank A4 sheet of paper, a 2M pencil and an eraser. The following instructions were given: "Please, draw a house as good as you can. You can draw a house of any type, any you wish. You can erase your drawing as much as you like – it will not influence your assessment. You may think over your drawing as much time as you need. Just try to draw a house as best as you can. Then, please, draw a tree and a person just as best as you can." Next the analysis according to the plan developed was carried out. Then, with the help of special tables all results were transferred into IQ [1]. Thus, system of quantitative HTP test handling gives several measurement units correlation of which has diagnostic meaning and shows actual IQ level, which can be lowered by so called non-mental personality traits including somatic genesis (reversible and irreversible).

Statistical analysis of the results was made on Microsoft Excel and STATISTIKA_6 programs. In order to evaluate importance of differences between samples, odds ratio (OR) and 95% confidence interval (95% CI) for mean difference were calculated. χ^2 was used for statistical analysis of differences of two groups by quality features distribution.

Results and discussion

Average age of the teenager subjects in control group was 13.7 ± 0.2 years, with gender distribution of 7 (46.7%) girls and 8 (53.3%) boys. Average age of the teenager subjects in GD group was 13.8 ± 0.6 years and there were no valid differences found compared to control group yet gender distribution differed reliably – GD was 8 times more often diagnosed in girls than in boys (16 cases (88.9%) against 2 cases (11.1%), accordingly), $\chi^2=6,9$, $p=0.01$, OR = 9,1, 95% CI = 1.2-84.6). Duration of thyrotoxicosis in teenagers was from 2 months to 8 years, 3 ± 0.6 average.

Quantitative analysis of IQ level HTP test results showed that in teenagers in thyrotoxicosis group percent of raw G-points was 17.6 points lower compared to those in control group ($p \leq 0,001$). After transferring these values into IQ, this index appeared to be 29.2 points lower and as a mean corresponded to lower average IQ level (Figure 1).

Share of raw G-points indicates potential (not implemented today) level of mental functioning, while net balanced estimate – of current intelligence. When comparing mean of net balanced estimate of teenagers in control group with those in GD difference appeared to be quite significant and made 71.1 points ($p \leq 0.001$). Net balanced estimate of GD teenagers was 3.5 times lower that of control group teenagers. In children with thyrotoxicosis these results in IQ equivalent were lower average while in children from control group they were above average (Figure 2).

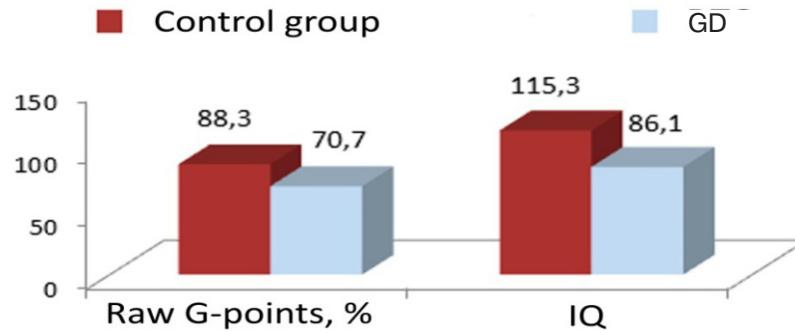


Figure 1. Raw points, %, and IQ HTP test results in GD group of teenagers

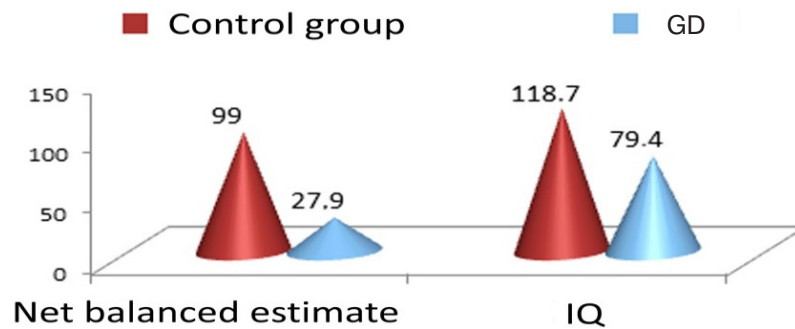


Figure 2. Net balanced estimate and IQ results of HTP test in teenagers with GD

Mean of IQ from raw G-points and IQ from net balanced estimate in children with thyrotoxicosis did not differ reliably ($p > 0.05$). It is assumed that IQ percent of raw G-points represents awareness of the subject and understanding of basic spatial correlations which are quite rough and precise components of mental functioning, while net balanced estimate of IQ represents assessment of developed concepts in subject which is a little bit more subtle and abstract

component of mental functioning. Nevertheless, lower mean of net balanced estimate (27.9 ± 6.1) were diagnosed in teenagers with thyrotoxicosis compared to raw G-points results (70.7 ± 2.0 , $p \leq 0.001$), which probably indicates influence of emotional and/or organic factors.

Analysis of averaged IQ results in all groups showed that GD children had lower IQ compared to healthy ones, $p \leq 0.001$ (Figure 3).

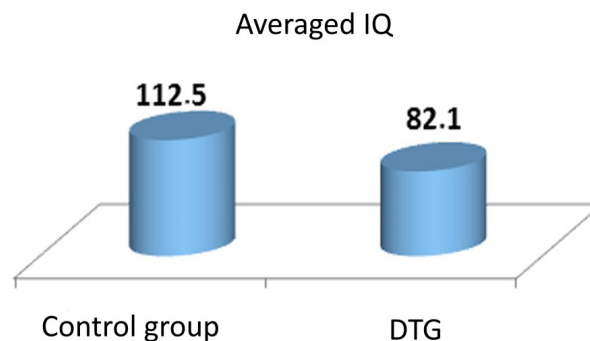


Figure 3. Averaged IQ HTP test results in teenagers

When studying individual results of mean IQ it was revealed that intelligence level in majority of healthy children (13/86.7%) was above average and only in two children (13,3%) — below average. While in GD group majority of children (14/77.8%) were with IQ level below average (OR = 22.8, 95% CI = 2.8-244.8, $p = 0.001$) and in 22.2% (4 subjects) mild dementia was diagnosed.

It should be mentioned that among thyrotoxicosis group the worst results were connected with proportions. We can assume that due to thyrotoxicosis teenagers' abstract-logical thinking disturbs while specific-conceptive remains, shift from perceptual cognition to rational and from specific generalization to abstract are impeded.

Conclusion

1. Lower IQ results were shown in GD group compared to healthy children group which indicates active involvement of intelligence in pathogenetic mechanisms of developing structural and functional disturbances in thyrotoxicosis.
2. Formation of mental deviations may be considered as cognitive thinking development disturbance.
3. There is a need in further study of mental abilities of teenagers with GD.
4. Further psychological rehabilitation of children with thyroid pathology and detection of disturbances in cognitive sphere seem to be important.

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Ethnic aspects of orthognathic bite

Abstract: In the early 20th century the sphere of use of craniology data in medicine significantly spread. Improvement of methods of diagnostics, operative technique and increase of surgical interference in organs of head

characterized new approach to the questions which seemed well studied. Contemporary level of orthodontics and jaw facial surgery requires high level of metric accuracy in determination of forms, spatial position and dimensional characteristics of cerebral and facial skull. Numerous researches of international authors are devoted studying of separate parameters of the skull taking into account different facial and cranial indicators.

Keywords: Ethnic norm, orthognathic bite, cephalometric analysis.

Introduction. Contemporary level of orthodontic help includes rather complex forms of pathogenic diagnostics without which neither early prevention of tooth jaw anomalies and deformations nor their consequent apparatus and reconstructive treatment could be performed. Very significant methods of such diagnostics of tooth jaw facial anomalies are anthropometrical and cephalometrical researches [1; 2; 3; 4].

Thus orthodontic literature contains more different cephalometric analysis, however none of them is universal for attaining all goals and all of them have their disadvantages. Therefore we consider correctly using several methods of cephalometric analysis at once for the same patient. Besides cephalometric analysis are mainly based on comparison of data received as the result of the specified patient's examination (group of patients) with average statistical meanings in this population (for example, Caucasians). Therefore for the last decades a row of works devoted to studying of morphometric and cephalometric indicators of nor for separate ethnic groups and nationalities which have their particularities appeared in foreign literature [5–17]. Nevertheless, norm indicators developed by foreign authors need to be checked in their acceptability for people in our geographical area. Use of these average meanings in diagnostics of tooth jaw anomalies for our population will be hardly correct. Therefore it is appropriate to examine group of people for our geographical area with developed orthognathic bite.

Ethnic norm and signs of orthognathic bite

According to E. Angle (1889), first molars influence on the correct relation of tooth rows which are erupting first and differ by permanent localization and take stable position in the base of the skull. He suggested classification which is based on mesio distal relations of tooth rows. At that E. Angle indicated three basic classes.

Class I — relation of first permanent molars is correct, at this mesial buccal cusp of first molar of the upper jaw is in the intercuspal groove of first molar of the lower jaw.

Class II — mesial buccal cusp of the first molar of the upper jaw is before intercuspal groove of the first molar of the lower jaw. To characterize relation of frontal teeth E. Angle indicated two subclasses: with protrusion of the upper incisors as II/class 1, and with retrusion of the incisors as II/class 2.

Class III — mesial buccal cusp of the first molar of the upper jaw is located behind intercuspal groove of the first molar of the upper jaw [18].

In the literature data about frequency of bite types are also seen as well as in different ethnic groups [19; 20; 21].

Orthognathic bite is considered as anatomic functional norm in contemporary literature which is seen in 50–80% of cases [22]. When losing teeth recreation of bite is problemat-

ic because parameters of tooth rows are not indicated in different combinations and proportions with dimensions of head, face and jaws in representatives of different ethnic groups.

That is why currently bite estimation by only character of tooth rows closure does not correspond to modern demands and possibilities of science and [23]. Estimation of tooth rows of orthognathic bite dimensions in proportionally hierarchy connection with lineal and angular parameters, indicators of jaws, face and head which are taken from naturally volumetrical situation of all structures in alive person is actual not only for ethnic anthropology and clinical anatomy but also for cosmetology, jaw facial surgery, orthodontics, prosthodontics, especially at reconstruction of teeth, tooth rows and lost bite and face and also medico-legal practice for person identification. [24; 25; 26; 27; 28].

Many authors tried to give notion to the word "bite". We consider Persin L. S. gave the most precise determination to word bite. «Bite is multiple closure of tooth rows at habitual position of the lower jaw". According to the author, the first and the main sign of bite is multiple closings of tooth rows. No closure- no bite. Persin L. S. identified notions "physiologic bite" and "physiologic occlusion". "Bite of tooth rows is determined at central and habitual position of the lower jaw. At physiologic closing of tooth rows central position of the lower jaw and its habitual position are the same" [29].

Besides closing Trezubov V. N. indicated other signs of bite:

- 1) tooth row of the upper jaw covers tooth row of the lower jaw in the area of lateral teeth with buccal cusps and in the frontal area anterior overbite is 1/3 of the length of the crown;
- 2) each tooth has two antagonists with exception for central lower incisors and upper third molars;
- 3) midline between central incisors of the upper and lower jaws coincides;
- 4) length of the crown decreases from central incisors to molars;
- 5) multiple fissure cuspal contact of teeth from the right and left is present and closing;
- 6) occlusion from the right and left side is class 1 by Angle

All these signs (exception first) are specific for physiologic types of bite. It should be noted that Trezubov V. N., by characterizing orthognathic bite as normal indicated its transitional forms [30].

Ethnic particularities of bite are studied in Anikiyenko A. A., Rogov M. E. (2002), Haldyeva N. I., Zubov A. A. (2005), Sanzhitsyrenova (2000), Chaban A. V., Proskokova S. V. (2000) works when studying teeth dimensions, tooth rows, apical bases in teleuts, northern hakas' and chulim ty-

urkr. It was noted that mongoloids are inclined to macrodontism (large teeth) [31; 32; 20; 21; 33].

At this fact, some authors (Mirgazizov M. Z., Smerdina L. N., 1998; Chaban A. V., Proskokova S. V., 2000) [34; 33] consider macrodontia as pathogenic factor on anomalies of tooth rows, and other Haldyeva N. I., Zubov A. A. (2005); Sanzhitsyrenova T. I., Anikienko A. A. (1999); Budaev A. A., Belozertsev A. Ju. (2004); Galera V., Cunha E. (1993); Brenchley Z., Oliver R. G., (1997) [32; 21; 35; 36; 37] — as ethnic variant of norm.

Thus, Baydik O. D. (2005) supposed that every ethnic group should have its norm of teeth dimensions, shape and sizes of tooth rows, jaws and skull in common [22].

Thu KM, Winn T, Abdullah N, Jayasinghe JA, Chandima GL. (2005), indicated that indices of tooth rows developed by Pont and Linder Hearth for caucasians in the boundary of XIX, XX century can lead to faults in diagnostics of anomalies of tooth rows in mongoloids, particularly in buryats. In some representatives of mongoloid race (hants, buryats, Eskimos, Mongols, Kazakhs, yakuts, etc.) wide dimensions of tooth rows and alveolar arch are prevalent [38; 39; 40].

Ethnic norm and shape of tooth rows.

Bite is made from morphological structures: tooth rows and teeth. The latter have not only aging, sex particularities but also racial ethnical and individual [41; 42; 43]. Composed tables of teeth, tooth rows and indices parameters are meant for Caucasians and do not consider ethnic territorial and other distinctions [44]. Many researches indicated variabilities of dimensional and relief signs of teeth and tooth rows [2; 45; 21; 46; 40].

Since Myulreyter's times (1889) normal shape of tooth row is used to consider ellipsoid for upper jaw and paraboloid for lower jaw. Alveolar rows of jaws in different ethnic groups were studied by Zanina-Pokrovskaya V. S. (1973). The author indicated the following forms: ellipsoid, paraboloid, U-shaped, trapezoid, hyperboloid and square. Each of these forms, as Zanina-Pokrovskaya noted, is seen with different frequency. Upper alveolar row is very variable in all ethnic groups, as in men as in women. More often ellipsoid, paraboloid and U-shaped form is seen, trapezoid and hyperboloid is less often [47]. Thus, for example, according to the data of different researchers, ellipsoid arch is seen in men's skull from 0% (Chukchi, Tungus, Kirghiz) to 76,92% (Italians); paraboloid — from 0% (Italians, Papuan, Indian) to 46,66% (Ingush); U-shaped — to 0% (Italians, Moldavian) to 47,62% (Ainu). Trapezoid shape is seen in all groups less often and only in Yakut frequency of occurrence has reached 29,17%. Hyperboloid shape is seen less often, — maximum in Negros (15,39%). Square form occurs very seldom — maximum (9,52%) — in Ainu. In mongoloid groups ellipsoid arch is seen less often than in Caucasians. In Caucasians groups U-shaped and paraboloid shapes are seen less often than in mongoloids. Lower jaw is different by more stable form. Paraboloid form is prevalent in it, its other forms are seen less often. According to A. A. Zubov's

observations (1973) more characteristic form of the upper tooth row for men is angular forms (trapezoid and square) which is apparently connected with formation and eruption of large canine. During examination of young men and women G. G. Manashev (2000) noted that the most frequent form of the upper and lower jaws is paraboloid, U-shaped form occurs in young women more often [48]. When analyzing of casts with computer program Reflex Plotter Jones M. L., Richmond S. (1984) made conclusion that the ideal form of the tooth row is parabola. However authors carried out investigation on small material — only on 28 pairs of casts [49]. G. V. Kuznecova et al. (1998) prepared patterns for making normal tooth row of nine sizes with intervals 1 mm. In the basis is graphic method of Hawley- Herber- Herbs based on the sum of mesio distal diameters of incisors and canines. Received curve has form of ellipse [50]. However, according to Hmelevskiy S. I. (1984), for modern person ellipsoid shape of the upper tooth row and paraboloid shape of the lower jaw is less possible and thus, as the author noted, they are not typical. During morphofunctional studying of tooth rows S. I. Hmelevskiy established that tooth jaw facial system is build on the base of circles and spheres which allow it to organically fit in spherical organization of the whole skull [51].

Othmana S, Xinwei E, Lim Sh, Jamaludin M, Mohamed N, Zamros Yuzaidi M, et al. (2012) made investigations on 120 casts of Malays and 129 casts of Malaysian aborigines for determination of morphological differences of tooth rows. Results of researches showed that ethnic Malays and Malaysian aborigines have similar tooth rows in shape and size. In both ethnic groups more popular form to tooth rows is oval and less popular is square [52].

Nabil M. Al-Zubair (2013) on 398 casts made investigations to assess shape of tooth row in adult Yemenites. In the result five forms of tooth rows were discovered and narrow form is the most widespread (30,9%), the wide form (23,9%), and less widespread form is average (9,3%) whereas wide and angled shapes made 18,3% and 17,6% accordingly [53].

Lee K, Trang V, Bayome M, Parke J, Kim Y, Kook Y. (2013) compared Korean and Vietnamese patients, as a result, they discovered that Vietnamese patients had significantly larger tooth rows relatively to Koreans. Among Koreans all three forms of tooth rows were evenly distributed but Vietnamese often have square shape of tooth rows [54].

Olmez S, Dogan S. (2011) compared shapes and sizes of tooth rows in ethnic Turks and established that at anomalous bites, according to Angle's classification, conical, oval and square shapes of tooth rows are mostly seen. With help of this research at treatment of orthodontic patients authors suggest to consider ethnic variants of norm to attain esthetic functional and stable shape of the row [55].

Thus, according to the data of the above mentioned researches tooth rows have different form, naturally connected with the shape and construction of the whole skull. At this

authors indicated many-sided variability of jaw shapes, tooth rows and the whole skull gave little information on variability of tooth sizes, shape of tooth rows and arches in representatives of different ethnic groups of modern population. To a smaller extent, variability of a separate organ (tooth) organization in its relation to the jaws and skull were considered.

The history of metisation (crossbreeding)

Siberia has always attracted the attention of researchers, including anthropologists, geneticists, historians, linguists, dentists [56; 34; 57; 32; 58; 59]. Immigrants to America crossed this territory in the Upper Paleolithic period. There is the ancient “open” contact border of Mongoloids and Caucasians in Western Siberia, which led to a confusion of the two major races and led to the need for active learning of metisation. “The mixing of peoples and races metisation — a powerful process that should be considered as one of the most fundamental factors of division of the human population on the big and small race. The appearance of the “intermediate”, most often of mixed origin, but sometimes undifferentiated racial types occurred in ancient times. That was population of western and southern Siberia, the Ural and Central Asia, border between Caucasians and Mongoloids [22].

According to McComb J. et al. (1996), the population of Altai is genetically different from other indigenous groups in Siberia. This causes an even greater interest in the study of

the indigenous population of the Altai, and especially in comparison with Caucasians. There were little cephalometric and odontometric indicators cited in these studies. The authors did not indicate the condition and size of the teeth, dentition and occlusion, or cite the data resulted in a small clinical material. Facial and cranial size and topography of a modern human being century vary not only in connection with the territory of residence. They change with racial-ethnic lines, which is partly associated primarily with some specific adaptation to climatic factors [60; 61; 62; 63].

Analyzing the sources listed in the research, it is noted that most of the researchers discuss various departments of the head, face, skull isolated from each other. Describing the structure of the skull or head, they do not pay attention to the shape and structure of the teeth, dental arches, occlusion, or vice versa, they indicate the structure of the latter and do not give information about the shape of the face and head, taking the racial-ethnic and regional characteristics in account.

Thus, we consider conduction of a comprehensive research of the shape and size of the head, face, jaws, teeth and dentition with orthognathic bite. This allows to identify the most reliable signs of extraoral indicators of bite, create new analog models of jaws with the racial and ethnic features for the people of our geographic area.

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The characteristic of the immune status at hiv- infected children with acute rhinosinusitis

Abstract: The immune status has been studied at 25 HIV-infected of children with ARS. The control group of comparison consisted from 14 practically healthy faces. At a HIV-infected of patients with ARS has revealed deep in-

fringements of the immune status, especially from the T-link of immunity and its subpopulations, and also frustration humoral an immunity link, suppression of proinflammatory cytokine IL-10 and increase proinflammatory IFN- γ . Under the influence of the spent treatment have not revealed certain changes from the immune status at patients. It is possible to ascertain only positive changes of maintenance IL-10 and parallel decrease IFN- γ in dynamics of treatment.

Keywords: The immune status, a HIV-infection, acute rhino sinusitis, cellular immunity, humoral immunity, an immunodeficiency, cytokines.

HIV/AIDS is the retrovirus infection characterized by epidemic distribution of global scale, amazing exclusively T-helpers [1–3]. Last two decades the defining reason of a secondary immunodeficiency (SID) at children became a HIV-infection which pandemic continues to accrue. Defeat of immune system at a HIV-infection has system character, being shown deep suppression T- and B-links of cellular immunity [1; 3; 4].

One of the first symptoms of AIDS quite often are diseases of LOR-organs. Acute rhino sinusitis (ARS) often comes to light at children with a HIV-infection, disease of it at children's age fluctuates within 60–75%, and lethality makes 0,01–0,2% from the diseased [1; 6]. According to a number of authors, at a HIV-infected of children ARS meet more often, than at children normal immune system [1; 4; 5]. *Aims of the study* — To study parameters of the immune system at a HIV-infected of children with ARS.

Material and Methods

We investigated 25 children at the age from to 3 till 14 years of a HIV-infected with ARS, were on hospitalization in LOR-BRANCH of the Bukhara regional children's versatile medical centre. Boys have made 56.6%, girls — 43.4%. Unilateral defeat of sine was observed at 57.8%, bilateral — at 42.2%. Except inflammation signs the general anxiety, a bad dream, refusal of a chest food, headaches was marked. Besides traditional inspection (the general analysis of blood, urine, bacteriological and bio-chemical researches) all patients have passed LOR-survey, under indications — sine sounding (26.5%), X-ray additional bosoms of a nose (9.6%). In the basic group there were 25 HIV-infected with ARS patients, and in a control — almost healthy 14 children of similar age who did not have in anamnesis ARS and a HIV. All 25 HIV-infected children consisted on the account in the Bukhara regional AIDS-centre. Patients received antiretroviral therapy, antibacterial, anti-inflammatory and local therapy in the conditions of a hospital. The HIV diagnosis was based on revealing of specific antibodies in standard serological tests (ELISA, immune bloating in updating Western-bloat) and comparisons epidemiological and serological data. Immunologic studies were carried out in conjunction with the Institute of Immunology NA RUz (Tashkent). In researches included patients from a HIV-infection and ARS which parents have given the informed consent to participation in the given researches (work has been executed according to the Helsinki declaration and it is approved by ethical committee of Bukhara State Medical Institute). *Phenotype* lymphocyte carried out indirect by immune fluorescent method with the help mono-

clonal antibodies to CDs-receptors «Sorbent Ltd» (Russia). Defined T-lymphocytes (total set — CD3); T-helpers (subset of Th — CD4); T-suppressors (subset of Ts — CD8); B-lymphocytes (subset CD19). Calculated an immunoregulatory index (IRI) — the ratio of CD4/CD8. Concentration serum antibodies (Ig) A, M and G defined a method of radial immune diffusion [7]. Level cytokines (IFN- γ , IL-10) in whey of peripheral blood was studied a method of the immune enzyme analysis with use of test systems by firms «Vectors-best» (Russia). Parameters of the immune status studied twice: before and 1 month after treatment.

The obtained data was exposed to statistical processing with use of computer program Micro-soft of Excel 2003 on LG-Pentium IV. Significance of differences when comparing the mean values were determined by Student's *t* test. Data are presented as of $M \pm m$. Differences were considered significant at $P < 0.05$.

Results of research and their discussion

The retrospective analysis of studying of the immune status at a HIV-infected of children with ARS has shown that in terms before carrying out before treatment at them essential infringements have been revealed from their immune system (tab. 1). At a HIV-infected with ARS patients observed 0.7-fold fall of absolute value of leukocytes and the relative content lymphocyte, double decrease in the absolute values of lymphocyte. Such decrease was reflected in statistically significant decrease from 2 to 3 times of absolute values of the total pool T (CD3) — and B (CD19)-lymphocyte (tab. 1).

At a HIV-infected patients with ARS children showed profound suppression T-cell immunity in their relative expression, namely, 0.6-fold reduction in T-cells with the phenotype (CD3), even more significant suppression T-share helpers cells — Th (CD4) — up to $13.8 \pm 2.3\%$ (in the control group $34.2 \pm 1.6\%$; $P < 0.001$), while the content of subset of T-cells — T (CD8)-cytotoxic exceeded the background values in the control group moderate ($P > 0.05$).

In this connection in the given group there is an inversion an immune regulatory index (IRI) — the ratio of CD4/CD8, — that leads to serious changes in immune system of patients with HIV-infection, combined with the ARS. Thus, we find out a disbalance of T-cell subset with a decrease in the proportion of helpers Th (CD4) and increase suppression parts — Ts (CD8) (tab. 1). Reduction IRI registered by us at HIV-infected with ARS children testifies to functional insufficiency of T-cells with a phenotype of Ts (CD8), and it is a sign of the profound immunodeficiency which has developed at patients. At a HIV-infected of patients with ARS have revealed small activation of subset of

T-killers — Tk (CD16) that, possibly, is also *pathognomonic* at this pathology.

In respect of B-cell component of the immune system can be said that moderate decrease occurred, which was statistically is possible to tell that there was a moderate decrease that statistically confirmed ($P>0.05$). Decrease B (CD19) lymphocytes was reflected in the spectrum of serum immunoglobulin (SI) content of two classes — IgA and IgG, and quantity IgM, on the contrary, increased (tab. 1).

The data obtained by us testifies to profound infringements in the functioning of the immune system in children of patients with a HIV-infection and ARS, which were reflected a spectrum cellular and humoral immunity factors. These disorders appear to be quite possible as a fact that plays an important in the pathogenesis of this mixed-pathology in children. The decrease of the relative quantitative properties of Th (CD4) — this aggravating factor, and an unfavorable forecast criterion.

The spent treatment did not lead to appreciable changes of parameters of immune system at a HIV-infected of children with ARS. We observed a tendency in moderate increase of separate links of cellular immunity and humoral immunity, however restoration of key parameters of the immune status (tab. 1). Besides, at patients with chronic processes saved pressure of the humoral component of system of immunity remained at $P>0.05$. In a HIV-infected of patients with ARS have found out weak increase T (CD3) and B (CD19) in

their relative and absolute values, and also moderate increase of production of Tk (CD16), Ts (CD8), the concentration of IgA (tab. 1).

Spectrum studying cytokines at a HIV-infected of children with ARS has shown that at them presence of *significant* differences between values of the basic group with control group was marked. So, for example, if at healthy children level $\text{IFN-}\gamma$ made 23.70 ± 5.38 pg/ml, at a HIV-infected of children with ARS the similar parameter was in 3/5 times above and there was at level 82.84 ± 21.17 g/ml (tab. 2). So, high level $\text{IFN-}\gamma$ at a HIV-infected of children with ARS testified to expressiveness of degree of inflammatory reaction. It is known that as a source $\text{IFN-}\gamma$ serve activated T-lymphocytes and natural killers. Among T-lymphocytes producers $\text{IFN-}\gamma$ are both the cytotoxic Ts (CD8), and Th (CD4) cells, however at a differ-entiation of the last on Th1 and Th2 ability to develop $\text{IFN-}\gamma$ keep only Th1-cells. The major function $\text{IFN-}\gamma$ is its participation in medium interrelations between lymphocytes and macrophages, and also in regulation of a parity cellular and humoral components of the immune response. Being the basic product Th1-клеток, $\text{IFN-}\gamma$ reduces secretor activity Th2-cells. Thus, $\text{IFN-}\gamma$ *enhances* the development of cellular immunity and suppresses displays humoral immunity. Hence, $\text{IFN-}\gamma$ plays an important role in immune regulation, being key by the cytokine cellular immune response and inhibitor of the humoral immune response [8].

Table 1. – Parameters of immune system at a HIV-infected of children with ARS in dynamics of treatment

Indicator	Healthy (n=14)	Patients (n=25)
1	2	3
Leukocytes, num./mklт	6123 ± 162	4251 ± 321*** 4437 ± 234***
Lymphocytes,%	29.6 ± 1.7	21.4 ± 2.15** 22.7 ± 2.4*
Lymphocytes, abs.	1812.4 ± 35.7	931.5 ± 97.2*** 1003.6 ± 47.5***
T (CD3),%	58.3 ± 2.5	38.4 ± 3.2*** 41.2 ± 2.7***
T (CD3), abs.	1058.2 ± 72.2	362.5 ± 43.6*** 425 ± 51,4***
Th (CD4),%	34.4 ± 1.6	13.8 ± 2.3*** 12.4 ± 2.7***
Ts (CD8),%	22.7 ± 1.2	24.2 ± 2.8 26.5 ± 3.1
IRI (CD4/CD 8)	1.5 ± 0.14	0.58 ± 0.31** 0.49 ± 0,36**
Tk (CD16),%	15.4 ± 0.9	16,2 ± 2,5 18,4 ± 3,2
B (CD19),%	24.3 ± 1.22	19,62 ± 4,4 22.5 ± 2.6
CD19, abs.	351.6 ± 29.4	182.1 ± 20.5*** 228.7 ± 34.9**
IgA, mg%	129.2 ± 10.8	84.4 ± 7.8** 101.9 ± 13.6
IgM, mg%	86.7 ± 8.9	140.4 ± 13.1*** 136.3 ± 16.5**

1	2	3
IgG, mg%	1047.3 ± 33.4	888.7 ± 42.7**
		761.4 ± 54.6***

The note: in numerator the data before treatment, in a denominator — after treatment;

* — $P < 0.05$; ** — $P < 0.01$; *** — $P < 0.001$ — in comparison with control group.

Table 2. – The maintenance pro- and anti-inflammatory cytokines at HIV-infected of children in a combination with ARS in dynamics of treatment.

Indicator	Control group	The basic group
IFN- γ , pg/ml	23.70 ± 5,38	82.84 ± 21.17**
		21.93 ± 7.42
IL-10, pg/ml	10.95 ± 3.63	86.08 ± 19.43***
		52.04 ± 12.06**

The note: in numerator the data before treatment, in a denominator — after treatment;

* — $P < 0.05$; ** — $P < 0.01$; *** — $P < 0.001$ — in comparison with control group.

Level IL-10 in group at a HIV-infected of children with ARS approximately in 8 times higher than those values of the control group. It is known that IL-10 it is described as the factor stimulating B-lymphocytes as it causes proliferation B-cells. The main producers IL-10 are Th2 cells. IL-10 inhibits functions of macrophages and secretion by them IL-1, FNO and IL-6, having thus anti-inflammatory an effect. IL-10 causes proliferation and a differentiation B — and T-lymphocytes, influences development hematopoietic cells, on macrophages, natural killers, basophiles, being the functional antagonist cytokines, produced Th1 cells. IL-10 promotes development of allergic reactions, possesses the expressed anti-inflammatory action [8].

The comparative analysis has shown that the parity IFN- γ /IL-10 (proinflammatory/anti-inflammatory cytokines or Th1/Th2) at healthy children equaled 2.2. In the presence of the expressed inflammatory process, that is at children of the basic group, this indicator made 0.96. The expressed disbalance in functioning of the core regulator cytokines which was expressed by acute lifting of level anti-inflammatory cytokines and suppression proinflammatory cytokines, acute inflammatory conditions being the basic regulators is revealed. Thus, the HIV-infected of children with ARS have an expressed stimulation of production both proinflammatory, and anti-inflammatory cytokines. Such

processes can as a necessary condition for protection against the infectious agent and system damaging action of high concentration proinflammatory cytokines [8].

After treatment carrying out in group of a HIV-infected of children with ARS level IFN- γ has come nearer to control values, and level IL-10 in dynamics of treatment if decreased, but nevertheless remained at high level, in 5.5 exceeding those parameters at children of control group. The parity IFN- γ /IL-10 in the basic group tended to even bigger to decrease, making 0.42. Thus, at a HIV-infected of children with ARS deep deficiency of most of the parameters of the immune status is observed. One of the major disorders of the immune status is a significant suppression of Th (CD4)-lymphocytes and inversion of the IRI with an increase in functional activity of Ts (CD8)-lymphocytes, which is unfavorable clinical criteria. The given patients did not have positive dynamics of changes of the immune status after treatment carrying out. Under the influence of treatment there was a suppression proinflammatory of cytokine IFN- γ . However, it should highlight that the detected change in the level of IL-10 and a violation of the proportion of pro- and anti-inflammatory cytokines indicates the presence of preexisting immune deficiency, which, apparently, and was manifested in the form of complications associated with HIVinfection.

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Optimization of surgical correction of genital prolapse with subsequent tubal sterilization

Abstract: Currently, pelvic organ prolapse is the most common pathology among women of reproductive age. For these patients it is relevant not only the correction of pelvic organ prolapse but also the search for the most effective contraceptive methods. Treatment of prolapse with simultaneous contraception for these patients is an actual problem of modern gynecology. This paper proposes a method of transvaginal voluntary surgical contraception, produced in conjunction with surgery descent and prolapse of the vaginal walls. We studied the nearest and long-term results of surgery in women during the surgical treatment of genital prolapse at the same time was performed transvaginal tubal ligation.

Keywords: Transvaginal voluntary surgical contraception, descent and prolapse of internal genital organs.

One of the urgent problems of modern gynecology is genital prolapse in women of reproductive age. This is due to the fact that descent and prolapse of internal genital organs remains in the spotlight of gynecologists, not only because of the tendency to increase the frequency and severity of this disease, but also the fact that intervention for prolapse in the structure of gynecological operations in frequency rank third place, but also by the tendency to increase the frequency of this pathology.

In the structure of gynecological morbidity the descent and prolapse of internal genital organs makes 1,7–28% [1; 8]. Despite the improving the quality of obstetric care, approximately 50% of all women giving birth in term observed genital prolapse of varying severity, the disease has a wide age range, in addition, in recent years there has been a noticeable “rejuvenation” of this disease and the increasing number of complicated and recurrent forms [1; 2; 3; 6]. Problem of genital prolapse is becoming increasingly important for women of reproductive age. Insolvency of the pelvic floor, including the omission of sexual organs, is extremely frequent pathologies observed in almost a third of women of reproductive age [5; 7]. In the treatment of prolapse and internal genital prolapse the surgery plays a leading role. In literature described in detail more than 300 ways of surgical treatment of descent and prolapse of internal genitals by vaginal, abdominal, laparoscopic or combined access, which indicates a certain degree of imperfection of each. However, the high rate of recurrence of the disease (16 to 43%) indicates a lack of efficacy of currently used surgical techniques [1; 3]. In modern conditions, given the trend toward “rejuvenation” of the disease, genital prolapse seems not only medical but also personal, family, social issues affecting sexual, professional and many other areas of life of patients. Reasons for the high incidence among women of reproductive age — one-third of all patients on

given nosology — lie in the general deterioration in the health of women in the population.

The most important factor in maintaining the health of women who have undergone surgery for prolapse is a solution to the problem of unwanted pregnancy. It is believed that carried plastic surgery on the genitals is an absolute indication for cesarean section [7]. Thus, women operated on for prolapse of the vaginal walls need to be informed and make a choice about their reproductive goals, i. e. they need the highly effective methods of contraception, such as voluntary surgical contraception. In this regard, the use of contraception is considered as one of the most important trends in the rehabilitation of women in the process of complex treatment of genital prolapse. It is known that when choosing a method of contraception should be considered reproductive intentions and experiences of patients, which is the driving factor of contraceptive behavior [5]. Researchers did not study these issues in women with genital prolapse.

The purpose of this study was to develop recommendations for optimizing the surgical correction of genital prolapse and choosing an effective method of contraception for women of reproductive age.

Materials and methods

Under the observation were 105 women of reproductive age with genital prolapse. A survey of women began with the study of history. From history we found out the age of the transferred gynecologic and extra genital diseases, surgery. The focus was on duration of the disease, the nature and effectiveness of the remedial measures earlier. In the study of menstrual function was paid attention to the age of menarche, menstrual function (duration of menstruation, the intensity, the presence of pain), the rhythm of the cycle. Also was noted the age of onset of sexual activity, contraceptive methods used previously. In the analysis of reproductive function was drawn

attention to the number of pregnancies, births, abortions, especially their current complications. Especially we paid attention to obstetric trauma of soft tissues of the birth canal and the effectiveness of their recovery. Were excluded chronic inflammatory diseases of the pelvic organs, complications of pregnancy and childbirth, vaginal operative delivery methods, benefits and other conditions of the body, which could lead to obstetric injury of the cervix and vaginal walls. Additionally were examined: occupation, place of residence, professional activity, especially working and living conditions, availability of physical activity, the types of additional loads (work in the garden and suburban areas, the content of the farm cattle and small livestock). Hereditary predisposition was emerged from history. The age range is 20–45 years. Basically, it was a woman's age group 31–40 years (52%). The average age of patients was $37,3 \pm 2,5$ years.

Of the total number of examined patients residents of the city were 66 (62.5%), of village — 35 (37.5%). The genetic predisposition for genital prolapse was indicated 60 women (57.5%). Most of the patients had 2–3 childbirths (48.7%). 28 of (27.5%) women had a history of one childbirth, and 24 (23.8%) — 4 or more. Parity was $2,52 \pm 0,7$, ie per a woman was by $2,52 \pm 0,7$ childbirths. Reproductive function was characterized by a large number of births, which were accompanied by high perineal injuries (64%) (the weight of a newborn 4000gr was in 28%), high frequency of abortion. Gynecological inflammatory diseases identified in 100% of cases. Out of 80 women who had a history of childbirth, all 80 linked their disease to childbirth. Almost half of the patients — 55 (52.5%) had a history of 1 to 4 artificial and spontaneous abortion.

In 15 (18.6%) diagnosed cervical elongation in combination with the old perineal, in 45 (56.3%) — elongation cervix in combination with the old perineal, 12 (15.0%) — ptosis walls vaginal cervical elongation, cystocele, 8 (10.0%) — ptosis cervix in combination with the old discontinuity.

All patients in the scheduled order underwent surgical treatment. As the table shows, the predominant method of surgical treatment of genital prolapse in women of reproductive age is a front and rear-Colpe perineorrhaphy. Restoration of the pelvic floor was performed in all women using their own tissues. All patients used vaginal access.

Our proposed technique of colpoperineolevatoroplastics strengthening of vesicovaginal fascia and sterilization by Pomeroy transvaginal access:

Stage I — bares vagina using mirrors, grab a cervix vulsella and reducing it. Making the front vaginal vault incision 2–3 cm long and penetrate into the abdominal cavity.

- Stage II — using pipe hook Ramathibodi grab the fallopian tube and reducing it in the vagina. Examining Division ampullar and fimbriae, we see that relegated pipe and choose avascular area.

- Stage III — in the avascular portion of the pipe creating a loop of 1–2 cm, impose a stranglehold free chromic catgut (simple O-shaped ligature) around the pipe and tight-

en a square knot. Loop tube is cut off, holding the ligature stretched. Inspect the stump tubes for the absence of bleeding, cut the ligature 1 sm from the tube and immerse the tube into the peritoneal cavity. Perform the same procedure on the other side of the wound and sutured anterior vaginal vault continuous catgut suture.

- Stage IV — cervix send down to the entrance of the vagina, in the midline, at some distance from the outer 1.5–2 cm opening of the urethra and toward the cervical os before reaching the border of cervical and vaginal vault, cut the vaginal wall to be loose layer of fiber. Blunt and sharp by exfoliate vaginal wall from the underlying fascia gallbladder. Separation area depends on the flap of the vaginal wall, which will be deleted as redundant.

- Stage V — purse-string catgut suture connect midline perivesical tissue, piercing the fascia and muscle layer, thereby provided "strengthening" of the bladder and hemostasis simultaneously.

- Stage VI — remove redundant tissue of the vaginal wall, the wound edges combine continuous catgut suture. Evaluation of hemostasis, removal of bullet forceps.

- Stage VII — define the boundaries of the triangular flap removed posterior vaginal wall with clamps Kocher two clips at the outer corners of the triangle imposed on the lower sections of the labia minora, above the boundaries of posterior commissure, at the level where the future will be re-formed back spike. The vertex of the triangle is located to the rear vaginal wall along the midline. Reducing bottom clips together, define the width of the resulting postoperative vaginal entrance.

- Stage VIII — stretching the clamps base of a triangle with a scalpel make a thin cut along the junction of the vaginal mucosa and perineal skin. Impose on the resulting flaps clips, stretch injury, and penetrate into the rectovaginal tissue and blunt and sharp separation through the vaginal wall of the rectum. The flap is cut off with scissors, starting from the top corner, then moving to the side corners.

- Stage IX — continuous catgut suture to sew up the wound resulting from its upper corner, connecting only the edges of the mucosa. After a few — 4–5 — pass the end of the thread stitches with needle holder assistant and proceed to levatoroplastics.

- Stage X — levatoroplastics performed in two ways, depending on the muscle. If at a palpation determined that the leg muscles are not broken, they were isolated from the fascia. If at a palpation the abdomen muscles, lifting the anus, poorly defined, the remaining parts of the muscle were ligated together with the fascia covering. In the first case from the vaginal wound over the abdomen muscles (determined by palpation) cut tissue and fascia. Found on both sides of the levator under them carried a thick ligature and pulled up into the wound of the vagina, while freeing them from the fascia prerectal parts into which imposed tightening 2–3 main seam. In the second case, not separating the muscles using steep thick needle, a first summing it with one hand muscle, gouged

and grasped from the other side arm. At the time of the needle under the thumb muscles were pushed posteriorly intestine.

- Stage XI — continued the connection of edges of the vaginal wound continuous catgut sutures to the boundary of the skin. Passing to perineal muscles and suturing them.
- Stage XII — suturing perineal code by Dyutsman. As a control, to 30 patients were held DCA in the first stage, before the vaginal surgery, according to the standard technique of minilaparotomy.

The marked tendency towards improving the quality of sexual life, shows the positive impact of elimination of geni-

tal prolapse with simultaneous DCA on the quality of life of women.

Conclusion

1. Optimization of surgical correction of genital prolapse with simultaneous transvaginal tubal ligation in women of reproductive age eliminates the basic pathology and provides a reliable method of contraception.

2. The given method of surgical treatment of prolapse with simultaneous transvaginal DCA does not affect the duration of the operation, and is an effective method of contraception.

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Interrelation of the values of prolactin and obesity degree in women with disorders of reproductive health

Abstract: We determined dependence of BWI values and obesity degree on the amount of prolactin in blood, testifying its role in the development of obesity and disorders of reproductive health.

Keywords: prolactin, obesity, women, reproductive health.

Topicality. According to the data of WHO, nowadays there is more than 1.7 billion people in the world who have excessive body weight or obesity. In compliance with the expert

prognosis to 2025 the number of people with obesity will increase almost 2 times [7]. According to the results of epidemiological studies women suffer obesity more often than men [4].

Excessive body mass is a state of abnormal or excessive accumulation of fat in organism with the degree harmful for organism. Though for women it is more than just size problem. First of all, it is chronic diseases, which cannot be hidden from others, and for women it is reason of constant stress and often episodes of depression and low self-estimation. Secondary, that disease is often accompanied by metabolic alterations and increase of the risk of appearance of disorders in other organs and systems [6]. In gynecological endocrinology excessive body mass in women of reproductive age is considered to be risk factor for the development of several metabolic disorders, such as hyper insulinemia (HI), insulin resistance (IR), and hyper androgenia (HA). It can be accompanied by dysfunction of ovaries, sterility, various hyper plastic processes, and high risk of development of cancer of endometrium, ovaries, and mammary glands [2].

Epidemic of obesity is linked with availability of very tasty and cheap caloric food in the present time, and serious changes in the style of life. At the same time genetic factors play important role in the regulation of energetic balance and, according to multiple studies with participation of twins, heritability of overweight composes from 40% to 70% [9].

Hyper prolactinemia, i. e. increase of prolactin level in blood, is a biochemical marker of hypothalamus-pituitary dysfunction, observed by endocrinologist, gynecologists, urologists, sexual pathologists and psychiatrists in their practice. According to the literature references, in the total population the prevalence of this status is about 0.5% in women and 0.07% in men, and up to 80% of the cases are observed among women in the age from 25 to 40 years old [1].

Prolactin plays an important role in the survival of human as a species, as it provides not only lactation function, but also effects other important processes, including ones conditioned by its effect on metabolism and reproduction system, formation of food and maternal behavior [3].

In hyper prolactinemia besides disorders of menstrual cycle, patients have other clinical symptoms. Among these patients obesity is most often met, and some patients complain fast gaining weight [5].

Hyper prolactinemia can be observed in hyper thyroids, and 20–30% in women with polycystic ovaries syndrome. In some cases hyper prolactinemia is combined with hyper androgenia, as high level of prolactin intensifies secretion of androgens in adrenals [1; 8].

Taking into account the topicality of that problem, we performed clinical study of reproductive age women with obesity.

Objective of the study was definition of interrelation between obesity and hyper prolactinemia in women of reproductive age.

Material and methods: we studied 65 women of reproductive age with overweight and obesity (main group, average age was 29.8 ± 0.79) with menstrual dysfunction and infertility; control group — 20 women without problems of reproductive health with normal values of BWI (BWI below 25 kg/m^2 ; average age was 29.1 ± 0.56).

All patients of the main group complained gaining weight and menstrual dysfunction, 27 (41.5%) were diagnosed with primary infertility, 17 (26.1%) had disorders of menstrual cycle opso menorrrhea type, 13 (20%) oligo menorrrhea cases, and 8 (12.3%) secondary amenorrhea cases.

In both groups we estimated the character of menstrual cycle, anthropometric parameters (body weight, BWI, WL, HL, WL/HL).

Originally we determined amount of prolactin in blood serum using immune enzyme method. Tests were performed at 3–7th days of independent or induced menstrual cycle.

In the clinical checking we determined the following: type of constitution, degree of secondary sexual traits development, character of hair growth, and presence of galactorrhea. From anamnesis we defined the time of menarche start. We performed ultra sound checking of thyroid gland, womb and ovaries.

Results of the research. In the analysis of anthropometric characteristics the average body weight of the examined women of the main group was equal to $84.7 \pm 2.3 \text{ kg}$, the average value of BWI was 31.2 ± 0.61 .

In healthy women of the control group average body weight was $64.3 \pm 1.7 \text{ kg}$, BWI — 24.2 ± 0.66 . In the main group women had reliable high anthropometric values ($P < 0.05$).

In the control group the average value of waistline (WL) was equal to $78.45 \pm 1.37 \text{ cm}$, hipline (HL) to $97.53 \pm 1.85 \text{ cm}$, WL/HL- 0.80 ± 0.06 ; in the main group the average value of waistline (WL) was equal to $96.77 \pm 1.85 \text{ cm}$ ($P < 0.01$), hipline (HL) to $110.53 \pm 1.72 \text{ cm}$ ($P < 0.01$), WL/HL — 0.97 ± 0.05 ($P < 0.01$).

At the moment of primary check-up body weight was fixed in 25 (38.4%) women of the main group, obesity I stage (BWI $30\text{--}35 \text{ kg/m}^2$) in 23 (35.4%), obesity II stage (BWI — $35\text{--}40 \text{ kg/m}^2$) in 10 (15.4%), and obesity III stage (BWI $> 40 \text{ kg/m}^2$) in 7 (10.8%) patients. In the control group 9 women (45%) had BWI equal to 25 kg/m^2 , i. e. the values were at the lower border normal range.

On the basis of the achieved data we determined that, majority of the women of the main group (74.3%) had abdominal and only 25.7% gluteo-femoral (mixed) type of obesity.

At the performance of ultra sound checking of womb and ovaries we revealed echo graphic signs of polycystic ovaries syndrome in 43 (66.1%) (according to the criteria of international consensus, Rotterdam, 2003) women. It should be noted that, that category of women obesity was observed in the majority of the cases (88.4%; 38 patients).

In hormonal profile of the patients of the main group there were some disorders. Rise of LH level and ratio LH/FSH above 2.5 folds with formation of polycystic ovary syndrome was observed in 20 (31%) women. We revealed subclinical hypothyroids in the analysis of TTH and T4 in 5 (8%).

In the study of prolactin and obesity stage interrelation in women with problems of reproductive health we revealed that, prolactin in blood increases together with the rise of EBW value.

Women with obesity and problems of reproductive health had 3.5 fold increase of prolactin amount ($P < 0.01$), which depended on the stage of obesity, and in the cases with excessive body weight in the main group its amount was increased 2.2 fold, while at the III stage 4.8 fold.

By means of correlation analysis between the values of BWI and prolactin level we determined strong positive link ($r = +0.856$).

Thus, we determined dependence of prolactin values and obesity stage in women with problems of reproductive health, proving its participation in the development of obesity and problems of reproductive health. That hypothesis can be explained with the physiological effects of prolactin, possessing direct stimulating impact on β -cells of pancreas and participation in the development of tissue insulin resistance. Besides that, prolactin can directly affect cells of fatty tissue, stimulating proliferative and metabolic processes in adipocytes, lead-

ing to the increase of fat tissue amount and development of leptin resistance.

In relation to the above mentioned, we can say that, in women of reproductive age with increased level of prolactin, it is rational to monitor the values of BWI, to maintain ideal weight and to decrease the number of concomitant diseases.

Conclusions:

1. In 74.3% of the women with problems of reproductive health have abdominal type of obesity, and in 25.7% gluteo-femoral type.

2. Among the women with symptoms of polycystic ovaries syndrome obesity was registered in 88.4% cases.

3. We determined increase of prolactin level in blood dependently on the stage of obesity.

4. We revealed correlation interrelation of BWI value with the level of prolactin.

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Peculiarities of mineral density of bone tissue in children with juvenile rheumatoid arthritis

Abstract: The change of structural functional status of bone tissue parameters in children suffering JRA with joint-visceral and joint forms of the disease, differed in its character, while the expression of these changes depended on the form of the disease.

Keywords: juvenile rheumatoid arthritis, bone mineral density, children.

Topicality. Juvenile rheumatoid arthritis (JRA) is inflammatory disease with chronic character, which damages joints usually in children under 16 years old. Nowadays among children diseases with rheumatoid character juvenile arthritis takes the first place. This disease is spread around the whole world and the percentage of morbidity among children varies from 0.05 to 0.6 [2]. Associate and inalienable clinical mani-

festation of JRA is development of skeletal-muscle pathology, the intensity of which testifies about severity of the disease and adequacy of the performed therapy [2], progressing of erosive-destructive alterations in joints, and formation of osteoporosis (OP) [3; 4].

According to the data of statistical studies, JRA affects from 2 to 16 individuals per 100 000 of children population,

in the age under 16 years old [1]. The spread of JRA in various countries takes from 0,05% to 0,6% [5]. Approximately in 50% of the children the disease starts before 5 years old. Girls suffer JRA 1.5–2 times more often than boys. The disease has a great social importance due to often loss of workability in early age. The percentage of invalid children with set diagnosis of juvenile rheumatoid arthritis is high about 70%. About 50% of the patients lose workability after 3 years history of the disease [4; 6].

There is decrease of social functioning level in a society, deterioration of life quality occurring as a result of pathologic alterations of structural-functional status of skeletal system in the patients with JRA and it levels the resource of their “social return” [8]. In compliance with the data taken from our and foreign references [7; 9], patients with JRA have notable decrease of osteodensitometering parameters, change of mineral exchange values, and osteogenesis markers.

The preserved tendency of osteoporosis morbidity growth among children population with rheumatoid diseases proves insufficiency of existing prophylactic methods efficacy.

The aim of the research: The aim of the research was to study structural-functional status of bone tissue, taking into account expression of mineral density values' shifts in the patients with JRA.

Materials and methods: In TashPMI clinics we studied 36 children (6–16 years old) with JRA. The average age of the examined children was 11.3 ± 0.8 years old. Before the checking of the children of control group (20) we performed detailed study of their anamnesis for detection of chronic diseases, long term administration of any agents affecting bone tissue, orthopedic tests and anthropometric tests.

Anthropometric tests were performed in compliance with unified strategy using standard equipment. Height-weight values were measured for the calculation of body weight index (BWI) according to the following formula: $BWI = \text{body weight} / \text{height}^2$ [2].

In the study of structural functional features of bone and muscle tissue we applied osteodensitometering method and biochemical analysis. Osteodensitometering was performed with the help of ultrasound osteodensitometer General Electric Medical Systems (USA). We determined qualitative and quantitative parameters of trabecular BT architectonics: 1) speed of ultrasound transmission (SUT, m/s) — dependent on elasticity and density of bone; 2) broadband ultrasound weakening (BUW, dB/mHz) — reflecting BT density, quantity, size and space orientation of trabecular bone; 3) rigidity or density index of BT (BTDI,%) — characterizing status of spongy BT.

Values of osteocalcin (OC) were studied as a marker of osteogenesis. The level of OC in blood serum was determined with the help of solid-phase immune enzyme analysis. NMID Osteocalcin (Nordic Bioscience Diagnostics A/S, Canada) test system was used.

Biochemical tests of calcium and phosphorus exchange values and markers of bone resorption and osteogen-

esis in blood serum and urine were performed for all patients.

Statistic processing of the obtained data was performed with the help of computer variation, correlation, regression, mono and multifactor dispersion analysis (license programs Microsoft Excel and Statistica, StatSoft, USA). We determined the average means (M), its mistakes (m), mean quadratic deviations, correlation coefficients, regression criteria, dispersion criteria, Student criterion (t), and reliability of the statistical values (p).

Results and discussion. The severity of the disease and activity of rheumatoid process were determined on the basis of clinical checking in compliance with the common diagnostic criteria.

According to sex the patients with JRA were divided as follows: boys — 16 (44.4%), girls — 20 (55.6%). At the moment of visual examination in compliance with JRA classification joint form (JF) of the disease was revealed in 28 (77.8%), joint-visceral form (JVF) — in 8 (22.2%) children. Various degrees of functional insufficiency were noted in 68.2% children. Polyarthritis was registered in 61.3% of the examined children, oligoarthritis — in 32.3%, monoarthritis — in 5.4% of the patients. Duration of the disease among the checked children was in the terms from 6 months to 14 years. Average age of the disease debut was 6.5 years old. Factors, which served to be trigger mechanism of JRA, were such as acute respiratory viral diseases (42.9%), tonsillitis (21.4%), trauma (11.1%) and others. (24.6%).

To evaluate the values of structural functional status of bone tissue in the patients with JRA dependently on the form of the disease, we studied the values of bone density, permeability for ultrasound, and intensity of ultrasound transmission.

Comparative analysis of the obtained data of the patients with JRA and the children of the control group showed a reliable ($p < 0.001$) decrease of all values of US densitometering in all checked children. That indicates disorganization of bone structures under the influence of systematization of connective tissue inflammation process.

In the analysis of the obtained data we paid special attention to decrease of bone tissue rigidity, as that value was the sign of osteoporosis development. In our study decreased values of bone structure density index were detected in 21 (75.0%) patients with joint form and in 8 (100%) patients with joint-visceral form of JRA. Consequently, we can consider that sex, age, hypokinesia, medical therapy, unfavorable factors of environment, genetic predisposition to rheumatic diseases, hormonal misbalance, and low peak bone mass have a significant contribution in the development and progressing of bone pathology.

Besides that, we revealed reliable ($p < 0.01$) decrease of bone tissue density in case of joint form of JRA in relation to joint-visceral one. The value of ultrasound transmission speed in case of joint form was 1522.12 ± 1.85 m/s, and for joint-visceral form — 1501.02 ± 3.98 m/s.

Detection of changes of ultrasound transmission speed (UTS) value to the side of diminishing in cases of joint-vis-

ceral form of the essential disease in comparison with the joint form was statistically reliable ($p < 0.001$). Reliable differences between mean values of broadband ultrasound weakening parameters in children with joint-visceral form and joint form of the disease were not detected.

Changes of structural functional status of bone tissue in the patients with JRA in the form of osteoporosis were revealed 2 times more often among the patients with joint-visceral form of the disease: 91.2% of the patients with joint-visceral form of JRA had changes of structural functional status of bone tissue in the form of osteoporosis or osteopenia with various degrees of manifestation.

In the studies of biochemical values of mineral exchange in the patients with JRA, dependently on the form of the disease, we detected a reliable decrease ($p < 0.01$) of Mg in blood serum in cases of joint and joint-visceral forms of the disease, where that value was 0.81 ± 0.06 and 0.76 ± 0.05 mmol/l correspondingly.

In case of joint-visceral form of JRA there was notable average value of blood serum P and rise of Ca day secretion ($p < 0.05$) and P with urine ($p < 0.05$), testifying acceleration of bone exchange, particularly bone resorption processes.

It was noted, that patients with JRA had decrease of Ca, P and Mg amount in blood serum and excretion of P with urine in comparison with the group of healthy children. The most expressed alterations were registered in patients with joint-visceral form of the disease.

Besides that we performed estimation of osteocalcin amount, and revealed that children with JRA had osteocalcin amount in serum reliably ($p < 0.001$) below the values of healthy children (71.22 ± 1.21 and 92.46 ± 1.67 ng/ml correspondingly), proving low osteosynthesis and diminished activity of osteoblasts in the patients with JRA.

In children with joint-visceral form of the disease the amount of osteocalcin was reliably lower than in the patients with joint form (58.88 ± 3.76 and 74.34 ± 1.24 ng/ml correspondingly, $p < 0.05$), indicating decrease of osteosynthesis in the children with joint-visceral form of JRA.

Thus, even with small clinical material, the obtained results of the research prove that the processes of bone metabo-

lism in children with juvenile arthritis have various orientations: from activation of bone exchange to its suppression. The most expressed disorders of bone metabolism such as hypocalcemia, hypercalcemia, hyperphosphatemia, hypomagnesemia, decrease of osteocalcin amount, physical development retardation are revealed in children with polyarticular variant of juvenile chronic arthritis with systemic forms of juvenile rheumatoid arthritis.

Conclusion. It was determined that decrease of bone structures density index was detected in 21 (75.0%) patients with joint form and 8 (100%) patients with joint-visceral form of JRA. The value of ultrasound transmission speed in cases of joint form was 1522.12 ± 1.85 m/s, and in cases of joint-visceral form — 1501.02 ± 3.98 m/s. ($p < 0.001$). Alterations of BTDI in patients with JRA such as osteoporosis were revealed 2 times more often than among the patients with joint-visceral form.

It was revealed, that in cases of joint-visceral form there was notable decrease of average level of phosphorus in blood serum and increase of day excretion of Ca with urine ($p < 0.05$). Thus, in cases of joint form the total amount of Ca was 2.34 ± 0.06 mmol/l, inorganic phosphorus — 1.21 ± 0.07 mmol/l; in cases of joint-visceral form — 2.30 ± 0.02 mmol/l, 1.17 ± 0.09 mmol/l correspondingly, proving acceleration of bone resorption processes.

It was detected that patients with joint-visceral form of the disease the level of osteocalcin was 58.88 ± 3.76 ng/ml, with joint form — 74.34 ± 1.24 ng/ml ($p < 0.05$), indicating diminished osteosynthesis and decreased activity of osteoblasts. We revealed direct correlation links with SUT, BUW and BTDI ($r = -0.71$; $r = -0.64$; $r = -0.68$ correspondingly), and the level of osteocalcin and Mg ($r = -0.42$; $r = -0.25$ correspondingly).

Thus, the change of structural functional status of bone tissue parameters in children suffering JRA with joint-visceral and joint forms of the disease, differed in its character, while the expression of these changes depended on the form of the disease. The obtained data testify the necessity to study values of structural functional status of bone tissue in children with various forms of JRA, and that will provide effective performance of rehabilitation measures.

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Relationship between some indices of the cytokine system and haemostasis at low birth weight infants

Abstract: The work performed in order to study the complex dynamics of hemostatic parameters in the first week of life in low birth weight infants, and comparing them with the features of the cytokine spectrum. There were conducted examination the state of hemostasis and the content of TNF and IL1b in 20 healthy full-term newborns and 68 low birth weight infants at the early neonatal period. Analysis of the dynamics of certain hemostatic parameters testifies the variability of these parameters at different stages in the early neonatal period in low birth weight infants. At low birth weight infants tensions in the hemostatic system is observed from the first days after birth. Pro-inflammatory cytokines, along with other factors, lead to increase the tension in all hemostatic system and dysfunction of endothelium.

Keywords: cytokines, the endothelium of blood vessels, hemostasis, newborns.

The early neonatal period life of the child represents a unique combination of extreme impacts, requiring continuous change of adaptation mechanisms to the functional, hormonal and biochemical and immunological levels. In the process of adaptation to extrauterine life in the hemostatic system of the newborn dynamic changes taking place, which should not exceed the physiological limits, but the combination of multifactor extreme conditions disrupted the balance in the system. Among such extremal effects refers the prematurity, low birth weight, which is peculiar to immunological disorders [3; 7; 8; 9].

There is extensive information about cytokines now. Cytokines having multifunctionality, provide all phases of the inflammatory, hemostatic and immunological processes until recovery, that is, they are able to perform and immunostimulatory (proinflammatory and immunosuppressive) anti-inflammatory, hematopoietic function [12]. The spectrum of effects of interleukins including: induction of IL-2, colony stimulating factors, synthesis of acute-phase proteins, of which is pro- and anticoagulants products IgA, IgM, IgG, induces maturation of megakaryocytes, osteoblasts, and macrophages, neuronal differentiation. On the other hand, they also induce apoptosis of neutrophils possessing anti-inflammatory properties. A special place in the regulation of blood coagulation activity of endothelial belongs that is modulated by cytokines: tumor necrosis factor (TNF- α , IL-1 β) [1; 5]. They participate in generating a large amount of tissue thromboplastin of all vitamin K-dependent factors [7; 11]. Among the challenges of modern neonatology are insufficiently studied issues relating to the formation of the hemostatic system in LBW newborns in the early neonatal period, since the combi-

nation of extreme influences, demanding continuous change of adaptation mechanisms on the functional, hormonal, biochemical levels affect this process [2; 4; 6; 8]. Considering the above stated the purpose of work was to study the complex dynamics of hemostatic parameters in the first week of life in low birth weight infants, comparing them with the features of the cytokine spectrum.

Materials and methods. We conducted a clinical and laboratory (state of hemostasis and cytokine TNF- α and IL-1 β) examination at the early neonatal period in 20 healthy full-term newborns and 68 low birth weight infants. The age of mothers of surveyed children in both groups was identical: ranged from 20 to 35 years, on average, 25.2 \pm 0.6 years.

In addition to clinical research methods, there have been conducted special research methods: the standardized partial thromboplastin time (aptt), using reagents firm "renamo" (Russia); determination of prothrombin time according to quick; determination of fibrinogen by using koagulometers sets «human diagnostics worldwide (geramaniya); determination of thrombin time using the reagent kit of the company "renamo" (Russia); determination of the amount of cytokines, tnf, IL-1 β -elisa-test systems using ltd. "cytokine"

Results of the study

Analysis of the survey results showed that in 48.9% of the surveyed women have chronic diseases without exacerbation during pregnancy (chronic tonsillitis, chronic pyelonephritis, diffuse nontoxic goiter). From obstetric history in group 1 revealed that 39.4% of women - primigravida, 22.8% - again primiparous pregnant, 37.8% - multiparous. In 15% of the mothers was observed anemia 1 and 2 degrees, 25% have been observed toxicosis of 1st half. All Group 1 chil-

dren born at line 39-40 weeks gestation, weighing an average of $3576 \pm 0,59$ g and a body length on average 51.4 ± 0.2 cm. Apgar score was at 1 minutes into the 7-9, 5 minutes – 8-9. Condition at birth for all children was satisfactory. In the analysis of obstetric history two groups we found a variety of diseases in mothers, the consequences of which are unconditional chronic intrauterine fetal hypoxia. When analyzing the data of pregnancy revealed that toxicosis 1st half of pregnancy were observed in 72% of women, gestosis 2nd half of pregnancy in 22% of threatened abortion, 16% of women. In 75% of women with anemia pregnancy was I-II degree. The children were born on 30-34 weeks gestation. A natural way resolved 80% of women, while 30% of children born in the breech presentation ($P < 0.05$). Analyzing the data, we can assume that the intrauterine development occurred in the conditions of chronic hypoxia followed by exposure to intrapartum asphyxia. The average birth weight was $1900 \pm 20,0$, the growth – $44,4 \pm 1,2$ sm. Period of early adaptation flowed for all the children in different ways. Apgar score was 4-6 points. In the first hours of life were marked lethargy and hypotonia, weak cry, spontaneous motor activity, inhibition of physiological reflexes. At 38.4% of the children was observed transient neurological symptoms (tremor when crying or small muscular hypotonia).

Dynamics of the vascular-platelet and coagulation parts of hemostasis in infants in the control group on the first day showed the following: kaolin-kefalinovoe time (KKV) reaches for the first day – $68,7 \pm 3,19$ sec., plasma fibrinogen (PT) $3,4 \pm 0,3$ g/L, prothrombin time (PTT) $13,0 \pm 2,0$ seconds, platelet- $226,0 \pm 11,5 \times 10^9$; thrombin time $18,2 \pm 2,0$ seconds, aggregation activity platelet $51,4 \pm 4,4$ sek. At low birth weight infants, these figures were significantly different: kaolin-kefalin time (KKV) reaches for the first day – $98,9 \pm 2,29$ sec., plasma fibrinogen (PT) $1,8 \pm 0,3$ g/L, prothrombin time (PTT) $18,0 \pm 2,0$ seconds, platelet - $134,0 \pm 11,5 \times 10^9$; thrombin time $23,2 \pm 2,0$ seconds, aggregation activity platelet – $69,4 \pm 4,4$ sek ($P < 0,05$). Especially characterized by low levels of fibrinogen, the functional activity of platelets, low platelet aggregation, which is a risk factor for intraventricular hemorrhage. It should be noted that, in preterm low birth weight infants hypocoagulation greatest shift was detected from the first days of life and maintained 10-14 days, whereas in healthy term infants hypercoagulable first days gave way to anticoagulation, and the end of the 1st week in accordance with changes of adaptive mechanisms tended to stabilization of hemostasis. This is apparently helps to stabilize the hemodynamic and hemostatic processes.

In the study of cytokine spectrum of blood, we have found that an important informative indicator of the immune system of a newborn baby in the early period of adaptation is the

level of production of cord blood monocytes of TNF- α , IL-1 β . The degree of increase of the concentration of IL-1 β and TNF- α serum of LBW newborns coincided with the severity of the child's condition. In newborn infants with low birth weight concentration of IL-1b in the peripheral blood serum had a tendency to increase since the 3rd day of life and were $0.450 \pm 0,081$ pg/ml vs. $0,259 \pm 0,093$ pg/ml ($P < 0,01$) in the control group. In the following days the life of serum level of cytokine gradually decreased. The amount of TNF- α from the first days of life had significantly increased $82,3 \pm 1,2$ pg/ml versus $8,3 \pm 1,9$ pg/ml, respectively; ($P < 0,01$) and persisted throughout the neonatal period.

Discussion. Increasing the concentration of IL-1 β and TNF- α in the blood may be an early diagnostic sign of the formation of multiple organ disorders and evidence of involvement of these immunocytokines in the pathogenesis of critical states of low birth weight infants. Probably, high serum level of TNF- α indicates the intensity of immunological reactions in the body of the child and plays a central role in the inflammatory response, tissue damage which may be a predictor, on the development of adjustment disorders in the early neonatal period. TNF- α increases the permeability of capillaries, vascular endothelial damage.

Analysis of the dynamics of certain hemostatic parameters testifies the variability of these parameters at different stages in the early neonatal period in low birth weight infants. At low birth weight infants the tension in the hemostatic system is observed from the first days after birth. A wide range of variation indicators vascular-platelet and coagulation level in the early neonatal period without severe clinical complications thrombohemorrhagic testifies a close connection with the processes of hemostasis homeostatic adaptation. At the same time the limits of fluctuations should not go beyond the physiological limits, which increase the risk of thrombotic and hemorrhagic complications. Together, these changes cause less stable hemostatic system, a much greater incidence of bleeding and the like inside the vascular blood clotting in this group of infants. Practically any abnormality is observed in premature infants, can be complicated by bleeding or DIC syndrome. This is due to the emergence of new factors affecting hemostasis. In particular, vascular endothelial dysfunction factors which are damaging hypoxia, ischemia, endotoxins and cytokines (TNF- α and IL-1 β).

Conclusions

1. At low birth weight infants is observed variability hemostatic parameters at different stages of early neonatal period.
2. Pro-inflammatory cytokines lead to increased the tension all the hemostatic system and the endothelium dysfunction that underlie the formation of multiple organ disorders in the critical states of low birth weight infants.

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Characteristic peculiarities of virusologic values in children with herpes simplex combined with atopic dermatitis

Abstract: In the article we presented the data of checking of 61 children with clinical manifestations of Herpes simplex combined with atopic dermatitis. Characteristic types of Herpes Simplex DNA were revealed with the help of Real-time PCR, so in 26.0% we revealed EBV, in 16.3% — HSV-2, and CMV in 10.2%. In 49.2% we revealed its association. In 37.7% of the children with AD high titers of IgG antibodies to Herpes Simplex virus and in 47.4% cases diagnostically significant presence of specific IgM we determined using immune enzyme analysis.

Keywords: Herpes Simplex virus, atopic dermatitis, children

One of the most topical and complex problems of the modern medicine is infectious pathology in children, explained by the high level of morbidity, difficult diagnostics, and low efficiency of the therapy. Among great number of diseases caused by pathogenic microorganisms such as bacteria, fungi, protozoa, the most dangerous are viral infections, often processing without symptoms, non-pathogenically, in association with other diseases, and more often together with the background weak immunity.

Unfavorable epidemiological circumstances, and causes leading to the growth of manifest forms of infections and its relapses prove insufficient vigilance of doctors in relation to viral diseases, late laboratory diagnostics, absence of a common concept of therapy and prophylaxis — all these lead to increase of the number of patients with viral diseases [1].

Several researches, performed both in our country and foreign, show high level of Herpes virus infection (HSV, CMV, EBV) among children with somatic pathologies [2; 3; 5; 6].

Many studied performed recently showed that, from 3% to 15% children and from 2% to 10% adults suffer atopic dermatitis (AD) [2; 10]. In the present time significant rise of AD morbidity is noted among children, and its manifestations are registered in 90% of the patients applying to a dermatologist [4]. These data prove that, AD becomes a significant problem of health care.

There is a hypothesis about a possible role persisting herpetic and cytomegaloviral infections play in the development of allergic pathologies, including AD in children [3].

In spite of the fact that clinical manifestations of various forms of the pathology are well known and described, for the confirmation of the diagnosis, definition of prognosis and prescription of adequate therapy of herpetic infection it is necessary to apply a complex of laboratory research methods.

Objective: to study characteristic peculiarities of viral values in children with Herpes Simplex associated with atopic dermatitis.

Materials of methods of the research: we performed checking of 61 children with atopic dermatitis and clinical manifestations of Herpes simplex in the age from 1 to 14 years old. Duration of AD progress in all patients corresponded to the age. Exacerbation stage was noted in 57 (93.4%) patients, while the rest had incomplete remission. From the anamnesis data we detected that, first clinical manifestations of AD on skin in the majority of the children (41 or 67.2%) appeared within the first year of life, less from one year to two years old (17 or 27.9%) and in few patients it appeared later (3 or 4.9%). Hereditary predisposition to AD was determined in 57.4% of the children. We also analyzed the prevalence of clinical manifestations of Herpes simplex virus among close relatives sick with AD, and it was equal to 36.1%.

Dermal manifestations of dermatitis were characterized by typical morphology and location of rash (face, neck, body, flexor surfaces of limbs). In clinics there was prevalence of symmetric erythematous-papulous rash tend for grouping, with small and middle plate peelings; foci of infiltration and lichenification; linear and spotty excoriations; and hemorrhagic crusts. White spread dermagraphism was defined in 44.3% (27) patients, mixed in 57.4% (35), and pink one in 16.4% (10).

The study of clinical progress peculiarities of AD associated with HSV in children was performed by means of analysis of clinical-epidemiological cards filled for each patient. We took into account severity degree of AD scaled with the help of SCORAD, type of the disease progressing (relapsing or continuous), activity degree, prevalence, clinical form of AD, presence of complications, concomitant lymph adenopathy, etc.

The degree of AD severity was average 57.5 ± 7.1 points. In 33.3% children we registered maximal activity degree. Spread form of AD was registered in 64.8%, general form in 27.6%, and local one in 7.6% children.

The complex studies of the children included traditional research methods such as clinical blood, urine analysis, coprogram, ultra sound checking of inner organs, and the patients were checked by other specialists, if necessary.

All children were also checked with the help of PCR-real time method for detection of genome DNA of the agent. Besides that we performed detection of markers of HSV1 and HSV2, cytomegalovirus (CMV) and Epstein-Barr virus (EBV). For the study of humoral immunity parameters by means of immune enzyme analysis (IEA) we performed serological test in 61 children for the detection of specific antibodies to HSV, CMV, EBV and other herpes viruses.

For the material we used peripheral blood, saliva, and urine.

Results of the research: with the PCR real time analysis data we determined the following characteristic rules: markers of HSV2 were detected in 16 (16.3%), CMV in 10 (10.2%), EBV in 26 (26.0%) patients, and the last groups were mostly children in the age from 1 to 3 years old; and HHV6 was detected in 9 (9.1%) patients. In relation to association with other herpes viruses in the children with AD,

we detected association of HSV-1+HSV-2 in 19 (19.3%) children, HSV-1+EBV in 6 (6.1%) and HHV-6+EBV in 5 (5.1%).

The highest percent values of the virus isolation were achieved in urine (96%) and saliva (91.3%).

The analysis of the results of antibodies titer (AT) definition showed that, it varied from 1:50 to 1:24800. In compliance with the accepted regulations for "Vector-Best" test system titers 1:200 and more are considered to be diagnostically significant (DST). Titers below this value are not diagnostically significant (DNST). We revealed high prevalence of the viruses (HSV and CMV) among children with AD, and this value was equal to 63.9%. In 18% we revealed CMV, less — combination of two infections HSV and CMV (8.1%). 2/3 of the children had high titers of antibodies IgG to HSV (37.7%). The obtained data testify reactivation of herpes viruses in AD.

Activity of infectious process was determined by the presence of specific IgM antibodies to viruses. Diagnostically significant titers (3 1:200) were revealed in 12 (19.6%) children with AD, high titers were determined in 17 (27.8%), and it was about half (47.4%) of the total number of the examined children with specific IgM.

Thus, markers of Herpes Simplex virus in children with AD were met in 63.9% cases. High titers of specific IgM in blood serum were revealed in 47.4%, and that proved persisting and reactivity of herpes viruses in children with atopic dermatitis.

In conclusion it should be noted that, for the establishment of reliable diagnosis, detection of intra-cellular location of the infectious agent and definition of quantitative viral load it is necessary to apply high sensitive, very specific and fast PCR-technologies, it is especially important in pediatric practice. In the checking of the direct markers of herpes viral infections in new-born babies and children of young age preference should be given to the urine test, as viral particles in it accumulate in great amounts and the material is obtained by means of non-invasive method.

Conclusions:

1. The types of Herpes simplex virus DNA were detected in children with Herpes Simplex virus associated with atopic dermatitis with the help of PCR method with hybrid-fluorescent detection of amplification products in real-time mode; thus in 26.0% we detected EBV, in 16.3% HSV-2, and CMV in 10.2%. In 49.2% we revealed association of these viruses such as HSV-1+HSV-2 in 19 (19.3%), HSV-1+EBV in 6 (6.1%) and HHV-6+EBV in 5 (5.1%) patients.

2. 2/3 of the children with AD had high titers of antibodies IgG to Herpes Simplex virus (37.7%). The obtained data testify reactivation of herpes viruses in AD.

3. Diagnostically significant titers to Herpes simplex (3 1:200) we detected in 19.6% of the children with AD, and high titers were revealed in 27.8%, it was equal to 47.4% of the total number of the examined children with specific IgM.

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High level of neurotrophins in blood of patients with spinal muscular atrophy of the 2 type as a result of compensatory-adaptive process

Abstract: Adaptation is a broad biological concept, including all forms of regulation of the body functions under normal and pathological conditions. A study of neurotrophic regulation in patients with spinal muscular atrophy of the 2 type with identification of neurotrophins (BDNF and NGF) in blood was carried out. High concentration of neurotrophins in serum may be related to the activity of compensatory and adaptive processes aimed at partial recovery of lost motor function in patients with the SMA of the 2 type. The obtained data shall be taken into account when treating patients with the SMA of the 2 type.

Keywords: spinal muscle atrophy of type 2 (SMA), compensatory and adaptive mechanisms, blood serum, neurotrophins, BDNF, NGF, immunoenzyme method.

Compensatory and adaptive mechanisms are triggered both under physiological and pathological conditions. Any form of life envisages adaptive reactions aimed at its survival, preservation of its condition or properties when exposed to environmental factors or shifts within the system itself [1, 173]. Compensation is one of the most important forms of adaptation, which develops under pathological conditions, so it is distinctive, as a specific human has a specific disease. Thus, compensation is a set of body reactions, occurring during injuries or diseases and aiming to restore disturbed functions. Human has individual reactions, but at the same time, as a representative of biologic species, he is also given some species-specific adaptive reactions. Both reactions are difficult to separate, that is why they are normally referred to in clinics as compensatory and adaptive processes. The biological matter of compensatory reactions is to restore disturbed functions of organs and systems, and the degree of their recovery is the main criterion for the adequacy of these reactions. The physiological goal of the neurotrophic regulation is maintenance of viable populations of neurons to perform a genetically-programmed function. The study of neurotrophic regulation in

patients with neurodegenerative diseases may open up new therapeutic directions for the doctors.

The objective of the study: to evaluate the activity of compensatory and adaptive processes in patients with spinal muscular atrophy of the 2 type, exploring the neurotrophic regulation by determining neurotrophins (BDNF, NGF) in blood.

Materials and methods. Clinical-neurologic and neurophysiological examination of 10 patients with 2 type SMA was carried out. Level Beta-NGF and BDNF in 10 patients (SMA 2 type) was determined in serum using Beta-NGF ELISA Kit and BDNF ELISA Kit (RayBiotech, Inc). The studies were carried out according to standard protocol. The work was based on the following methods of statistical analysis: determination of numerical characteristics of variables; estimation of conformity of empirical law of distribution of quantitative variables to theoretical law of Gaussian distribution according to Shapiro-Wilk test; an estimation of influence of qualitative factor on a dispersion of quantity indicator using ANOVA dispersion method, an estimation of a force and direction of linear relationship between the quantity indicators

using parametrical Pearson correlation coefficient, nonlinear relationship — using Spearman's correlation coefficient. Description of quantitative signs was carried out using arithmetic mean value and standard deviation. Zero statistical hypothesis was rejected at significance value $p < 0,05$. The statistical analysis was carried out using STATISTICA 8.0 package (StatSoft®, Inc., USA).

Results and discussions: Spinal muscular atrophy is autosomal recessive disorder, characterized by progressive degeneration of alpha-motor neurons of spinal cord. With an incidence of 1 in 6000–10 000 live births and a carrier frequency of 1 in 40–50. The disease manifests itself as a weakness of proximal muscles, pareses, respiratory insufficiency and early mortality [2, 358]. 10 patients with 2 type spinal muscular atrophy were examined, among them: 4 girls and 6 boys at the age from 8 up to 12 years old. All patients with 2 type SMA have been under medical observation for 3 years, during this period of time the disease was progressing. Motor defect was manifested since birth. Genetic defect was identified at the long arm of 5th chromosome (within the interval between D5S629 and D5S557). Clinical-neurologic picture includes flaccid pareses of hands and feet with prevalence of the process in the proximal parts, active movements were only in distal parts of the hands, neck muscles, mimic and respiratory muscles. There were generalized fibrillations and fasciculations of the muscles, intense diffuse hypomyotonia. 85% of children had intense atrophies of intercostal muscles with respiratory insufficiency and minor bulbar disorders. Changes of osteoarticular system were manifested as intense contractures of large joints of extremities and kyphoscoliosis. Functions of pelvic bodies were normal. There were no sensitivity and cognitive disorders.

Results of enzyme immunoassay testify that blood serum concentration of NGF (3899 ± 1058 pg/ml) in patients with 2 type SMA is significantly ($p < 0,001$) higher, than in control group (782 ± 582 pg/ml). Estimated values of NGF blood serum concentration in control group are within the range from 110 pg/ml to 2237 pg/ml. Whereas in 2 type SMA patients — within the range from 1387 pg/ml to 5411 pg/ml. BDNF (36653 ± 3606 pg/ml) concentration in blood serum of patients with 2 type SMA is significantly ($p < 0,05$) higher, than in control group (27313 ± 7260 pg/ml). Analysis of the parameter dispersion has shown, that BDNF blood serum concentration in the control group is within the range from 16040 pg/ml to 41960 pg/ml, in patients with 2 type SMA — from 22523 pg/ml to 63700 pg/ml. The research performed by us has shown that children patients with 2 type SMA have elevated level of neurotrophins: BDNF and NGF.

The study carried out by us showed that patients with SMA of the 2 type had an increased level of neurotrophins in contrast to other neurodegenerative diseases of the CNS, which are followed by a shortage of neurotrophic support [5, 231–243; 11, 27–29]. Neurotrophins are synthesized by neu-

rons, glial cells and target cells, interact with tyrosine kinase receptors (Trk-A, Trk-B, Trk-C) on the surface of neurons [8, 677–736]. This triggers the activation of protein kinases cascade known as mitogenactivatedprotein kinase — MAP kinase pathway, further phosphorylated MAP kinase). MAP kinase passes through a nuclear membrane and phosphorylates various gene transcription factors within a nucleus [7, 145–156]. Resulting changes in gene transcription initiate the processes of proliferation, differentiation and maintenance of neuronal survival [6, 1134–1148]. High concentration of NGF may be associated with age of the patients, because regardless of pathology a child's body is growing. The processes of growth and differentiation of neural tissue, synaptogenesis are intensive in children [4, 117–123]. The activity of these processes depends on the concentration of growth peptides. But hyperexpression of neurotrophins can not be explained simply by ontogenesis peculiarity, as a control group was represented by children of this age. Perhaps the increased synthesis of neurotrophins (BDNF, NGF) is due to development of compensatory and adaptive processes aimed at strengthening of the reparative function of the nervous tissue.

Progressive loss of motor neurons in the SMA of the 2 type leads to increased neurotrophic regulation, but part of the neurons population has already died and is not capable to interact with growth factors. These phenomena can hypothetically explain the elevated level of neurotrophins (BDNF, NGF) in the SMA of the 2 type. However, a very high concentration of neurotrophins according to our research does not lead to restoration or partial compensation for lost motor function in patients with SMA of the 2 type [3, 45–52]. In the experiment on organotypic tissue culture, we have demonstrated that the serum of the patients with SMA of the 2 type inhibits outgrowth of sensory ganglia neurites [10, 112–117]. We found a strong correlation between the fact of neurite growth inhibition of sensory ganglia neurons and concentration of neurotrophins in serum of the patients with SMA of the 2 type [9, 148–150]. Thus it has been shown that the process of sprouting in patients with SMA of the 2 type is not triggered due to very high concentration of neurotrophins that promotes further progression of the disease.

Conclusion. Patients with SMA of the 2 type have increased concentration of neurotrophins (BDNF, NGF) in blood. Most probably hyperexpression of neurotrophins (BDNF, NGF) in patients with SMA of the 2 type is caused as a result of the activity of compensatory and adaptive mechanisms aimed at strengthening of neurotrophic regulation for a partial compensation for lost motor function. These data shall be taken into account when treating patients with SMA of the 2 type. Neuroimmunology success opens new perspectives for clinicians in study of neurotrophic regulation of the nervous system, which in future may come into daily practice and will be used for diagnostics and creation of individual treatment programs for the patients with neurodegenerative diseases.

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Some peculiarities of physical development of children depending on applied care methodology

Abstract: The results of the investigation showed that MHI figures in children, received EN and the corresponding care were in correlation with the average MHI figures typical for the given age in the population even exceeding them during some periods. The children in comparison group had MHI of lower than mean figures, typical for the given population, however MHI figures didn't exceed two standard deviations.

Keywords: infants, care, physical development, mass-growth index.

Infants in arms and children in early childhood are subjected to growth stopping and development mainly as a result of nourishment and care disturbances [2].

Physical, functional, nervous and psychical development of a child is an integral process which formed out of the whole complex of a great number of morphological and functional indications in their dynamics and intercommunication. The aggregate of factors: biological, genetic, social-economic, daily-round and alimentary influence the rate of growth and development of children.

Investigations conducted by Elliot K. G. et al., (1997) revealed the existence of correlation between the size of psychological assistance received by the child, child's growth and

nutritious status. Besides, there are a lot of published works demonstrating direct connection between the educational level of people taking care of the child, their children's health and nutritious status [9].

The results of numerous investigations carried out in different countries of the world show with validity that a lot of technologies applied in medicine were found to be ineffective, nevertheless they have been still applied [1, 10]. One of the most important reasons of children's morbidity and death is the ancient stereotype concerning the necessity of fixing the child's upper and lower extremities, in such a way promoting the limitation of diaphragm excursion, blood circulation reduction, and, in this connection the tendency to frequent

respiratory diseases [4, 8]. The fixing of extremities is closely connected with a high risk of development of sudden infantile mortality syndrome [7].

The other weighty reason of the growth of children's morbidity is the stereotype of frequent bathing rejection stipulated by the fear of catching supercooling, umbilical cord infection and the other disturbances [3, 6]. According to investigation data frequent bathing of children with medicinal herbs promotes relaxation of the nervous system, that is very important when it is out of order, and also reducing of susceptibility towards infection and decreasing of intoxication during respiratory diseases development [5].

While using of soap the disturbance of normal biocenosis of skin and its dryness began developing [11]. Careless marketing without any observance of international codes enlarges the application of different kind of adsorbents of physiological excrements, especially in medical institutions. In the first place they present the baby to feel the process of urination and defecation and also can lead to the disturbance of urination rhythms and urine-genital system development.

The aim of our research was to investigate the dynamics of physical development of children depending on the kind of rearing and the applied modes of care.

Material and methods. From the total number of 445 examined children 335 children (79,7%) were on exclusively nursing (EN) up to three moths, towards the sixth month their number reduced to 351 children (78,9%). 4 groups for observation were formed depending on the kind of rearing: the first group consisted of 351 children (78,9%) who were on EN up to six months, the second group consisted of 27 children (6,1%), who were on mainly nursing (MN) — that is, parallel with mother's milk the children were given baby's dummy, water from small bottles. The third group consisted of 44 children (9,9%) who were on mixed nursing (MxN), that is, in addition to mother's milk the children were given some artificial mixture. The fourth group consisted of 23 children (5,2%) who were on artificial feeding. On the whole, in the groups with children up to 2 years old 346 children (77,8%) were on mother's milk rearing, while in groups where the children were more than 2 years old 14 children (9,3%) were given mother's milk.

The indices connected with the mass, height and mass-height index were investigated in 445 children from their birth and up to the age of 5. The following principles of care, rec-

ommended by WHO, such as: inapplicability of baby's dummies, free position of a child, frequent daily bathing of children with medical herbs (chamomile, marigold, motherwort, St.-John's — wort) were put into practice in 363 children (the main sub-group), subjected to different kinds of rearing. 82 children (comparison sub-group) were subjected to the previously used care — fixing of extremities, rare bathing with soap (control group). We have been studying the dynamics of body mass increase differentially with respect to every kind of rearing according to the given care in order to investigate the direct influence of care principles on the physical development of children.

Children's anthropometric data have been estimated: measuring of body mass in grams on the scales «Zalimp (Warszawa) Nr 2372» and measuring of height in centimetres with the help of height-indicator. The measurement of physical development parameters was carried out just after the birth, then on the 15-th and the 30-th days once a month till one year, then every three months till three years and every six months every five years. Mass-height index of children was estimated according to the formula: the ratio of body mass in kg to the square of body length (height) in m².

The data obtained during investigation were subjected to statistical analysis on the personal computer Pentium — IV with the help of program of Microsoft Office Excel — 2003, including application of fixed functions of statistical analysis. The methods of variation statistics of parametric and non-parametric character were used, with calculation of arithmetical mean of the index under investigation (M), standard error of the mean index (m), relative quantities (frequency,%). The statistical meaning of the obtained measurements while comparing of the mean quantities was determined according to Student criterion (t) with estimation of error probability (P) during control on normal distribution (according to excess criterion) and equality of general dispersions (F-Fisher criterion). Authenticity level of $P < 0,5$ was assumed to be statistically significant measures.

Results and discussion.

The analysis of the results of the investigation showed that after birth the mass of the examined children was on the average $3395,4 \pm 450,9$ g, the height — $52,3 \pm 3,1$ cm. The dynamics of mass-height index of children from their birth and till 5 years old, received different kinds of rearing is represented in table 1.

Table 1. – Dynamics of MHI (mass-height index) of children received exclusively nursing from 0 till 60 months depending on the applied care principles

Sub-groups	6 months	12 months	36 months	60 months
Main	$17,2 \pm 0,05^{***}$	$17,0 \pm 0,05^{***}$	$15,4 \pm 0,04^{**}$	$15,5 \pm 0,04$
Comparison	$16,8 \pm 0,16$	$16,2 \pm 0,15$	$14,8 \pm 0,17$	$15,3 \pm 0,18$

Notes: the differences on the data of control group are significant (** – $P < 0,01$; *** – $P < 0,001$).

The results of the investigation showed that MHI figures in children, received EN and the corresponding care were in correlation with the average MHI figures typical for the given age in the population even exceeding them

during some periods. The children in comparison group had MHI of lower than mean figures, typical for the given population, however MHI figures didn't exceed two standard deviations.

MHI figures in children received MN with the corresponding care were lower than mean statistical value, however they didn't exceed two standard deviations. Nevertheless MHI figures in children with MN in control group were lower

than two standard deviations, from mean statistical value, in such a way indicating the moderate degree of emaciation of the children of this category.

Table 2. – Dynamics of MHI of children received mainly nursing from 0 till 60 months depending on the applied care principles

Sub-groups	6 months	12 months	36 months	60 months
Main	16,7±0,27	16,3±0,21	15,0±0,20*	14,8±0,23
Comparison	16,0±0,20	15,9±0,18	14,4±0,21	14,2±0,19

Notes: the differences on the data of the control group are significant (* – $P < 0,05$).

During investigation of height-mass index in children received MxN (mixed nursing), (Table 3) it was found that its figures were the lowest among all children, besides with the corresponding care MHI figures were at the lower limit of two

standard deviations from the mean statistical value, and in the case of traditional care during some age periods the figures were lower.

Table 3. – Dynamics body mass index of children received mixed nursing from 0 till 60 months depending on the applied care principles

Sub-groups	6 months	12 months	36 months	60 months
Main	16,0±0,24**	15,6±0,17*	14,7±0,20	13,8±0,17
Comparison	15,1±0,14	15,0±0,15	14,1±0,16	13,1±0,12

Note: the differences on the data of the control group are significant (** – $P < 0,01$; * – $P < 0,05$).

The low value of MHI can express the after-effects of prolonged influence of nutrition disturbances and indicate its chronic insufficiency in children who don't have enough indispensable food substances. It can be also connected with the absence of the corresponding care and repeated infections.

In the children with artificial feeding the dynamics of MHI was the most variable, with the sharp fluctuations (Table 4). During some age periods it increased, sometimes reaching the lowest limit of two standard deviations from the mean statistical values.

Table 4. – Dynamics of MHI on children's body, who received artificial feeding from 0 till 60 months depending on the applied principles

Sub-groups	6 months	12 months	36 months	60 months
Main	17,7±0,27**	17,6±0,35***	16,6±0,23	16,6±0,22
Comparison	18,8±0,30	17,8±0,23	16,9±0,26	17,1±0,26

Notes: the differences on data of the control group are significant (** – $P < 0,01$; *** – $P < 0,001$).

During investigation of MHI in dynamics in children with the given kind of nursing without any differentiation concerning the care mode the children revealed general inclination to redundant body mass (MHI figures were at the highest limit of two standard deviations from the mean statistical value). However, during differentiation it was found, that children

had higher MHI with the previously applied care than with the modern applied care. Sharp fluctuations of MHI in the given group, perhaps, are stipulated by frequent morbidity of children in the given group as well. Thus, the results of the given investigation show in what extent the mode of children's care is considerable for the physical development of children.

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Peculiarities of the changes of the values of nitric oxide system in children with Mycoplasma pneumonia associated with Herpes viral infection

Abstract: The article represents the data of nitric oxide system in children with Mycoplasma pneumonia associated with Herpes viral infection. A reliable rise of nitric oxide level and peroxy-nitrite was established. More explicit values were noted in the patients with HSV and CMV association, and it coincides with clinical progress of endotoxemia and lesion of various organs and systems.

Keywords: Mycoplasma pneumonia, Herpes viral infection, children.

Extra hospital pneumonia is the most widely spread group of pneumonias. In spite of constant upgrading of diagnostic methods and availability of modern very effective antimicrobial agents, in developed countries extra hospital pneumonia still occupies a leading place in the structure of morbidity and lethality of infectious diseases [2; 4; 5]. Recently the role of Mycoplasma pneumonia (MP) played in the development of bronchial pulmonary diseases in children is growing and it takes from 8 to 25% of all cases, and in isolated and semi-isolated groups — up to 50% [1; 3; 6]. Pathogenesis of Mycoplasma infection depends on the direct action of the agent on various organs and systems, and it also consists of interrelation of toxins, enzymes and development of auto immune reactions. Mostly Mycoplasma pneumonia is combined with Herpes viral infections, the result of which is an impact on an organism of two or more agents of viral, bacterial or other etiology [10].

Nitric oxide (NO) and its derivatives, as well as active forms of oxygen, are key pathogenetic factors of an infection, inflammation and malignant growth [7, 8]. K. Mayeda, T. Akaike (1998) in their review presented the data demonstrating that NO, superoxide and the product of its reaction — peroxy-nitrite, appearing in cases of infectious diseases, take a

great part in the development and pathogenesis of diseases: they become mediators of inflammation, modify proteins and damage nucleic acids [11; 12]. In the literature there is a great number of publications, dedicated to the part of nitric oxide in pneumonias with various etiologies, mostly among adult patients. Though, there are no peculiar changes of NO-ergic system in children with mixed-infectious pneumonia.

The aim of the research: is to study the peculiarities of changes of NO-ergic system in children with Mycoplasma pneumonia associated with Herpes viral infection.

Material and the methods of the research: the follow-up covered 195 children aged from one to three years old with Mycoplasma pneumonia (MP) associated with Herpes viral (HSV) (80 children — 1st group), cytomegalovirus (CMV) (65 children — 2nd group) or their association (50 children — 3rd group) during active stage of the disease, getting clinical therapy in pulmonologic department of RSSPMC of pediatrics.

Clinical diagnosis of Mycoplasma pneumonia was set taking into account clinical anamnestic and additional laboratory and radiologic data. Status of 26 children was mild severe, and severe in 65 children. The most severe progress of the disease was observed among the patients with MP+CMV+HSV.

For the establishment of diagnosis we took into account anamnestic data, results of clinical, laboratory, functional and immunologic research methods.

Specific diagnostics of an infection presence was performed by means of the immune enzyme analysis (IEA) method in reference laboratory of RSSPMC and PCR method in Immunology Institute of AS of the RUz.

Control group involved 30 almost healthy children of the corresponding age. Biochemical analysis included detection of NO content according to the sum of nitrites and nitrates metabolites (NO_2 and NO_3), in Metelski V. A. et al. modification definition of nitric oxide synthase (eNOS) activity; nitrate reductase (NR); and the level of peroxynitrite (ONOO^-).

Statistic processing of the results of the research was performed with the help of «Microsoft Excel XP» and «Statistica 6,0».

Results and discussion: Mycoplasma pneumonia in young children was accompanied by explicit clinical manifestations of endotoxiosis, especially in the group of children with association of several viruses.

In 9.4; 10.7 and 14.8% of children of the 1st, 2nd and 3rd groups we registered dry mucous membranes of the upper respiratory ways, dry torturing coughing and conjunctivitis.

More than half of these children — in 50; 57.1 and 66.7%

cases — had explicit bronchial obstruction syndrome, displayed clearly in the radiologic images.

Inflammatory process had right side location in 56.3; 46.4 и and 44.4% cases, bilateral in 34.3; 46.5 and 48.2% of the patients, left side in 9.4; 7.1 and 7.4% of the children, correspondingly to the groups.

Radiologically 53.1; 57.1 and 70.4% of the children had infiltration of pulmonary tissue. In the rest cases there was detected deformation and turbid pulmonary picture, intensification of vascular component and interstitial alterations.

The values of hemogram were characterized by erythropenia, neutropenia, moderate Leukocytosis with symptoms of eosinophilia, monocytosis, lymphocytosis, and in some cases leucopenia with lymphocytopenia, acceleration of ESR, testifying the presence of inflammatory process in organisms of the children with explicit decrease of immune reactivity.

In the children with MP combined with Herpes viral infection we observed a rise of nitric oxide metabolism terminal products' level. Degree of it depended on the group of the agents. Thus, if that value raised 1.29 times in the children of the 1st group in comparison with the data of healthy children, in the children of the 2nd group the rise was equal to 1.4 times, and in the 3rd group — 1.63 times. CMV infection, especially combined with HSV, significantly raised production of nitric oxide.

Table 1. – Content of nitric oxide system in children with Mycoplasma pneumonia, $M \pm m$

Groups	Content of the products		Enzyme activity	
	$\text{NO}_2(\text{NO}_3)$, Mkmol/l	ONOO^- , mkmol/l	eNOS, mkmol/min*mg of protein	HP, mkmol/min*mg of protein
Control group, n=20	9.67±0.43	0.08±0.003	16.88±0.87	0.22±0.005
1 st , n=32	12.47±0.48 ^a	0.15±0.006 ^a	12.57±0.36 ^a	0.32±0.011 ^a
2 nd , n=28	13.49±0.39 ^a	0.18±0.006 ^a	12.30±0.31 ^a	0.39±0.007 ^a
3 rd , n=27	15.75±0.24 ^{a, 6, B}	0.33±0.007 ^{a, 6, B}	9.45±0.51 ^{a, 6, B}	0.48±0.011 ^{a, 6}

Note: *a* - difference between the values of almost healthy and sick children are reliable ($P < 0.001$), *6* — differences are reliable for the 1st group, *B* — differences are reliable for the values of the 2nd group.

It should be noted, that in spite of the raised NO production, we observed inhibition of eNOS 1.34; 1.37 and 1.79 times in blood serum of the children of the 1st, 2nd and the 3rd groups, correspondingly. And it was observed more in the cases of mixed infection.

According to the reference data, generation of NO high concentrations demonstrates cytotoxic activity as one of cell-mediated immunity effectors [4; 7]. Synthesis of it in the amounts like that is provided by inducible isoform of NOS, synthesized in immune competent and other cells and tissues under the influence of cytokines and other biologically active substances.

Actually, activity of NR in the blood of 1st group children raised 1.45 times, 2nd group children — 1.77 times and especially among the patients of the 3rd group — 2.18 times in comparison with the values of almost healthy children.

Disorders of enzyme generation of NO Cause disorders conditioned, first of all, by the ability of all NOS isoforms to produce superoxide-radical together with nitric oxide.

The following reaction of these products leads to formation of toxic agent ONOO^- with high oxidative activity. In case of

nitric oxide and superoxide generation by one and the same system the possibility of interaction increases, and these enzymes can contribute much to the formation of ONOO^- in the cells and tissues, which often becomes the reason of cell death.

For the detection of that we determined the amount of ONOO^- in blood of sick children with mixed pneumonia. The analysis performed for that showed the rise of its amount 1.87 times in the children of the 1st group. A greater rise we could observe among the children of the 2nd group with combination of MP and CMV, and its level statistically significantly increased 2.25 times. A sudden rise of that compound we noted among the children of the 3rd group with the combination of MP with CMV and HSV. That value increased 2.2 and 1.83 times in relation to the values of the 1st and 2nd groups and 4.22 times in comparison with the values of healthy children.

In usual conditions formation of ONOO^- is not intensive, as an endogenic super oxide dysmutase deletes superoxide radical. Though, in case of inflammation activated leukocytes and other cells can produce great amounts of superoxide.

High concentrations of it inhibit aconitase and cellular breathing, it oxidizes biologic tioli, causes raptures of DNA chains, exhausts the level of NAD and ATP, and causes disorder of intra cellular signaling processes, promoting acceleration of apoptosis.

Experimental researches with mice infected by influenza virus or effected by liposaccharides revealed a hundred times rise of xantine oxidase activity in bronchial alveolar lavage leading to significant generation of super oxide. At the same time the authors observed activation of inducible NOS, leading to the rise of NO⁻ concentration and as a result sudden rise of ONOO⁻.

On the basis of the achieved data it was detected that more intensive production of nitric oxide and peroxynitrite is more characteristic for the children of the 2nd and 3rd groups, and obviously, conditioned by toxic effect of CMV, as it damages blood cells, epithelial cells, and freely moves to vascular endothelium, conditioning ischemia and hemorrhages to various tissues, especially in combination with HSV.

The results achieved in the process of the performed research correlate with the degree of clinical manifestation

of intoxication, involvement of gastro-intestinal system, liver and kidneys to the pathologic process, and development of metabolic encephalopathy. Evidently, the development of secondary infection, rising the amount of active population of lymphocytes, leads to the expression of acute stage cytokines, inducing formation of super oxide and peroxynitrite and significantly accelerating cell apoptosis.

On the basis of the achieved data we can conclude the following:

1. Children with Mycoplasma pneumonia associated with Herpes infection had notable rise of nitric oxide and peroxynitrite. More expressed values were noted among the patients with MP+HSV+CMV association, and that coincides to the clinical symptoms of endotoxicosis and lesion of various organs and systems.

2. Hyper production of toxic metabolites of NO-ergic system in children with Mycoplasma pneumonia, associated with Herpes viral infection conditioned by the expression of nitric oxide inducible synthase, especially with HSV+CMV.

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Peculiarities of clinical progress and diagnostics of tubercular meningitis at the modern time

Abstract: We studied clinical progress of tubercular meningitis in 38 patients at the modern stage. We performed analysis of the terms of detection and causes of late diagnostics of tubercular meningitis. The necessity of PCR and CT diagnostics performance was proved.

Keywords: tuberculosis, tubercular meningitis, diagnostics.

In spite of stabilization of epidemic situation of tuberculosis, nowadays its clinical structure is deteriorating [3, p.147], particularly frequency of patients with tubercular meningitis significantly increased [4, p 6], including its severe and complicated forms associated with high lethality rate. Tubercular meningitis (TM) today, as well as before, is one of the most difficult diagnosed diseases. Duly detection of TM (within 10–12 days) was observed only in 20–30% of patients, and that was explained by diversity of its clinical and morphologic manifestations [6, 450; 2, p 10].

In this form of tuberculosis a high lethality rate is observed — from 14 to 60% [4, p 27].

TM, diagnosed in early period of the disease before involvement of deep parts of brain, can be treated. That is why duly diagnostics determines the success of its therapy and saving patient's life. The diagnosis is stated on the basis of definition of symptoms complex made by many specialists including anamnesis, clinical symptoms of neurologic status, analysis of cerebro-spinal liquor, and magnetic-resonance imaging of brain [5, 814; 1,70].

Absolute diagnostic criterion is isolation of *Mycobacteria Tuberculosis* in cerebral-spinal liquor, but it is rare. At the same time, nowadays the capabilities of cerebral-spinal liquor checking for that purpose significantly widened. Efficiency of application of diagnostic tests such as polymerase chain reaction, planting on liquid nutritious media, and molecular-genetic test Gen-xpert was proved.

The aim of our research was to study peculiarities of clinical progress and diagnostics of TM in modern conditions.

Material and methods of the research: We performed analysis of the results of checking of 38 patients with tubercular meningitis in the age from 17 to 58 years old, who applied to the clinics of Republican specialized scientific-practical medical center of phthisiology and pulmonology. It should be noted, that annually from 6 to 10 patients apply the center with TM.

Among the examined patients there were 21 (55.2±8.0%) men and 17 (44.8±8.0%) women. Majority of the patients were in the age of 21–30 years old (14 patients — 36.8±7.8%), 31–40 years old (12 patients — 31.6±7.5%), 41–50 years old (7 patients — 18.4±6.2%). Three patients were under 20 years old (7.9±4.3%), and two above 50 (5.3±3.6%). Thirty two (84.2±6.9%) of 38 patients applied to the clinic in extreme-

ly severe status and 15 (39.5±8.0%) — in coma. Nineteen (50.0±8.1%) patients had symptoms of cerebral edema. Five of thirty-eight patients (13.2±5.4%) had detected HIV infection.

There were basilar meningitis, meningoencephalitis and spinal form. Diagnosis of basilar form of tubercular meningitis was stated in 26.3±7.1%, and meningoencephalitis in 73.7±7.1% patients.

All patients had meningeal symptoms (rigidity of occipital muscles, superior and inferior Brudzinski, Kernig, and presence of pathologic reflexes such as Babinski, Rossolimo, and others).

Together with clinical follow-ups, we performed the following common laboratory checkings of patients: common analysis of blood and urine, biochemical blood analysis, radiologic, ultrasound and electrocardiographic tests, and polymerase chain reaction (PCR). PCR was performed simultaneous with blood and liquor, and that provided compatibility of the obtained results. In the analysis of cerebral-spinal liquor we detected the following parameters: pressure in cerebral spinal channel, color and transparency of liquor, sedimentation of arachnoid net, amount of protein, glucose and chlorides in cerebral-spinal liquor. For TM the following alterations in liquor were considered characteristic: increase of protein amount (normal- 0.2–0.4 g/l), pleocytosis (normal ≤5 kl/mkl), big amount of lymphocytes and less neutrophils; decrease of glucose amount (normal –2.78–3.89 mmol/l) and chlorides (normal –120–128 mmol/l).

Performance of CT and MRI of brain was important for diagnostics of TM. Sixteen (42%) patients underwent computer tomogram (CT) of brain.

All patients were prescribed specific chemotherapy: for primary detected tubercular meningitis in compliance with DOTS I category, for recurrent cases — DOTS II category. Parental injection of chemotherapeutic agents such as Isoniazidum and Rifampicinum, was widely used. Besides that, for therapeutic and diagnostic purposes endolumbal puncture was applied with injection of hydrocortisone according to scheme. We performed intensive dehydration, desensitizing and detoxificative therapy together with vitamin therapy, hepatoprotectors, and agents for improvement of micro circulation of blood in brain.

Results of the research and discussion. Thirty one (81.5±6.2%) patients had primary revealed tuberculosis, among them twenty (64.5±8.5%) patients had TM associated with tuberculosis of lungs, 11 (35.4±8.5%) with extra pulmonary tuberculosis, 7 (18.4±6.2%) patients before got therapy for TM.

Prodromal period in all patients was characterized by growing sluggishness, adynamia, irritability, bad appetite, appearance of catarrhal symptoms, headache, and loss of interest to life. Prodromal period proceeded average from 2 weeks to 1.5 months in twenty (52.6±8.1%) patients, in 18 (47.4±8.1%) — acute start was noted. Patients with gradual development of the disease had significant variability of symptoms of prodromal period. Common cerebral symptoms were prevailing: insignificant headache, vegetative changes, change of mood, intoxication symptoms (weakness, sweating, sub-fibril temperature, dyspepsia), giving the basis to suspect other diseases. Often patients applied to general medical departments, where their status was assessed as syndrome of intra cranial hypertension, syndrome of neuro-circulatory disorder, acute respiratory infection, and influenza. It should be noted that, often patients applied self-treatment with wide administration of antibiotics and analgesics, leading to prolongation of prodromal period and no clear symptoms. That, in its turn, made diagnostics and timely application of patients to specialized clinic difficult.

We analyzed duration of clinical manifestations of TM in the patients before coming to clinic. While in twelve (31.6±7.5%) patients that term was equal to one week, in 18 (47.4±8.1%) it was up to two weeks. More than one month progress was registered in 5 (13.1±5.4%) patients, and more than 4 months in 3 (7.8±7.5%).

Tubercular meningitis was revealed in the department of general medicine in 18 (47.4±8.0%) patients, in anti tuberculosis hospitals — 12 (31.5±7.5%), 7 (18.4±6.2%) patients applied to clinic themselves in extremely severe state and one patient was diagnosed in specialized tuberculosis clinic. TM was detected simultaneously with other location in 22% of the patients, and tuberculosis of other organs preceded tubercular meningitis in 61%, while so-called “isolated TM” was revealed in 17% of the patients.

Basilar for of TM was diagnosed in 10 (26.3±7.1%) of the patients, and meningoencephalitis in 28 (73.6±7.1%). Low quality of anti tuberculosis therapy led to torpid, long-lasting progress of tubercular meningitis and development of pharmaceutical resistance of MBT. 2 (5.2±3.6%) patients had therapy of tuberculosis of respiratory organs with small doses of anti tuberculosis agents, and because of that the main disease was complicated by meningitis.

In thirty five (92.1±4.3%) of 38 patients TM developed together with active pulmonary and extra pulmonary tuberculosis; in 5 (14.2±6.0%) patients it was combined with disseminated tuberculosis of lungs; 8 (23.0±7.1%) with infiltrative tuberculosis, 6 (17.1±6.3%) with fibrous cavernous tuberculosis of lungs, 3 (8.5±4.7%) with tuberculosis pleuri-

tis, 1 (2.8±2.7%) with cirrhotic tuberculosis, 2 (5.7±4.0%) with tuberculosis of lymphatic nodes, 4 (11.4±5.4%) with tubercular mesadenitis, and in 6 (17.1±6.3%) patients with tuberculosis of skeletal system.

The most constant symptoms of TM were as follows: headache not linked with meal (100%), weakness (100%), nausea (69%), vomiting (65%), hyper aesthesia (56%), photophobia (53%), difficult speaking (39%), dizziness (49%), rise of temperature (35%). Convulsive symptom was noted in 13% of the patients. Diplopia and dysphagia were registered in 35% and 31% of the patients correspondingly. Hallucinations were observed in 26% of the patients. Disorder of pelvic organs' function as a disorder of urination was noted in 61% and constipations in 53% of the patients. Face asymmetry was seen in 87% of the patients. Absence of abdominal reflexes and late stable dermagraphism was revealed in 100% cases.

We registered such meningeal symptoms as rigidity of occipital muscles (100%) and Kernig symptom (100%). Recently there was notable growth of frequency and manifestation degree of these symptoms among adult patients with TM. Brudzinski's symptom (superior and inferior) was observed in 23 (60.5±7.9%) patients.

In 30 (78.9±6.6%) patients the process was accompanied with dissociation between the pulse rate and rise of body temperature, disappearance of tendon reflexes and appearance of pathologic reflexes (Babinski, Oppenheim, Gordon, Rossalimo), vaso-motor disorders (late, spread and stable dermagraphism, Trusso spots).

Total hyper aesthesia and meningeal posture were noted relatively rarely in the initial stage of the disease in 7 (18.4±6.2%) patients, but all patients had these two in the terminal stage.

Damage of vestibular apparatus was noted in 100%, and damage of oculomotor nerves in 30 (78.4±6.6%) patients. Pseudo bulbar reflexes were detected in 10 (26.3±7.1%) patients, diminishing of hearing ability in 2 (5.3±3.6%), paralysis and paresis of lower limbs in 9 (23.7±6.8%) patients.

Analysis of cerebral spinal liquor showed that, 76.3±6.7% patients had increased pressure in cerebro-spinal channel. The character of liquor in 68.4±7.5% was transparent. Analysis of liquor did not revealed dependence between the amount of protein and cells and the forms of tubercular meningitis, its severity. For the majority of the patients with TM (60.5±7.9%) presence of xanto chromia was characteristic. 71±7.3% patients had lymphocyte cytosis. In 57.8±8.0% patients we observed sedimentation of “arachnoid” net. Increase amount of protein in cerebral-spinal liquor up to 2.3g/l was registered in 71.0±8.0% of the patients. Diminishing of glucose in cerebral-spinal liquor was noted in 60.5±7.9% patients. It should be noted that, 13.2 ±5.4% patients had normal characteristics of liquor. Pandi reaction was positive in all patients: strong positive 4+ (13%), positive 3+ (18%), moderate positive 2+ (26%), and weak positive 1+ (26%).

Bacteriologic analysis of cerebral-spinal liquor was performed for 35 (92.1 ±4.3%) patients. While in sputum MBT

was isolated in 10 (26.3±7.1%) patients, in cerebral-spinal liquor it was isolated in 3 (7.9±4.5%) of them. PCR showed MBT in three more patients (7.9±4.5%). PCR of blood in all patients was positive.

CT showed cerebral hypertension and encephalitis in all patients, 6 focal alterations, 2 tuberculoma of brain in the patients with HIV.

In four patients (33.3±13.6%) of twelve who died there was combination of tubercular meningitis with tuberculosis of lungs, in 5 (41±14.2%), in 2 (16.6±10.7) with tuberculosis of skeletal system, 2 (16.6±10.7) with lymphatic nodes, and combination with HIV in 3 (25.0±12.5) patients.

Five patients died during initial three days after coming to clinic, four died within 10 days, and three — within one month. All patients who died had late diagnosed TM, and the main reason of death was cerebral coma with development of paralysis of vascular and respiratory centers.

Thus, the number of patients with TM is increasing, proving unfavorable situation of tuberculosis. The character-

istic features for tubercular meningitis in modern conditions are as follows: prevailing of tubercular meningoencephalitis and decrease of basilar form prevalence, growth of meningitis combination with tuberculosis of lungs and extra pulmonary lesions, absence of general practitioners' vigilance for early revealing of tubercular meningitis. Complex check-up of the patients with tubercular meningitis should include CT of brain and PCR of liquor and blood.

Conclusions.

1. In modern conditions there is notable growth of tubercular meningitis combination with pulmonary and extra pulmonary location of specific lesion.

2. Among the clinical forms the prevailing one is tubercular meningoencephalitis.

3. The complexity of tubercular meningitis diagnostics is conditioned by atypical variants of the meningitis progress, and underestimation of prodromal period of CNS stimulation in tubercular meningitis by general practitioners.

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Radiographic signs of tuberculous spondylitis combined with pulmonary tuberculosis

Abstract: The use of computed tomographic scanner and NMR-machine before surgery chine in the postoperative period allows obtaining the objective criteria for evaluating the effectiveness of surgical treatment and defining the further treatment tactics.

Keywords: tuberculous spondylitis, tuberculosis of lungs.

Relevance. Problems of tuberculous spondylitis complicated not only due to the nature of persistent and devastating disease process, but also to the complexity of its diagnosis and developing complications. However, a major problem in the treatment of tuberculosis of the spine is the presence of concomitant TB processes in other organs, particularly in the lungs [1; 4; 6].

The frequency of combinations of spondylitis with the active specific processes in the lungs, pleura, lymph nodes, brevity and lack of time intervals between their primary identification, the trend towards prevalence of process in the spine suggests about of massive infection, weakening of the body of patients [7; 8; 9].

Therefore, early detection and the target adequate therapy of tuberculosis of the spine and lungs seems in present time the most actual direction in medicine.

The aim of the work was to determine the causes of late diagnosis, clinical manifestations of tuberculosis of the spine combined with pulmonary tuberculosis.

Materials and Methods: The results of the examination and treatment of 86 patients with tuberculosis of the spine, combined with pulmonary tuberculosis. The age of patients ranged from 20 to 60. There were conducted orthopedic and neurological examination, chest roentgenograms and spine, ultrasound of internal organs, computed tomographic scanner and NMR-machine before surgery.

Results and discussion. In the analysis of the age and sex composition of the patients established that the defeat of the spine by tuberculosis among males are more common (58.1%) than among women (41.9%). The defeat of the spine by tuberculosis absolutely dominated in both groups of patients aged 21–50 years and amounted respectively to 83.7% and 77.8%. Period of the defeat of the spine by tuberculosis (the beginning of the process until establish the diagnosis) was as follows: 15 (17.4%) patients in Group 1 up to 6 months, in 8 (9.3%) up to 1 year, 63 (73.3%) patients more than one year. Similar rates were observed among patients in group 2 and amounted to respectively 17 (31.5%), 8 (14.8%), 29 (53.7%).

The limitation period of pulmonary tuberculosis ranged from 2 months to 2 years. In 67 (77.9%) of patients with pulmonary tuberculosis is installed for the first time, 19 (22.1%) patients previously treated with anti-TB drugs and came to the hospital with acute exacerbations in the lungs.

Radiological examination of affected vertebrae showed that patients with defeat of 3–4 and more the vertebrae is more common (48.8%) than patients in group 2 (29.7%). Therefore, the instability of the spinal column established at 65.1% of patients in Group 1 and 42.6% of patients in group 2.

Limiting the mobility of the spine occurred in 72.1% of patients in Group 1 and 53.7% in group 2, which was accompanied by severe pain symptoms, even at low load.

The presence of paravertebral abscesses on the background of severe intoxication and violation of the parenchymal organs increases bone destruction that occurred significantly more frequently among patients in Group 1 (88.3%) than in group 2 (66.6%). Fistula forms process observed in 8.1% of patients in Group 1 and 3.7% of patients in group 2.

The progression of destructive changes in affected vertebral bodies on the background of paravertebral abscesses and epiduritis leads to compression of the spinal cord, especially on distant stages of development of tuberculosis. Accordingly 67.4% of patients in group 1 and 53.7% of group 2 patients were defined the presence of spinal disorders with varying degrees of severity. Easy Para paresis by type of pyramidal insufficiency was observed in 19.8% of group 1 and 22.2% in group 2. The severities of spinal disorders were defined by the presence of disorders of the pelvic organs. Disturbance of

function of pelvic organs were observed in 46 (53,5 ± 3,0%) patients in Group 1 and in 17 (31.5%) patients in group 2. The partial urinary retention has been accordingly in 36.0% and 22.2 imperative desires interleaving with delay in 15.1 and 7.4% the paradoxical urination was noted accordingly in 2 and 1 patient.

Based on the analysis of X-ray, CT and MRI of the spine of tuberculous spondylitis by character of destruction was divided into 3 main types: 1) focal destruction of the bodies of the vertebrae; 2) formation of interbody bone cavity with sequestrs or cheesy masses peripheral parts of the bodies at the same time preserved and form a kind of “bone box” around the cavity of destruction; 3) the planar contact degradation when Interconnecting parts of bodies are destroyed by uniformly over the entire area. By the depths of destruction of bodies were highlighted 4 different destructions of vertebrae:

— the vertebral bodies are destroyed superficially and up to 1/3 of the height;

— the vertebral bodies are destroyed on 1/2 or 2/3 of the height (the most common);

— subtotal and total destruction of the vertebrae; 4) destruction by type of caries. With involvement of a large number of vertebrae there was a concomitance species and the options of destruction. In rare cases of atypical course of tuberculous spondylitis the character of destruction did not fit into indicated species.

The bone compression of the spinal cord and epidural abscess on survey roentgenogram and computed tomographic scanner without contrasting of the dural sac could be expected at revealing calcified caseous masses and sequestrs in the lumen of the spinal canal only in the 31.8% of cases. In other cases, reliably estimate the level, degree and extent of the compression of the dural sac without contrasting were impossible.

On contrasting myelograms the presence of epidural abscess was determined by the compression, which the abscess had an impact to the contrasted membranes of the spinal cord, forming on their background the defects of filling or causing the block of spinal fluid. The dural sac at the level of compression follows the shape of kyphosis of the spinal canal, deviated and shifted back to the result of outside pressure far as allowed reserve space of the spinal canal. The complete block of tracts of cerebrospinal fluid testified about expressed pathological manifestations of tuberculous spondylitis.

On the KMG in the sagittal projection we have allocated 4 different compression of the dural sac at the evolutive forms of tuberculous spondylitis:

— Local or extended compression of the dural sac by abscess with visualization of the contour and the extent of the abscess (45,8%);

— local bone compression with residue of vertebral body (11,9%);

— unequal contrasting of the dural sac, when the level of compression contour its can not be traced, but in the frontal Myelogram was determined contrast agent above and below the compression (3,4%);

— complete block of cerebrospinal fluid tracts, stop the contrast agent (35,62%);

Two of patients had mixed bone compression of the dural sac with compression of epidural abscess.

Stopping of contrast medium at full block of cerebrospinal fluid tracts was a gradual along the concave an arc which skirted and underlined the lower pole of the abscess, or there was a dramatic “breakaway” of contrasted area of the dural sac. Complete block of cerebrospinal fluid pathways with sharp transverse stop of contrast agents, in our opinion, is connected with a high pressure in the epidural abscess, or with involvement in the inflammatory process of the spinal cord membranes. It is corresponded severe neurological disorders such as “A” and “B” ($P_{K3}=0.05$) in the localization of lesions in the upper- and middle chest part of spine.

Analysis of our data has shown that the percentage of incorrect interpretation of the results of the radiation survey of tuberculous spondylitis in the early stages is still large, dominated late diagnosis of tuberculous spondylitis. In 96.0% of cases, the process has been revealed at the peak of spondylitic phase in 33.0% on background of developed neurological disorders. The most frequently involved in the process of 2–3–4–5–6 vertebra.

Infiltrations in the spinal canal were detected in 45 (32.1%) patients. On roentgenograms revealed a well abscess in the thoracic vertebral in which they are seen against the background of the air of the lung tissue. Retroperitoneal abscesses were detected by indirect signs of expansion of contours m.iliopsoas major, when they reached a considerable size. It was impossible to see the abscess of soft tissues of the back and small paravertebral abscesses in the lumbar spine.

The contours of abscesses and their relationships with the surrounding organs on radiographs and tomograms do not always able to determine. Computed tomographic scanner are equally well detected abscesses, their cameras, relations with the vertebrae and surrounding organs and tissues, especially after an internal contrasting. At an early stage of formation of an abscess was observed infiltration of the fat around the body of the vertebra. A comprehensive assessment of changes in bone structure, identified on X-ray and Computed tomographic scanner tomograms and pathological signal changes on MRI, gave an idea of the morphological changes in the spinal column and the phase of tuberculous spondylitis. The use of computed tomographic scanner and MRI has opened up new possibilities in the diagnosis of tuberculous spondylitis; computed tomographic scanner and NMR-machine are highly effective in detecting spinal cord compression in patients with tuberculous spondylitis. 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 computed tomographic scanner and NMR-machine in the postoperative period allows to obtain objective criteria to evaluate the effectiveness of surgical treatment and to determine further treatment tactics.

Conclusion: According to the MRI compression of the spinal cord and its roots has a in 90.7% of patients with tuberculous spondylitis, whereas neurological disorders in 69.8%. Compression of the spinal cord and its roots revealed by using radiation methods in patients without neurological disorders in 64.1% of cases expands the indications for surgery. The sensitivity of NMR-machine was 88.7%, the specificity — 83.5%.

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The treatment of complicated forms of tuberculous spondylitis in patients with impaired motor function of the gastrointestinal tract

Abstract: Impairment of motor function of gastrointestinal tract occurs in 35.0% of patients with complicated forms of tuberculous spondylitis. Severity of the impairment depends on duration and localization of the specific tubercular process in the spine. Therapeutic correction of gastrointestinal motor function disorder during treatment of the main (tubercular) process before and after surgery improves the efficiency of the treatment of tuberculous spondylitis.

Keywords: tuberculosis, tuberculous spondylitis, gastrointestinal tract, motor function.

Tuberculosis of joints and bones, especially tuberculosis of the spine, is one of the leading problems of TB care, and occurs in 45.2 to 82.4% of cases [1; 5]. Chemotherapy and surgical procedures play a critical role in treatment of tuberculosis of this localization [3]. Efficacy of etiologic therapy, especially during the preoperative stage of the treatment may be reduced due to the large number of concomitant pathology of vital organs and systems. Almost 35.0% of patients with spinal tuberculosis have dysfunction of the gastrointestinal tract, whereby they develop intolerance to intake the antibacterial drugs [1]. Therefore, the intensive phase of etiologic and pathogenetic therapy does not lead to a regress of the specific process [2; 3; 4], and surgical treatment becomes method of choice in this patients, but surgery itself can cause gastrointestinal complications, especially in early postoperative period. These disorders are developed apparently due to spinal cord edema or irritation of the peritoneum.

However, we have not found any data regarding the effectiveness of surgical and complex pathogenetic therapy based on the nature and severity of the motor disorders of the stomach in patients with tuberculous spondylitis with neurological disorders in the available literature.

Purpose of the study was to analyze surgical treatment outcomes of patients with tuberculous spondylitis and gastrointestinal motor function disorder.

Material and methods: Treatment outcomes of 103 TB spondylitis patients with neurological and functional gastrointestinal disorders between the ages of 17 and 60 years (mean age $40,5 \pm 2,1$), 59 (57.3%) male and 44 (42.7%) female patients were analyzed.

One group (main group) of 52 (51,5%) patients with TB spondylitis with neurological disorders and functional gastrointestinal disorders were administered antibacterial therapy as well as therapy correcting function of gastrointestinal system. As a pathogenetic therapy drugs were prescribed: metoklo-

promid (Reglan, raglan) 10 mg 2 times a day № 20, bisocodyl (dulkolaks) 2 suppositories daily № 15, neostigmine methylsulfate (neostigmine) 0,05 mg daily № 20, Doprokin (domperidone) 10 mg 2 times a day № 20. Second group of 51 (49,5%) patients without functional gastrointestinal disorders were treated by a standard method. All patients underwent clinical, biochemical, ultrasound, X-ray, CT, and MRI examinations, and functional evaluation of the cardiovascular and respiratory systems.

The severity of neurological impairment was assessed by the scale proposed by H. L. Frankel et al. (1969) and modified by A. Yu. Mushkin et al. (1989). [1] Evaluation of motor function of the stomach was carried out by a modified method of F. Tympner with 400 ml of 0.9% NaCl solution of room temperature on the unit Interscan-250 (Germany) with 3.5–5 MHz linear transducer [1]. All patients underwent esophagogastroduodenoscopy as well with Olympus (Japan) machine by a standard method.

Results and discussion: 69 (67.0%) patients were diagnosed with active and progressive spine tuberculosis, that patients had relatively acute onset of symptoms of the specific process like intoxication, febrile body temperature, and weakness, loss of appetite and significant weight loss. In 34 (33.0%) patients the course of the specific process was torpid, that were presented with moderate intoxication symptoms, subfebrile body temperature, and insignificant weight loss.

According to X-ray and MRI (CT) studies tubercular process was localized at the cervical spine in 3 (2.9%) patients (one patient from I group and two patients from II group), at the thoracic spine – 17 (16.5%) (9 and 8 patients from I and II group accordingly), thoracolumbar spine — 21 (20.4%) patients (10 (I group) and 11 (II group)), lumbar spine — 38 (36.9%) (21 (I group) and 17 (II group)) and lumbosacral spine — 24 (23.3%) (11 (I group) and 13 (II group)).

The severity of the specific process was determined by numbers of affected vertebrae as well as abscess formation, which was presented in 75 (72.8%) patients (39 (I group) and 36 (II group)). Instability of the vertebral column was determined in 78 (75.7%) cases (40 (I group) and 38 (II group)).

Neurological symptoms were presented as radicular pain syndrome, muscle paresis, and sensory loss, as well as pelvic organs function impairment and vegetative nerve system disorders.

52 (50.5%) patients of the main group were diagnosed with gastrointestinal motor function disorder. Gastroparesis (weakening of the motor function of the stomach) was in 31 (59.6%) patients, gastric dysrhythmia (a violation of cyclic activity of the stomach in the interdigestive period) was in 19 (36.5%) patients. No gastrointestinal disorder was found in the control group patients. Clinically, all patients of the main group had discomfort at epigastric area (Fig № 1). Patients often had difficulties to localize the pain, noting that the pain arises from the upper abdomen, and sometimes about umbilical region. 18 (34.6%) patients had constant aching pain, and its intensity varied from moderate — in 8 (44.5%) cases, to mild — in 6 (33.3%) cases. In 4 (22.2%) cases the pain was sharp or cutting in nature. 12 (23.0%) patients noted a clear correlation between pain and food intake. 9 (17.3%) patients had fasting pains, 3 (33.3%) of them had nocturnal pain. In 6 (11.5%) patients the pain did not depend on food intake. 11 (21.2%) patients had dyspeptic syndrome: loss of appetite, nausea, heartburn, belching, meteorism and epigastric pain.

On admission 27 (51.9%) patients from the group I and 23 (45,1%) from group II were assigned to HRSZE regimen. Due to the intolerance of antibacterial drugs in 23 (44,2%) cases (group I) isoniazid and rifampicin were administered intramuscularly or intravenously. Remaining patients were assigned to HRSE regimen. Spinal cord compression on MRI and neurological deficit were indications for surgery at an early stage of treatment.

Surgical intervention aimed to remove necrotic tissues and sequesters with spinal cord decompression by resection of the affected vertebrae. Bone autografting was usually performed to fill bone defects, stabilizing the spine and inducing bone fusion. In 33 (32,0%) patients used autografts from a rib (2 to 4 fragments), which was resected as a part of surgical approach. In 70 (68,0%) patients with tuberculosis of the cervical, thoracolumbar, lumbar, lumbosacral spine, autograft was taken from iliac crest. Postoperatively, all patients continued their antibiotic therapy regimen for 2–3 months.

In 1–2 days after surgery, 9 ($17,3 \pm 1,0$) patients in group I and 11 ($21,5 \pm 0,7$) patients in group II (which did not have any clinical signs preoperatively) manifested with stomach motor function symptoms, which were presented clinically as belching, vomiting, abdominal distension, regurgitation.

During the first 2–3 months after surgery 46 (88,5%) patients from the main group showed clinical improvement, which was presented as improvement of intoxication symptoms in 46 (88,5%) patients, relief of pain in 43 (82,7%) patients. 45 (88,2%) patients in the same period showed significant improvement of intoxication symptoms and 44 (86,3%) patients improvement of pain in second group. All patients showed stable position of the bone grafts in both groups. No residual or recurrent abscess was found in 44 (84,0%) patients from group I and in 33 (91,6%) patients from group II. Acute coronary syndrome occurred in 1 patient on the sixth day after surgery. Exudative pleurisy occurred in another patient in 1 month postoperatively on the operated side of the thorax. Two patients occurred with abnormal liver function (increased transaminase levels) and one patient with allergic dermatitis. Abscess formation occurred in three patients on the opposite side of the operated vertebra revealed on MRI. Body temperature remained 37,0–37,5 within two months after surgery in one patient. Two patients developed toxic hepatitis. All the complications of the cardiovascular system, lungs, and liver were eliminated by adequate pathogenetic therapy.

Restoration of spinal cord function after surgery depends on the severity and duration of the compression. In our study, in 2–3 months after surgery complete resolution of spinal disorders was observed in all 45 ($43,8 \pm 2,1$) patients in both groups with radicular syndrome (ER type), and in 17 (10 from group I, 7 from group II) patients with type D disorder. Significant neurological improvement was indicated in patients with D — and C — type of disorder. Restoration of spinal cord function in patients with A — and B — types require long-term treatment and observation.

Conclusions:

1. Impairment of the gastrointestinal tract in patients with complicated forms of tuberculous spondylitis worsens the course of tubercular process in the spine and makes it difficult to cure.

2. Timely diagnosis and adequate pathogenetic therapy of motor function of the gastrointestinal tract increases the efficiency of treatment of tuberculous spondylitis.

3. Radical and reconstructive surgery on anterior aspect of the spine with complex antibacterial therapy prevents severe spinal deformities, neurological and gastrointestinal disorders.

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Effect of sedentary style of life on the teenagers' health

Abstract: According to the performed poll among 1350 children it was determined that, 39.8% of teenagers had sedentary life, which had direct impact on their health. Teenagers with sedentary life 3 times more often had anemia, and in 17.9% we registered rise of arterial pressure, while 25.3% oppositely decrease. 49.5% of the teenagers had some forms of diseases in majority of the cases characterized by diseases of endocrine system and gastro-intestinal tract.

Keywords: style of life, children and teenager's health, physical development

Topicality. In the modern time in many countries of the world health cult is widely introduced. And it, in its turn, promotes formation of the demand of healthy body. Health, weight, sequence in the enlargement of various parts of body, and its proportion is programmed in hereditary mechanisms and in optimal conditions of life activity proceed in certain sequence. Though external and internal factors can not only cause disorder of development sequence, but also lead to irreversible alterations [3].

Among the multiple factors, effecting the status of youth health, together with heredity, the role of "regulatory factors" of should be noted: environment, sanitary-hygienic conditions of life, and study in school. We should take into account the fact that, only 10% of human health depends on medicine, 20% on heredity, 20% on the impact of environment, and 50% on the style of life of a person himself [4]. Especially it is characteristic for teenagers, as especially in that age period health problems more often have functional character due to physiological, functional and psychological peculiarities, and they are reversible and can be corrected. But due to the same peculiarities teenagers are too much liable to the impact of environment, under the influence of which the formation of behavioral setting, habits occur, and on which their health depends [3; 6].

Motion is natural demand of a human organism. Excess or deficiency of motion is reason of many diseases. It forms the structure and functions of human organism. In the process of long-term evolutionary development of human a close relation between its motor functions and activity of inner organs was formed [5]. During the growth and development of human motion stimulates substance and energy exchange in organism, it improves activity of heart and breathing, and also functions of some other organs, playing important role in the adjustment of a person to continuously changing conditions of environment. Great mobility of children and teenagers

has favorable effect on their brain, promoting development of mental activity. Motor activity, regular physical trainings and sports is compulsory condition of healthy style of life [4].

Motor activity is one of the essential factors, which determine the level of exchange processes in organism and status of its skeletal, muscle and cardiac-vascular system [2]. It is closely interrelated with three aspects of health: physical, psychic and social, and play various roles in human life. The demand of organism in motor activity is individual and it depends on many physiological, social-economic, and cultural factors. The level of the demand in motor activity is significantly conditioned by hereditary and genetic factors. Certain level of physical activity is necessary for normal development and functioning of an organism and maintenance of health. That range has minimal and maximal optimal levels of motor activity [6].

Deficiency of motor activity in our country is characteristic for the majority of city population, and especially for people dealing with mental activity. These include not only mental job workers, but also pupils and students, the main activity of whom is study [1].

Objective: to study impact of sedentary life style on the health of teenagers.

Materials and methods of the research: on the basis of the performed poll of 1350 children, living in Tashkent city and Sirdarya region. The checking was performed among teenagers in the age from 14 to 18 years old, among them 663 girls and 687 boys. We performed anthropometric studies (health, weight, BWI).

On the basis of the designed inquirer we determined the characteristics of sedentary life.

Children with sedentary life were visually examined by the following specialists: pediatrician, neuropathologist, traumatologist, dentist, children's gynecologist, endocrinologist, and surgeon.

Results of the research: in the analysis of the achieved data of the poll we determined that, 537 children out of 1350 had sedentary life style (39.8%). And it was met 1.5 fold more often than in boys, respectively, in 47.1% (312 girls) and 31.4% (216 boys) cases ($p < 0.05$).

Among the teenagers with sedentary life style disharmony of physical development was met 5.6 fold more often, than among physically active teenagers (35.6%; 191 teenagers versus 6.4% (52 teenagers)).

According to the performed studies, both in our country and foreign ones, sedentary life gradually transforms to hyperkinesias, and later to somatoform dysfunction of vegetative nerve system [1].

On the basis of the analysis we determined presence of vegetative distention (including 3.5% excessive) in 23.2% of teenagers with sedentary life, and it provided prognosis of decreased tolerance to physical, emotional, and intellectual loads. Physically active teenagers had distention in 6.4% (52 teenagers).

Besides that, teenagers with sedentary life had anemia 3 times more often than physically active teenagers.

Rise of arterial pressure was registered in 17.9% of teenagers with sedentary life, while physically active teenagers had high arterial pressure only in 7.7% (63 teenagers), and it was 2.3 times rarer. Hypo tension was observed in 25.3% (136) of the teenagers with sedentary life. In that category of children teenagers with "D" registration of various specialists were met 2.6 fold more often.

Totally, about half of the teenagers have some forms of diseases (49.5%; 668 teenagers). It should be specially noted

that, the greatest amount of pathologies was observed among the teenagers with sedentary life.

In this category of teenagers the most often met pathologies were diseases of endocrine system (58.2%; 389 teenagers), diseases of GIS (24.3%; 162 teenagers), rarely cardiovascular diseases (15.7%; 105 teenagers), renal diseases (5.1%; 34 teenagers). And the indicated states were combined in 1/3 of the cases.

Thus, the results provide definition of the medical-social risk group among the teenagers. The revealed tendencies and dependence let us determine priority measures for the prophylaxis of diseases among teenagers, taking into account their life style, risk factors for the development of chronic infectious diseases, life conditions, and physical status.

Conclusions:

1. 39.8% of the teenagers have sedentary life style, which has direct impact on their health.

2. Insufficient volume of physical loads in educational institutions is the factor decreasing physical health of studying teenagers.

3. Anemia was observed 3 times more often among the teenagers with sedentary life, and in 17.9% we registered rise of arterial pressure, while in 25.3% oppositely decrease was noted.

4. 49.5% of the teenagers have some forms of pathologies in the majority of cases characterized by diseases of endocrine and GI systems.

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Neonatal adaptation preterm infants with intrauterine growth retardation

Abstract: Catamnestic monitoring of children with intrauterine growth retardation (IUGR) during the year revealed that the vast majority of them (82.9%) were observed by the neuropathologist. The predominant clinical syndromes were pyramidal insufficiency syndrome, movement disorders, neuro-reflex excitability, hypertensive, asthenic-neurotic syndrome.

Keywords: Neonatal adaptation, premature infants, intrauterine growth retardation.

Relevance. Perinatal pathology of premature infants is a leader in the structure of perinatal and neonatal mortality, morbidity and subsequent disability [1; 2].

Special attention is deserved the problem of the syndrome of intrauterine growth retardation (IUGR), that is not only medical but also social value. IUGR is one of the first places in the structure of perinatal morbidity and mortality, the cause of infectious and somatic morbidity in preterm infants, as well as further violations of physical and sexual development. On the average every tenth baby is born with a low birth weight for gestational age [3; 4].

Therefore, the identification of the causes of IUGR and characteristics of children with this pathology is an urgent task of neonatology.

Objective: assessment of the state of newborns with intrauterine growth retardation, depending on the mother's obstetric pathology.

Materials of research. To achieve the goal we have been analyzed 50 stories of preterm infants with IUGR, in which took account of the the delay and its degree of development, gestational age, their status at birth and the course of their postnatal adaptation, as well as various risk factors of formation of the pathology of the mother during pregnancy.

Results and discussion. It was revealed that the hypotrophic options of IUGR was observed in the vast majority of the analyzed stories (92.5% of cases), which corresponds also to the literature data. Other variants of IUGR were noted much less frequently: thus, a hypoplastic variant encountered in 8.8% of cases, and dysplastic — only 2.5% of cases. The vast majority of children were born at term of 34–36 weeks of gestation — 67.5%, 30–33 weeks — 20.0%, and 26–29 weeks — 7.5%.

The level of severity of children with hypotrophic option of IUGR in term infants were determined by the weight-height coefficient: I st. — 59–55, II art. — 54–50, III Art. — Less than 50. It was revealed that with the I degree of severity of hypotrophic option of IUGR was in 19.5% of full-term children, with grade II — in 65.8%, III grade — in 14,6%. In preterm infants degrees of severity of hypotrophic option of IUGR were calculated on deficiency of body weight at the given gestational age: the 1st degree — deficiency of weight up to 10%, the 2nd degree — deficiency 10–20%, the 3d degree — 20–30%. It was revealed that the vast majority of preterm infants (85.7%) were from the III degree, and only 14.3% — with I degree of severity. If to summarize the above figures, among all infants (both term and preterm) with hypotrophic option of IUGR the I degree of severity was observed in 22.5% of children, the II degree — 56,3%, the III degree — 21.2%.

In this group of children in the early neonatal period, there was a violation of postnatal adaptation, wherein 33.8% of them were in need of observation and treatment in the intensive care unit. More than 50% of infants in this group had abnormalities in the neurological status, most

often in the form of a syndrome of increased neuro-reflex excitability syndrome, depression, hypertension syndrome and the syndrome of vegeto-visceral dysfunction. Apgar score of the newborn revealed the presence of moderate (82.5%) and severe (5.0%) degree of asphyxia. It is characteristic that clinical symptoms of perinatal encephalopathy in these children were noted in the first days of life, wherein severity of clinical symptoms corresponded to degree of disturbance of cerebral blood flow. These children tended to a small weight loss, but its slow recovery, there was a tendency to long transient jaundice and slow healing of the umbilical wound. These children do not retain heat, some of them needed microclimate ditch. Even within the normal birth to these children, in most cases it proved traumatic therefore the period of postnatal adaptation flowed with various complications. In addition to the changes in the central nervous system, in 7.5% of children have respiratory distress syndrome in the form of atelectasis, hyaline membrane disease, pneumopathy, which indicates not only about the general immaturity in children with of IUGR, but the immaturity of the lungs, leading to a deficiency of surfactant.

The severity degree of hypoplastic variant of IUGR was determined by deficiency of body length and circumference of the head in relation to gestational age. In these children was observed relatively the proportional decrease of all parameters of physical development (below 10% percentile) at the given gestational age. Therefore, children had been the proportionally built but they been small and relationship between head circumference and chest had not been violated, the edge of seams and of fontanelles were soft. As children with hypotrophic option of IUGR, these children were prone to rapid cooling, respiratory disorders, and hypoxic encephalopathy.

In children with dysplastic option of IUGR were noted multiple stigma of dis embryogenesis (more than nine) from the skull, face, eyes, ears, neck, limbs and skin, and also pronounced neurological disorders.

In this regard, attempt was made to evaluate the etiology of IUGR highlighting recommended in the literature four major groups of risk of disease. The first group is the social and biological risk factors. For this were refined age of parturient women, their profession and occupation. It was found that in 10.0% of cases was marked the birth of children with IUGR from mature primiparas and 3.8% of cases — from young primiparas. When taking into account profession and occupational exposures revealed that the majority of women (76.3%) were not working (housewives), in most cases, have a low level of the welfare in the family; 7.9% postpartum women were students and female students who have psychological and physical stress, as well as insufficient and unbalanced diet have had an extremely adverse effect on fetal development. After the students by the frequency of occurrence followed women who engage in heavy physical labor (11.9%) and

women working at hazardous industry (3.9%). It is such a profession as a painter, Press operator, punch press operator and working in paint workshops.

The second group of risk factors is the so called maternal factors, leading to fetal growth retardation. Here in addition to the defects of nutritional status of women (deficiency of protein, vitamins, zinc and other microelements) are different concomitant factors of health state of maternal: pathology of pregnancy, harmful habits, taking certain medications. Thus, among the accompanying diseases of mother in 31.3% of cases, there is cardiovascular disease (various options neurocirculatory dystonia, rheumatism, varicose veins), in 28.6% of cases — inflammatory diseases of the female genital organs (appendages of the uterus, uterus), in 12.5% of cases — hormonal disorders (obesity, hypothyroidism, ovarian dysfunction, adrenal neuroendocrine syndrome). Next by frequency of occurrence, there was renal failure (chronic pyelonephritis, nephroptosis) and infectious diseases of the mother (hepatitis, SARS, syphilis, trichomoniasis).

The leading place among pregnancy pathology takes the chronic fetoplacental insufficiency (87.5%), which progresses rapidly when the duration of pregnancy begins to exceed the capacity of the placenta to provide the fetus with nutrients. Chronic fetoplacental insufficiency was present in all women with post-term pregnancy, and 2/3 of women with normal pregnancy on the background of concomitant pathology. This is followed by the previously tolerated abortion (medical abortions — 35.0%, self abortion — 2.5%), worsening of course of this pregnancy, and the presence of a long period of infertility (13.8%), the threat of termination of pregnancy (57.6%), toxemia of pregnancy (48.5%), anemia (46.3%), gestational pyelonephritis.

The third group of factors is the placental risk factors. These include developmental defects of the placenta (17.6%), placental abnormalities (19.6%), the entwining of umbilical cord around the baby's body parts (17.6%) absolutely short

umbilical cord (3.9%). These structural abnormalities of the placenta, as well as its attachment led to a decrease in the surface area participating in the exchange of substances between mother and fetus. To this also contributed a pathology that occurs at birth: the early discharge of amniotic fluid (46.3%), the presence of the total evenly narrowed pelvis (27.5%), rapid delivery (16.3%), and post-partum haemorrhage (7.9%).

The fourth groups of risk factors (fetus factors) in this group of children were not identified. These include multiple pregnancy, chromosomal diseases, hereditary metabolic abnormalities, congenital malformations, intrauterine generalized infection.

Catamnestic monitoring of children with IUGR during the year revealed that the vast majority of them (83.8%) were observed by neuropathologist. The predominant clinical syndromes were pyramidal insufficiency syndrome, movement disorders, neuro-reflex excitability, hypertensive and asthenoneurotic syndromes. The positive dynamics on the background of the treatment was observed at the vast majority of children (67.5%) and only 32.5% of the children remain under the supervision of a neurologist at the second year of life with minimal cerebral dysfunction.

Conclusions. Thus, according to the survey, the most common risk factors for preterm birth of children with IUGR include the following:

1. Pathology of pregnancy and childbirth (chronic fetoplacental insufficiency, and the threat of termination of pregnancy toxicosis, anemia, previous abortions).

2. Somatic and infectious diseases of mother as a before pregnancy and during it (cardiovascular disease, inflammatory diseases of the genital organs and kidney, hormonal dysfunction, various infectious diseases).

3. Unbalanced and poor nutrition during pregnancy (almost complete lack of fruit and necessary vegetables in their diet).

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Instrumental correction of scoliotic disease in children and teenagers in the Republic of Uzbekistan

Abstract: The article presents therapy results of 71 patients with scoliotic disease treated by means of three-stage surgical correction method. It was noted that segment reconstruction and instrumental correction was more successful than other modern world analogies, and it was a selective method in the complex radical therapy of severe ($95-186^\circ$ Cobb) forms of scoliotic disease among children and teenagers.

Keywords: scoliotic disease, surgical correction, children and teenagers.

Topicality. The therapy of axis deformations of vertebral column is one of the most difficult problems of the modern vertebrology. In spite of the significant success in the surgery of vertebral axial deformations in the recent decades, instrumental correction is still difficult for vertebrologists and the result of operations are not always satisfactory for orthopedists and the patients. The main reason is that the majority of surgeons make an accent on the application of various correction and fixation devices, paying little attention to the whole impact complex [1].

The surgical method of instrumental correction of scoliotic deformations most widely spread in Europe according to CDI [3] is not always effective and safe. The volume of correction after the application of that technology among the patients with average angle of scoliotic drift equal to 55° deformation correction is only 54.5%, and at the remote terms only 41.9% of the corrections are preserved [1]. The number of complications is still high — 26% [2], among them acute neurological disorders can reach 17% [4].

Sometimes it is possible to stop progression of vertebral deformation, to prevent development of inner organs' involvement, to protect a patient from various complications and to normalize social aiming only by means of complex surgical operations. For the successful salvation of these problems it is rational to follow the principle of step-by-step therapy.

The aim of the research was the estimation of three stage reconstructive correction method efficiency for the severe forms of scoliotic vertebral deformations.

Materials and methods of the research. From 2001 to 2014 on the territory of Uzbekistan 71 patients were operated with the application of three stage surgical correction method. The average age of the patients was 16.6 ± 5.8 years (13–33 years old). The average angle of scoliosis in the group was $125.4 \pm 2.6^\circ$ (from 95° to 186°) Cobb, Risser's symptom — 3.4.

It was mostly in thoracic-lumbar 57.7% (41) and thoracic 42.3% (30) location. Pathologic kyphosis was detected in 71.8% (51) with average central angle of projection hyperkyphosis $91.6 \pm 1.9^\circ$ ($42^\circ-181^\circ$), misbalance of corpus to cocix in 71.8% (51). The average kyphosis angle of T1-T12 was equal to $45 \pm 2.6^\circ$ ($5^\circ-108^\circ$), L1-L5 lordosis (–) $49.9 \pm 1.2^\circ$

($108-+36^\circ$). According to etiology there was prevalence of idiopathic 49.3% (35) and dysplastic 23.9% (17) scoliosis. Congenital abnormalities and systemic pathology (neurofibromatosis, Ehlers-Danlos syndrome) was 14.1% (10) and 12.7% (9) correspondingly. 74.6% (53) of the patients had complicated anamnesis, associated pathology and complications, such as pyelonephritis, cholecystitis, osteoporosis, syringomyelia, hypothyroids, hyposomia, myelopathy, myocarditis, sepsis and others.

Results of the research. At the first stage of three stage correction course we performed correction of vertebral deformation on the value of functional component of deformation mobility achieved in the process of conservative extension preparing. Single-shaft telescopic distractor with 4–5 hooks for sublaminar fixation to vertebrae was attached along concave side of deformation.

The second stage included transpleural mobilization diskectomy (average 5.2 disks (from 3 to 7)) with segment reconstruction of vertebral bodies and intervertebral spondylosis with auto transplants. The procedure was finished by additional correction of deformation with periosteum resection of 3–6 ribs, segment resection of dorsal parts of vertebral column along the arch and dorsal spondylosis with bone transplants. For the correction of the deformation we applied single-shaft and double-shaft endocorrectors (patent № IAP 03203, dated 22.09.2006).

The surgical correction was performed in three stages (totally 241 operations), average 3, 2 stage operations per a patient and 19.6 days (14–25 days) for a stage. Average 49.2 days for the complete therapy term. The average mean for scoliosis correction was 46.7% (31.2–58.6%) after the first stage and 64.1% (43,7–79,2%) at the end of the correction. And the average remaining angle of scoliosis curve after correction was 44.1° ($23^\circ-92^\circ$).

There was registered growth increase to 12.5cm (4–29) because of prolongation of body length.

Complications occurred in 10.8% of the children. These were: 3 pyramidal disorders, 5 soft tissues fistulas (St. Aureus. Ps. aeruginosae), 1 liquorrhea, and 3 exacerbations of chronic diseases. All complications were eliminated by means of prolonging of hospitalization term to 4.3 days average.

The average value of correction defeat in 2 years was $6.5 \pm 1.45^\circ$, or 7.5% of the total value of the achieved correction. At the term from 3 to 5 years — $3.8 \pm 1.22^\circ$, or 4,4% correspondingly. The average volume of pathologic kyphosis correction was $62.3 \pm 2.73^\circ$. Correction of the pathologic kyphosis in the cases of thoracic and thoracic-lumbar location was approximated to the physiological level in all the patients, among them 8 patients had hypercorrection and hypokyphosis state. Pathologic kyphosis correction defeat in 2 years was 4.6 ± 0.5 , or 7.4%, while at the term from 3 to 5 years $3.8 \pm 0.31^\circ$ more, or 6.1%. In one of two patients with lumbar location of pathologic kyphosis we were successful to form physiological lordosis, and in the second one — hypolordosis.

The balance of frontal axis was recovered to $87.4 \pm 3.8\%$ average. The loss of the balance within 2–5 years of monitoring didn't exceed 1,5%. Hyperlordosis was changed to 44.2%, to physiologic size, average up to $35.8 \pm 1.54^\circ$ in the group. In the process of the correction we achieved growth increase to 10.3 ± 1.24 cm (6–27 cm) by means of increasing body length. In 2 years there was average loss of body length to

2.9 ± 1.26 cm, and at the terms from 3 to 5 years to 0.8 ± 0.01 cm more.

There were noted 5 complications and it was 3.9% of the number of the performed operations and 10.8% of the operated patients. Three patients had 4 additional operations for the elimination of complications. All patients were stand to a vertical position on the 3–5th days after correction and discharged home on the 8–19 days after the final stage without external immobilization. In a month the patients could start studying and working with some limitations, and in 6 months without any limitations.

Conclusion. Thus, the step-by-step segment reconstruction and instrumental correction is better than other modern world analogies and it was a selective method in the complex radical therapy of severe ($95 - 186^\circ$ Cobb) forms of scoliotic disease among children and teenagers.

For the maintenance and maximal safekeeping of scoliotic deformation correction in the short and longer period it is necessary to apply step-by-step surgical method, which provides significant deformation correction to 73%.

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More than hypoglycemic therapy

Abstract: Exenatide has a more evident hypoglycemic effect in comparison with metformin, herewith it has positive effect on the clinical course of GERD, which makes it possible to consider it as agent of choice with patients with type 2 diabetes mellitus and gastroesophageal reflux disease.

Keywords: gastroesophageal reflux disease, obesity, analogue to receptor of glucagon-like peptide-1, metformin, diabetes mellitus.

The world researches devoted to the study of the issue of gastroesophageal reflux disease (GERD) developing affected by obesity becomes more and more actual as the combination of these pathologies considerably worsens quality of life of patients and complicates treatment.

The role of type 2 diabetes mellitus and obesity, in pathogenesis of GERD is classified ambiguously. According to some authors, the symptoms of GERD are registered irrespective of the value of the body weight index (BWI) of patients, according to other authors, the symptoms of GERD are more expressed at patients with the raised BWI, and abdominal obesity is a risk factor of development of erosive esophagitis [2; 4].

The most characteristic symptom for GERD, the heartburn, in patients with obesity is rare, along with it the regurgitation symptoms prevail (nausea, eructation, bitter in mouth, hiccups) [1; 3]. Also for patients with obesity frequent development of extra-esophageal signs of GERD, such as night cough, voice hoarseness, reflux-associated bronchial asthma, cardiac abnormalities, cardialgia, is characteristic. [1] Cases of asymptomatic disease course are frequent. The factors aiding the development of GERD in persons with overweight are irregular meal, prevalence in a diet of spicy and fat food, sweet dishes and bakery products, alcohol, sweet fizzy and caffeinated drinks. [1] The situation becomes considerably complicated at development of 2 type diabetes mellitus (2 type DM) on the background of obesity as it confuses the differential diagnostics of extra-esophageal signs.

On the basis of the Stavropol State University focused attention is given to this issue, the results of researches are regularly published in medical literature.

Purpose

The present research aimed to reveal the influence of various antihyperglycemic medications, such as metformin (biguanid group) in a dose of 2000 mg per day and exenatide in a dose of 10 mg per day (GLP-1 group) subdermally, on decrease in body weight and by that reduction of the number of sour refluxes, in comparison with a medication of the standard GERD treatment of the group of inhibitors of a proton pump — omeprazole in a dose of 20 mg two times per day.

Materials and methods

Research included 96 obese patients with the determined diagnosis of GERD. All patients had carbohydrate metabolism disorder (by withdrawal criteria the percent of glycated hemoglobin did not exceed 7) that in turn dictated the hypoglycemic therapy approach (modification of lifestyle, both in monotherapy, and in a combination with metformin or exenatide). The age of participants of the research fluctuated from 29 to 71.

The obesity degree evaluation was carried out using the formula of body weight index, at the studied persons this indicator was ranging from 30 to 50.

By means of daily impedance monitoring pH ("Gastroscan 24") and calculation of the DeMeester index which variability

was beyond limits the reference range (from 15,9 to 112,4), the diagnosis of GERD was confirmed.

Duration of the present research made 6 months. Intermediate control was carried out in 3 months from the beginning of treatment.

Processing of results was carried out by means of the EXEL, BIOSTAT, Student's t-test and Mann-Whitney U test.

All included patients were divided into 3 groups. Entered into the first group — 33 person, extent of carbohydrate metabolism disorder allowed to use as treatment only modification actions (diet therapy, physical activities) without application of the antihyperglycemic medications and as pathogenetic therapy of GERD the inhibitors of a proton pump were appointed (omeprazole 20 mg/2 times per day), into this group entered (18 women, 15 men). The second group included 34 persons (20 women, 14 men) — their level of glycated hemoglobin allowed to use along with the change of a lifestyle, the analogue of GLP 1 — exenatide 5 mg/2 times per day subdermally as antihyperglycemic medication, this antihyperglycemic was chosen taking into account expected weight reduction, due to delay of gastric emptying, and also due to the impact of medication on structures of a gipotalamus that can theoretically entail reduction of signs of GERD. The third group included 29 people, (11 women and 18 men) taking into account the percent of glycated hemoglobin, as hypoglycemic therapy was appointed metformin in a dose of 2000 mg per day.

Statistical calculations were made by means of Exel, Biostat. BWI was calculated by means of pair Student's t-test, index of Mann-Whitney U test due to the big dispersion of indicators.

During the research we confined us only to total statistics, without considering it on the basis of gender status.

Results and discussions

At examination of patients, at the introduction stage all of them had overweight, and also the standard index values were exceeded (see the table)

After the 3-month treatment in all three groups dynamic examination of the named parameters was conducted. In the analysis of data, in group of omeprazole reception, as expected changes of the body-weight index was not noted, however, there was accurate dynamics of reduction of the number of sour refluxes ($p < 0,05$). In the second group, taking into account the pleiotropic effects of the applied medication, statistically significant decrease in the body-weight index was noted. It is important to note that despite the lack of accuracy, the tendency to quantitative reduction of an acid regurgitation was noted.

In the third group no considerable changes in weight were noted that correlates as well with DeMeester index values.

The final point of the research was of the greatest interest; in the first group, as well as earlier, positive dynamics was noted only on one indicator — the number of sour refluxes, that fact found also the reflection in statistical parameter ($p < 0,05$). Despite the carried-out advisory work on modification of

lifestyle it was not possible to reach visible results in reduction of weight in this group.

In the group of patients, where exentide was applied, on both parameters the accuracy was reached; that is explained by the mechanism of action of medication (slowing down the gastric emptying, increasing saturation duration that leads to reduction of the consumed food, and by that to weight reduction that causes the return development

of gastroesophageal reflux disease, by decrease in intra-abdominal pressure).

In the third group, applying metformin, the decrease in body weight, but considerably less expressed in comparison with the second group, was noted that was also reflected in reduction of the number of sour refluxes, but without statistical confirmation. (see the table).

Table 1. – Indicators of BWI and DeMeester index, depending of the therapy

	start	3 months	p	6 months	p
omeprazole					
BWI	42,1±6,3	42,0±6,4	0,99	41,8±6,5	0,98
DeMeester index	66,7±2,8	52,25±8,6	<0,05	40,7±3,6	<0,05
exenatide					
BWI	39,4±4,2	36,9±4,3	<0,05	35,3±4,6	<0,05
DeMeester index	36,1±2,1	32,2±2,0	0,47	28,9±8,6	<0,05
metformin					
BWI	39,1±4,9	38,2±4,8	0,26	38,1±5,3	<0,05
DeMeester index	42,0±9,1	39,5±6,2	0,67	37,6±4,2	0,44

Conclusions

On the basis of the obtained data, it is possible to claim about the greater efficiency of antihyperglycemic medication exenatid on decrease in the body-weight index, in comparison with the metformin. Also during the research comparable data on efficiency of exenatide and omeprazole on the course of

GERD were obtained. The listed data seem perspective in application of exenatide with patients with 2 type diabetes mellitus on the background of obesity suffering in parallel the gastroesophageal reflux disease. That conforms to modern requirements of medicines in multiefficiency of the combined pathologies.

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Features of a clinic and diagnostics of patients with the family anamnesis of inactive adenomas of hypophysis

Abstract: The paper gives the results of examination of patients with inactive adenomas of hypophysis (IAH). All patients with IAH were divided into 2 groups: sporadic and familial forms of IAH. It has been found that in patients with familial IAH before clinical signs appear, the number of clinical symptoms was greater for the disease was more aggressive, and the prognosis was unfavorable.

Keywords: inactive adenomas of hypophysis, tumor, sporadic, family, differential diagnostics, headaches, neurologic violations, symptoms, sexual violations.

Early diagnostics of inactive adenomas of hypophysis (IAH) relates to difficult questions of modern neuroendocrinology [1; 2]. At a stage of microadenoma IAHs

are seldom diagnosed and more often casually found [3]. The diagnosis is, as a rule, verified when adenoma already reaches a considerable size [4]. IAH is met in 25–43% of hypophysial

adenomas and up to 10% of all intracranial tumors [5]. Molecular and genetic researches established that up to 5% of IAH cases refer to genetically predisposed people [6]. At the same time in literature there is practically no comparative data on clinical flow and disease diagnostics in populations between sporadic and family IAH disease [7].

The aim of the research was to study features of clinical semiology, their value for differential diagnostics in population of patients with the sporadic and family IAH anamnesis.

Materials and methods. Researches were implemented on the basis of the Republican specialised scientific practical medical center of obstetrics and gynaecology from 2009 to 2014. The inspection included 71 IAH patients with intracellular adenoma of a hypophysis — the tumor sizes were from 1 and more mm. The IAH diagnosis was verified on the basis of the carefully collected anamnesis, studying of dynamics of course of the disease, results of a magnetic and resonant tomography (MRT), and also enzyme-linked immunosorbent assay-definitions of the contents of hypophysial hormones in blood serum. In IAH diagnostics an important place in our researches is occupied by the family anamnesis collection for establishment of hereditary predisposition to this disease. The family anamnesis found out by means of the standard questionnaire “Family anamnesis” — the isolated forms of adenoma of a hypophysis (Familial isolated Pituitary Adenomas — FIPA, WHO — 2005) [8; 9].

According to a goal and research problems patients with IAH were divided into two alternative groups: the 1st group — 50 (70.4%) patients with environmental factors without the burdened family anamnesis and 2nd — 21 (29.6%) with the burdened family anamnesis, including with a panmiksiya — 9 (2.7%) and an inbriding — 12 (16.9%) patients.

Results and discussion. The analysis of the received data showed that on the average from total number surveyed patients were at the age from 18 till 70 years (middle age 44.5 ± 3.85 years). At the same time the greatest number of the arrived IAH patients to fall on age from 35 (23.9%) to 40 (25.4%) years and to a lesser extent be elderly to 30 (18.3%) and 55 (5.6%) and is more senior than years that will be coordinated with literary data [10].

As a result of the analysis of the received data it is established that at IAH patients seldom meets separate symptoms, more often they are combined and/or more come to light a disease of many symptoms — on 3–5 symptoms at the same time. The combination of 2–3 symptoms of a disease in 1-group is revealed at 17 (34.0%), a of many symptoms at 20 (40%) and a of many symptoms at 13 (26.0%). In 2-group the combination of 2–3 symptoms is revealed at 7 (33.3%), a of many symptoms at 13 (61.9%) and a of many symptoms at 1 (48%). Both in the 1st, and in the 2nd group at IAH patients important clinical manifestations were — sexual violations at 64 and 90%, decrease in sight — at 36 and 76.2%, headaches — at 54 and 80%, lack of periods — 22.0 and 28.0%, violation of

a menstrual cycle — at 18.0 and 23.8% at the age of women till 50 years, and at men till 55 years — violation of sexual functions — at 24 and 38.1%.

It should be noted that at patients of 2-group with hereditary IAH signs is more often than at patients of 1-group — without hereditary signs prevail frequency of clinical signs, such as sexual violations — 26.5%, decrease in sight — for 40.2%, headaches — for 26.5%, doubling in eyes — for 15.0%, visual discomfort — for 12.5% and other, on duration of a disease among women till 5 and 20 years — for 12.3 and 24.6%, but to a lesser extent till 20 and more than 21 years — for 23.2 and 15.2%, and among men of such difference it is not revealed. On the size of a tumor to 20 mm and huge women of 2-groups, and among men in 2-group the sizes of a tumor to 10 mm — it is less than in 1-group — for 21.2%, and with huge, on the contrary it is more — for 31.3%.

Interesting data are revealed by us when studying frequency of complaints to neurologic violations at IAH patients in groups depending on the size of a tumor. In 1-group with a tumor to 10 mm of the complaint to headaches showed — 46.7% of IAH patients, in 2-group — 50.0%, in the same group of 50.0% of patients showed complaints to dizziness.

With a tumor to 20 mm in 1-group of the complaint to a headache, dream violation, dizziness showed 58.8; 17.6 and 11.8%, and in 2-group on 62.8% of cases patients showed complaints to a headache and dream violation. At patients with huge IAH tumors in 1-group in 100% of cases complained of a headache and dizziness, 66.7% — on dream violation. In 2-group of the complaint in 100% of cases showed on headaches, dream violation, dizziness and on 9.1% of cases for lack of sense of smell, decrease in memory and apathy.

Thus, the analysis of the received results of researches showed that at IAH patients 1- and 2-groups considerable visual, sexual and neurologic violations that it is possible to believe are observed is connected with development by hypophysial insufficiency of various degree of expressiveness, owing to pressure of a normal hypophysial fabric or a hypophysial leg therefore, it is possible to believe, hormones can not reach a hypophysis. Sick patients with a size have tumors to 20 mm and huge according to the majority of researchers, sexual and all-somatic violations are more often than complaints on visual and neurologic, and also.

Intracranial hypertension with a headache, nausea, vomiting arising suddenly, as a rule, are accompanied by fast decrease in sight, hypotension, is a typical picture a hypophysis apopleksiya owing to a hemorrhagic heart attack of a tumor, and in certain cases the first IAH manifestation. It is possible to believe that increase in frequency of complaints with progressing of growth of a tumor distinction of symptoms of a disease there correspond degrees of a compression or an invasion of the next structures. In this regard, as a rule, the diagnosis was established by doctors, when the sizes of a tumor already were big, defiant violations of sight, a headache and/or hypopituitarism, and microadenomas — tumors to 10 mm

are identified seldom because of insignificant symptoms of a disease. Due to the growth of tumoral process as it is often noted at IAH patients with the size of a tumor to 20 mm and huge signs of a secondary hypothyroidism, including such symptoms as apathy, a hypothermia, dryness of skin, thirst, bradycardia, hypotonia, etc. or secondary adrenal insufficiency — weakness, fast fatigue, hypotension come to light. Important hypothalamic manifestations which can be shown at IAH patients in a combination to a secondary hypothyroidism increase and/or decrease in weight of a body, drowsiness, vegetative crises, dizziness, lack of sense of smell, decrease in memory and apathy.

It is important to emphasize that at IAH patients 2-groups of the complaint to disorder of sight, violation sexual, neurologic and the general clinical symptoms arise much more often and are diagnosed much earlier generally at the age of 30–40 years, in this group of patients, to a thicket come to light as at men, and women with the size of a tumor to 20 mm and huge.

Thus practically at all patients with macroadenoma the tumor is well visualized in hiazma-intracellular area to what usually homogeneous strengthening after introduction of contrast substance testifies. Existence of necrotic or cystous educations on CT us is not revealed. It is important to note that the increase in a tumor found at MRT-studied, coincides with dynamics of a clinical course of a disease.

Therefore, the carried-out clinical researches showed that at patients in population between with the sporadic and hereditary is IAH there are features, both on severity of a clinical

current, and on terms of identification of symptoms of a disease.

At patients with the family it is IAH the main clinical symptoms of a disease associate:

— visual, sexual, headaches, vegetative crises, a climax come aged till 20 25 years, and time of establishment of the diagnosis — 10–20 years;

— adenomas > 10 mm which progress quicker, in huge adenomas, with the heavy course of a disease more often come to light, than at patients from the single is IAH;

— the IAH family form and development of clinical symptoms at early age should be object of diagnostic screening and be considered as one of modifying factors of emergence of this disease.

Thus, clinical studies have shown that patients with familial form IAH prevalence of 29.6% in contrast to the sporadic form is associated with earlier clinical manifestations, aggressive course, a large number of clinical symptoms, the early development of refractory to treatment, poor prognosis disease. For sporadic IAH as hereditary family IAH latent characteristic for patients with a family history of more frequent symptoms of reduced vision, double vision, tearing, oligomenorrhea, galactorrhea, headaches, memory loss, vascular disorders.

This is of great importance in the early diagnosis and detection of risk of developing the disease. Based on the above it is safe to note that the signs of the total may be subject to differential diagnostic screening and monitoring of patients with hereditary traits IAH.

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Surgical and obstetrical approach at accompanying of uterine myoma at pregnancy

Abstract: Research objective was working out of the new technology of conservative myomectomy at 79 women with uterine myoma. It was established, that tying of 3 of pairs the main vessels of uterine at pregnant women with uterus myoma during cesarean section and conservative myomectomy, and also at women at the reproductive age has allowed to reducing of intra — and postoperative haemorrhage in 2–3 times. The results of dopplerometry investigations have shown, that from the 2nd days at the postoperative period it is marked gradual blood-groove restoration in the main uterine arterias, and for 6th days the blood-groove in uterus vessels is restored completely.

Keywords: uterine myoma, cesarean section, conservative myomectomy.

Protection of motherhood and childhood, including preservation of reproductive health of women, remains one of the priority directions of health care of the Republic of Uzbekistan. This problem has the special importance in connection with the steady growth of birth rate, high maternal mortality and decrease in health index of population [1, 3].

Accompanying of uterine fibroid at pregnancy causes serious danger to reproductive health of women [2, 5, 7]. Uterine fibroid is the most often found benign tumour of reproductive system of women. Its frequency in structure of gynaecologic diseases varies from 20 to 44% [7, 9]. In 13,3–27% of cases uterine fibroid is observed at reproductive age [4, 11]. According to data of literature, at 12–20% of the women having infertility, uterine fibroid is the only reason of reproductive failures [8, 10, 13].

Because of the fact that the number of young women with uterine fibroid increases every year, obstetricians even more often should resolve the issue of preservation of pregnancy and reproductive function, and also of the need and expediency of surgical intervention at accompanying of uterine fibroid at pregnancy, considering high risk of the operation [2, 6, 9].

At the present day most of authors consider myomectomy during cesarean section as additional risk factor of bleeding during operation and development of pyoinflammatory diseases in the postoperative period. The problem of conservative conducting patients with uterine fibroid is not fully solved, the issues of myomectomy at cesarean section are considered only in individual works, and tactics of pregnancy and childbirth care at presence of benign tumours of uterus is complex [1, 3, 4, 7, 11, 12].

Research objective is the development of new technology of conservative myomectomy at pregnant women during operation of cesarean section with preservation of reproductive function.

Material and methods. Work is performed on clinical base of the Republican specialized scientific and practical medical center of obstetrics and gynaecology of the Ministry of Healthcare of the Republic of Uzbekistan. Forty five

pregnant women with uterine fibroid were examined, they were divided into two groups, depending on the used method of operational approach. The first (main) group: 21 women, during cesarean section the conservative myomectomy with preliminary deligation of three couples major vessels of uterus by Olliari method was carried out. The second group: 24 women, during cesarean section the conservative myomectomy without preliminary deligation of three couples major vessels of uterus by Olliari method was carried out. Blood loss during the operation was estimated in gravimetric way. Patients of two groups were comparable on age — on average, respectively, 25,5±0,3 and 26,1±0,2 years old, on parity of childbirth and on the anamnesis.

Besides clinical examination and standard laboratory researches, at all women before and after the surgery careful ultrasound scan of pelvic organs with estimation of blood flow in the arterial blood stream of uterus according to dopplerometry was conducted. In the postoperative period examination of uterus vessels was carried out on the 1st, 2nd and 6th day by means of the ultrasonic scanner “Siemens Sonoline Versa Pro” with use of the trans-abdominal convex sensor of 3,5 MHz, at frequency filter of 50 Hz. Angle-independent indicators of the speed curve of blood flow (SCBF) were analysed: resistance index (RI), pulsation index (PI), systolic and diastolic relation (SDO).

Results and discussion. At 13 of 45 pregnant women with uterine fibroid the myomatous nodules were of small sizes and mainly interstitial localization, at the others multiple nodules (from 2 to 7) of various sizes (from 5 to 15 cm in diameter) with various localization in myometrium, generally subserosal-interstitial localization were revealed.

At all women pregnancy ended with planned operative delivery (cesarean section). Indications to it at 6 pregnant women was isthmus localization of myomatous nodule of small size but interfering advance of fetal head in the parturient canal, 2 women had a rapid growth of tumour at the end of pregnancy. At 24 pregnant women indications to operation was the uterine fibroid in combination with pelvic presentation, elderly age of primipara, infertility in anamnesis,

high myopia. At 13 women cesarean section was carried out in the course of childbirth in connection with anomalies of patrimonial activity and fetal hypoxia.

Myomectomy at pregnancy differs from that at not pregnant women. It is connected with the need of observance of the following conditions: 1) minimum injury for the fetus and extent of blood loss; 2) choice of a rational section on uterus taking into account the subsequent abdominal birth; 3) choice of the sutural material possessing durability, minimum allergenicity, ability to form a full scar on the uterus.

Features of surgical interventions in the 1st group were the following.

1. Operation was made under epidural or spinal anaesthesia, which, from our point of view, is more preferable as it allows creating the maximum relaxation, and thus makes the minimum medicated impact on the fruit.

2. We applied Joel-Cohen laparotomy to provide the most sparing conditions for the pregnant uterus and the fruit, and also for the optimum access to atypically located nodules of fibroid. Thus after carrying out of Misgav Ladach cesarean section and extraction of the fruit and afterbirth the body of uterus was brought out of the abdominal cavity in the wound. Considering the apparent vasculature with well-developed collaterals, in order to avoid large blood loss the preliminary deligation with catgut suture of three couples of major vessels of the uterus (a. uterine, a. ovarica and a. ligamentum teres uteri), and then suture of the wound on uterus with a single-row catgut continuous suture was carried out.

3. The lumps of myoma were taken with the gauze wads moistened with warm isotonic solution of sodium chloride without the use of such forcepses, as Museux's and "corkscrew". Then we dissected by cross-section over the lump the lump capsule, allocated the myomatous nodule by mainly blunt and/or sharp dissection.

4. At subserosal-interstitial location of lump the section was made, bypassing the vessels expanded during pregnancy,

reducing traumatization and solution of continuity of vessels of uterus.

5. The important role in the result of operation and pregnancy is played by sutural material and a technique of suture on uterus. Generally we used Vicryl No. 0 and/or No. 1. Stiches were put, starting from the bottom of the lump bed and fixation of a Z-shaped stich. The second end of the thread remained long for setting of knot with the first thread before the subsequent putting of a circular suture. Circular sutures were put with the first thread in several rows. The last knot on the wound remained under serousa of the uterus. In this case we considered closing of the wound more reliable, the tissues were kept in reposition condition, there was no ischemia of the stitched and adjacent sites, and the absence on the external surface of uterus of stiches reduced the risk of development of adhesive process.

In the 2nd group the conservative myomectomy on the above-described technique was carried out without preliminary deligation of three couples of major vessels of the uterus. The extent of blood loss during the operation in the 1st group made, on average, $360,3 \pm 28,1$ ml, in the 2nd group — $752,1 \pm 18,2$ ml.

Postoperative management of the maternity patients after myomectomy has the features caused by the need of creating favourable conditions for reparation of tissues, prevention of purulent-septic complications, adequate functioning of intestinal tract. For the purpose of prevention of purulent-septic complications we administered intraoperative antibiotic (preferably synthetic penicillin or cephalosporin of the III–IV generation taking into account sensitivity of microflora of vagina to antibiotics), continuing administration during a day.

In the postoperative period the dopplerometry of uterus vessels allowed to estimate changes of blood flow in the blood stream of uterus as after intraoperative deligation of three couples of major vessels, and without it (see the table).

Table 1. – Indicators of dopplerometry of vessels of the uterus in the postoperative period depending on deligation of the major vessels

Group	Postoperative period, Day	PI	RI	SDO
1-group	2	$0,36 \pm 0,01^*$	$0,82 \pm 0,001^*$	$5,66 \pm 0,03^*$
	4	$1,28 \pm 0,16^*$	$0,68 \pm 0,11^*$	$3,10 \pm 0,59^*$
	6	$1,08 \pm 0,13^*$	$0,62 \pm 0,06^*$	$2,61 \pm 0,35^*$
2-group	2	$1,21 \pm 0,20$	$0,60 \pm 0,05$	$2,52 \pm 0,37$
	4	$1,25 \pm 0,07$	$0,62 \pm 0,09$	$2,62 \pm 0,71$
	6	$1,18 \pm 0,12$	$0,64 \pm 0,07$	$2,88 \pm 0,23$

Note: where* — $P < 0,05$ in comparison with women of the II group

The received results attest that in the 1st group the course of the first days was defined by the unstable blood flow with a negative diastolic component that was indicative of incremental recovery of blood flow in uterus vessels, however carrying out measurements of indicators of SCBF was complicated. In the 2nd group the positive diastolic component of blood flow was defined, and RI made $0,60 \pm 0,05$.

From the second day of the postoperative period at women of the 1st groups the full-fledged blood flow in vessels was visualized, it authentically decreased that was indicative of incremental recovery of blood flow in uterus vessels (respectively $0,33 \pm 0,01$; $0,12 \pm 0,001$ and $0,66 \pm 0,03$).

On the 4th day the difference in indicators of speed curve of blood flow at patients of both groups was registered, but thus at women of the 1st group the positive dynamics and

normalization of blood flow remained. Nevertheless, these patients after operation of cesarean section had RI and PI authentically below, than in the 2nd group ($p < 0,05$).

The analysis of condition of blood flow on the 6th day of the postoperative period according to a dopplerometry also revealed almost complete recovery and its improvement in arteries of uterus at patients of the 1st group: the studied parameters came nearer to that of the patients of the 2nd groups.

Changes on the part of haemostasis at these patients, as well as increase in quantity of pyoinflammatory diseases, were not registered.

According to the questioning which was carried out in 3 months after operation, there were no neurologic violations at the operated women of 1 groups observed. Menstrual function at them was restored from the second month.

Main objective of the method of conservative myomectomy is preservation of reproductive organ, and also recovery of reproductive function. For decades of use of this method the cases of successful carrying out operation in the presence of several tens myomatous nodules are recorded.

Thus, technical capability of performance of conservative myomectomy exists at most of patients with uterus fibroid, but much also depend on readiness of the surgeon and expediency of carrying out such an operation in modern conditions. When the issue of need of carrying out conservative myomectomy at the women planning pregnancy is resolved it is very important to define accurately the ratio of advantage and risk of surgical intervention. Removal of myomatous nodules, though recovers integrity and functionality of body, is at the same time interfaced to known complications and consequences for reproductive system. The main complication in modern conditions of surgery is adhesive process, which can become the reason for infertility [5, 7]. Attempt of removal of a

large number of lumps can also be inexpedient as a set of stiches on uterus can render on the subsequent realization of reproductive function more negative effect than the removed lumps. Besides, when putting a stich on the bed after removal of myomatous nodule, owing to damage of trophism of tissues, the local site of damage is formed, therefore in the area of the stich fibrin deposits, that further leads to formation of adhesion of parts [3, 5, 6, 8].

Thus, selective deligation of uterine arteries with use of dissolving material during surgery creates optimum conditions for the surgeon, promotes reduction of the extend of intraoperative blood loss, shortening of time of operation and, above all, eliminates some reasons complicating operational technique during operation. At the same time early recovery of blood circulation in the area of the scar on uterus provides its fast healing, and the minimum sealing of the bed prevents formation of rough scars on uterus, therefore, prevents formation of adhesion of parts in the field of the scar.

Conclusions

1. Timely intraoperative deligation of three couples of major vessels of uterus with use of catgut suture to conservative myomectomy promotes decrease in the extend of intra- and postoperative blood loss, temporary stop of blood flow in this course of blood circulation and is an effective prevention of postoperative complications.

2. The offered new technic of sealing the bed of myomatous nodule allows to hold muscular tissue in reposition condition, without ishemization of the stitched and adjacent areas, and the absence of stiches on external surface of uterus reduces the risk of development of adhesive process. The blood flow in uterus vessels after intraoperative deligation of three couples of major vessels gradually recovers from the second day of the postoperative period, the complete recovery of blood flow comes by the 6th days.

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Section 8. Pedagogy

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Use of computers in test control quality of education

Abstract: This article discusses topical issues of improvement of the quality of the training of students of pedagogical universities in the application of computer test control. The problem of the impact of test control of level of mastering expertise. The results of the pedagogical research in order to identify the main problems in the organization and conducting of control testing of quality of is given knowledge.

Keywords: test, information technology, control, quality, assessment of knowledge.

Formulation of the problem. The widespread introduction of information technologies in almost all spheres of human life caused structural, functional and meaningful change in this activity. Therefore modern society confronts the education system a number of tasks related to updating of the content of education, development and introduction of new forms of educational process, educational technology and computer-based learning tools.

In modern conditions of educational process one of the most promising areas of improvement of the educational system is the introduction of control of quality of study using computer technology.

Analysis of recent research and publications. The current control of academic performance of students is based on didactic dimensions. In semantically measurement the result contains aggregate evaluation of students, which is displayed on the scale of the individual teacher. As each teacher has his own scale of assessment, measurement of this kind will always be subjective.

To eliminate subjectivity teaching measurements we can apply group controls when the level of student academic performance is rated by several teachers, and mark is formed by expert way [2]. Moreover, even when expert approach to inspections advances we cannot avoid errors related to the limited number of questions presented to students.

Questions of adaptive testing repeatedly attracted the attention of foreign scientists. This is evidenced by numerous studies and publications of fundamental nature of such authors as J. A. Arter, R. K. Hambleton, J. L. Horn, C. D. Jensen, G. G. Kingsbury, F. M. Lord, J. Millman, L. Nauels, R. J. Owen, K. J. Patience, M. D. Reckase, J. Spray, M. Waters, D. J. Weiss, A. R. Zara and many others.

Computer adaptive testing widely accepted in practice of the field. To a large extent this contributed applied theoretical research of scholars such as C. V. Bunderson, D. K. Yorn, G. G. Kingsbury, J. B. Olsen, H. Wainer, D. J. Weiss, whose works were not only supported by the educational community, but also widely used in the practice of professional selection [4, 4–6].

With the development of tests control of quality of training students, most educational institutions of Ukraine are oriented to a match of knowledge of educational standards. However, the desire of universities to meet state educational standards leads to overestimation of the cost of education [3].

The purpose of the article. Determine appropriateness of test control of educational achievements of students using a personal computer.

Presenting main material. Control of students' knowledge is feedback between teacher and students, the stage of the educational process when a teacher receives information on the effectiveness of the educational process on discipline.

The objectives of the control of knowledge and skills of students primarily concerns teachers and their work while conducting audits. However, the main character in the learning process is the student. The process of learning — acquiring knowledge and skills of students, so everything that happens in the classroom considering control activity should be important to him personally. Monitoring should be seen by students not as something that only teacher needs, but as the stage at which the student can focus on existing of knowledge, to make sure that his knowledge and ability to meet the current requirements of society are and good can be used in practice.

Our study showed that the use of computer-based testing enhances the motivation of students to teaching and learn-

ing saves time as the student to design tests, and a teacher to check the quality of student learning. Test becomes one of the main means of complex assessment of knowledge of students. Practice in higher educational institutions shows that young people with interest refers to the hardware, especially the multimedia capabilities and modeling on the computer screen of various educational processes. All this contributes to the revitalization of the students during the verification of knowledge, development of spatial thinking. Computer in assessing the quality of knowledge is used as an intermediary between teacher and students.

Control should be obligated, because without it the purpose of the learning process defeats, but it must be a clearly defined educational, developmental, professional and individual walling oriented focus.

Test control — a procedure that determine the level of training in a particular field of study. In teaching practice we use mainly following two types of tests: tests of achievements — for shearing of learning, skills in learning, after studying the topic, chapter or the entire academic discipline; intelligence tests — to determine the state of thinking, memory, attention and other characteristics of mental and intellectual development of the student.

However, existing tests have drawbacks: development of tests requires a lot of time and efforts; Developers' presence of high qualifications and experience; Some suggest the possibility of predictive tests.

Analysis of our survey of teachers using questionnaires showed that students prefer tests that have answers and they choose that option, which they believe is the most correct or the only one. These tests use 80% of the department of natural sciences and mathematics, so they require students specific, objective knowledge. When testing students with low level of knowledge of 10% of teachers use alternative test. This simplification tests containing two choices, either in the form of "yes — no" or "right — wrong", but they have the highest level of guessing of the correct answers. In the study of physical and mathematical disciplines their use is not desirable.

To assess the quality of knowledge of students of pedagogical universities of physical and mathematical sciences we applied adapted tests. The basic idea of adaptive testing is that the tests necessary to adapt to the level of readiness of students of a certain group. Students with low knowledge is useless to give challenges, as is likely possible to assert that they fail to answer them right. Just do not look in vain challenges in testing students with a high level of expertise. Obviously, the use of too easy test can lead to problems that all or nearly all students receive about the same high scores and hence measurement will not happen because of inconsistencies task complexity level of training of students who are tested.

Equally important issues are unique challenges for each student, resulting in minimized the possibility of prompts, learning of correct answers, etc. When the student pass the test, a second time he has to perform new tasks, which reduces the impact effect of fitness. Bank task contains 400–500 ques-

tions relating to different levels of complexity. Number of answers for most questions expanded to 5–6, which reduces the impact effect of guessing the results of testing.

Possible options for compiling tests considered in the literature [1; 5].

The complexity, diversity and the specific subjects of basic training of future professionals requires students not only knowledge of factual material, but also a certain level of intelligence. Unfortunately, only 5% of the department of natural sciences and mathematics in their work using a test of intelligence. Their use is especially important in the formation of personal professional development vector of student, organizations and independent work. These tests take into account the state of student thinking, memory, attention, integration of individual mental processes that is both characteristic of the individual student.

The study of subjects of natural mathematical training required to perform an action sequence. This applies particularly to solving problems in physics and mathematics. So to test the readiness of students to the basic stage studies should use tests that require streamlining operations in strict accordance with the algorithm.

In the study of fundamental training disciplines we offer four levels of tests. Tests of 1st level define basic level of knowledge of students before the start of the study of the section of subjects. Tests of second-level tasks control output level of knowledge that students have acquired after studying a certain topic or chapter. Third-level tests designed for quality control of theoretical knowledge on a particular subject. The fourth level test determines the ability of students to apply the acquired theoretical knowledge in professional work, life, to explain the processes occurring in nature, environmental problems.

Study of test control would not be complete if it was not studied students' opinion about its quality. Students of II–III year of study of pedagogical universities offered courses questionnaire, which objective was — detection ratio of students to test control of quality of knowledge. According to the survey results revealed that more than 90% of students prefer control over other test methods (solving problems, oral examination). A more objective assessment of the test results find 68% of respondents, 77% of students prefer writing over computer testing, citing the fact that it is possible to correct answer.

Analysis of sample social survey of university professors and school teachers, about their attitude to test of quality of knowledge gave the following results: 72% of respondents believe the best method of testing knowledge assessment; 28% — have a negative attitude to computer testing; 80% — prefer computer-based testing as a more progressive; 20% — preferred a written test; 90% — believe that the tests used to better generalization and systematization of knowledge, to consolidate the large volume of material in the discipline; 10% — consider it appropriate to use for the current questioning; 60% — recommend the use of test control of knowledge and skills of students, regardless of the level of training provid-

ed developed multi-level tasks; 98% — believe that computer testing is just one of the components of the overall assessment.

The majority of teachers think that computer test control is one of the best methods of control and is not desirable to give preference to one of the methods. It is necessary to use different methods of assessment — oral and written responses. All these methods create an atmosphere of constant, systematic, hard work students.

Areas for further research. Testing should not be seen as an absolute, universal method of control and therefore it does

not displace traditional controls learning, especially those that help you to check creative approaches to solving professional problems. formulate and express their own opinion. The use of computer technology in test of quality of knowledge significantly expands its capabilities.

To improve the effectiveness of training by means of computer control of quality of training development require further tests that allow students to check logic reasoning, creativity of students, their abilities to apply the acquired theoretical knowledge in the profession.

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Section 9. Psychology

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Features of display emotional deprivation in interpersonal relations at children of preschool age

Abstract: Article is devoted to the content of deprivation. The emergence of deprivation considered in psychological research. And also article about results of the scientifically research influence emotional deprivation to development of child under school age as subject of the social relations.

Keywords: Preschool age, psychical development, personality qualities of child, sense of satisfaction, emotional deprivation, to maternal love, interpersonality relations, loss, privation, mental condition

Preschool age is a peculiar stage in individual maturity of children. At this age it is possible to watch how intellectual, moral and individual qualities of a child develop. Particularly at this age changes come in different areas, beginning from developing mental, psychological functions, to difficult personal new changes. Also main changes in developing child of preschool age, define with such traits as realization of their personal qualities, abilities, success and failures realization of himself.

Especially, sufficient communication with adults a rich interpersonal climate, possibility of active locomotion, emotional stability is main factor of valuable and healthy formation of child's individuality. These factors lead to demonstration unfulfillment requirements inherent individual of child that is to deprivation. It extends influence to development psyche of child and leads to irreversible negative influence by its swiftness and duration. It leads to stagnation in his intellectual and mental development. In the future will help to complicate the social climate and establish relations with surroundings.

In studying emotional positions of children of preschool age the role of projective methods is very important. Par-

ticularly in the aim of diagnostics emotional deprivation of children of preschool age, we conducted a projective method "House, Tree, Man" in our research work.

This studying individual projective method suggested J. Bak in 1948. Test is intended to study adults, children and groups. This method will allow to study development individual, its sensitization (providing development psycho, harmonization of sensory lines and processes) flexibility, efficiency, generally it is possible to know its relation with surroundings, with specific faces.

For the purpose of learning influence of emotional deprivation in interpersonal relations of children of preschool age we used method "House, Tree, Man" in two forms. First of all from the finding out interpersonal relations of factors as defenseless, alarm, hostility and difficulty in communication, we had explained how they are exposed in children.

And during the second direction of method "House, Tree, Man" we explained the relation ourselves in development of child of preschool age. In our research work took part children of the age 5–7 from "Children's home", and "Children's town SOS" and preschool educational establishment".

Table 1. — Emotional deprivation and system of features of interpersonal relation at children

House Tree Man		N	X	y	m	t	p
Defenseless	Nursery	76	1,97	1,35	0,15	4,49	0,001
	Children's home	38	3,44	2,12	0,34	0,98	0,001
	SOS	38	3,18	,833	0,13		
Alarm	Nursery	76	2,19	1,37	0,15	3,26	0,001
	Children's home	38	3,42	2,63	0,42	0,63	0,001
	SOS	38	3,73	1,58	0,25		
Hostility	Nursery	76	1,89	1,39	0,15	2,63	0,01
	Children's home	38	2,94	2,88	0,46	1,38	0,17
	SOS	38	2,68	1,57	0,25		
Difficulty in communication	Nursery	76	2,27	1,07	0,12	1,67	0,096
	Children's home	38	2,84	2,52	0,40	1,87	0,065
	SOS	38	3,81	1,97	0,31		

At the first stage of our research work there have done experimental comparisons of mental peculiarities and states of children of preschool educational establishment, children's home and children's town SOS. By results of experiment there were found out significant differences by many directions between two groups of children. Including from factors affecting interpersonal relations feeling of defenseless in children from children's homes and preschool educational establishments were discovered significant differences ($t=4,49$; $p=0,01$). But among the children of children's home and children's town SOS it was exposed reverse connection ($t=-1,98$; $p=0,01$) by indicator of feeling of defenseless.

By the results of comparison scales of alarm among the probationers of children's home and preschool educational establishment there are considerable differences ($t=-3,26$; $p=3,26$) too. It is explained that these indicators are not so obvious among the pupils of children's home and children's town SOS ($t=,632$; $p=,000$). The main reason of this is that children bringing up in the children's homes cannot satisfy their requirements. These children cannot always get what they want in time. As a result of un satisfactions in personality of child deprivation is displayed. As Langmeyer & Mateychik (1984) approve the main traditional requirement of man is always active relation with new climate. As a result of conducted experiment in tested groups comparison of hostility and conflictness demonstrated that there are significant differences among the pupils of children's home and preschool educational establishment. And among the indicators of pupils of children's town SOS and children's home differences are deposit itself specific. In accordance with this these indicators are comparatively higher at pupils of children's town. By this reason the famous psychologist Maslou [8]. put forward the next example: two children

an ice-cream, but they didn't have opportunity. The first boy having heard mother's negative answer felt only that he will not eat ice-cream, and the second boy felt that his requirements do not dispose. The ice-cream is as symbol of mother's love for him, it is mentally valuably.

And so at first circumstance deprivation will not menace individual of child and not bring to serious consequences. If the objection applies by relation to love from child, then this deprivation will accept and examine from frustration.

If the deprivation accepts as single-minded subject symbol of love, respect honour or another supporting need it may bring to serious conquence for child's individual. The situation of the deprivation at children feeling parent's love and care regularly, feeling support to environment relatively may go very easy. The do not accept supporting requirements as a barrier.

Another mental uniqueness of children of preschool age is difficulties in communications, comparing results of method difficulties in communication it can be said that educability children in preschool educational establishment and children from children's home do not have significant differences ($t=1,67$; $p=,096$). At the same time you can see that differences are significant ($t=1,67$; $p=,065$) among the children living in the children's town SOS and educabilities in children's home.

Comparatively child becomes weak decadent, not interested in communication with people instable climate and without emotional participation durable similar climate suits him. He resists when he is wanted to change, when he is required something or he will taken away a toy.

In our research work we had tried to find out correlation depends of deprivation an interpersonal relations and results of cardinal analyzes are allowed in the table.

Table 2. – Features of deprivation and interpersonal relations of the children preschool age

Qualities	Defenseless	Alarm	Hostility	Difficulties in communication	Method fingers
Defenseless	1	0,268**	0,324**	0,247**	-,342**
Alarm		1	0,159	0,283**	-,166*
Hostility			1	0,257**	-,211**
Difficulties in communication				1	-,152
Method fingers					1

Results of the table shows significant depends between the defenseless and hostility. ($r=,268$; $p<0,01$). As far as hostility is high a child feels himself much defenseless. If the child does not get emotional communication in valuable extent, he does not get sufficient love from his parents or adults. And he will have the feeling of defenseless. As far as the child feels himself defenseless, he loses the trust of effect of defenseless.

Besides it is found out that positive significant connection between defenseless and hostility ($r=0,324$; $p<0,01$). If the child's feeling of hostility increases, the defenseless of him is increased. The additional negative factor of hostility of him, on this communication with fellows there is appeared conflicts.

From the results held methods we can see that there is positive connection between difficulty in communication and defenseless ($r=0,247$; $p<0,01$). Feeling of defenseless becomes a reason of increasing difficulty in communication of children on preschool age. The main reason as far as child feels himself defenseless so he will have difficulties on communication. This situation is observed on children trained children's home and children trained in children's town SOS. Also in process of communication an advantage of hostility is brightly expressed ($r=0,257$; $p<0,01$).

If there are difficulties in communication of preschool age children there may be appeared the feeling of defenseless, anxiety, dissatisfaction on him, conflict depression. In

researches of Lyasko & Gromova [3] it is said that maternal deprivation leads to early orational dysfunction of child. On children, trained in institutions process of mental development happens weakly as the result of lack the emotional communication.

As a result feeling of inconsistent situations there is appeared so child will have negative feelings.

Lack of attention by adults, lack of weak communication and promotions. As a result child suffers from interpersonal relations. According to the dates of Guryeva [2] defined social deprivation appears from the result of lack of connection with surrounding world on the child mind. At the same time it leads to discord the social adaptation and may bring depression, hard neurosis, and psychogenic psychoses.

From the results of method of preschool educational establishment we can see that the children with problems in communication have high dissatisfaction on themselves, main reason — child cannot behave himself freely. In Shelova's [9] point of view if child is in position of sensory isolation, then his development stops sharply and all mental development slow down, movements develop in time, speech does not develop, retardations are watched in intellectual developing.

There is negative connection between defenseless and thin motility ($r=-0,342$; $p<0,01$). It means that as far as thin motility well developed, so his feeling of child's defenseless is low, that is child feels himself protected. Low developed thin motility means sensory deprivation. In order to prevent appearance of sensory deprivation we must pay attention to our children more, in order to develop their cognitive processes we must play with them different objective, plot-role games, show them our love, praise them for little wins.

There is negative connection between hostility and development ($r=0,-,166$; $p<0,05$). As far as child's thin motility developed well, hostility is slow at him. When

children perform which exercise connected with thin motility and do it well they feel passive hostility.

There is founded out that there is also reverse significant connection between thin motility and hostility ($r= - 0,211$; $p<0.01$). As the result of undeveloped thin motility the hostility is getting strong, it manifests in communication with fellows and game activity. So in majority cases between developing thin motility and interpersonal relations negative correlation is manifesting at child. So, social mental state in interpersonal relations is one of the factors of manifesting deprivation in individual of child.

Summary. By the results of studied materials and organized experiments we can make following conclusions:

- at preschool age appeared the emotional deprivation may be connected with their individually features.

- children at preschool age manifesting the emotional deprivation may be connected with feature of educational establishment and social origin.

- children at preschool age emotional deprivation may influence at system of interpersonal relations.

- children at preschool age dissatisfaction with system of interpersonal relations may influence to formation of personal qualities and to discord of emotional spheres.

- feeling of defenseless in personality of child may bring fear and distrust surrounding him people.

- excess the feeling of anxiety may prevent to developing humans' qualities and features in personality of child.

- communication is the most important factor in the system of interpersonal relations, it helps to develop personality.

So, difficult and different relations of child with fellows are formed. In this system of relations in a certain extent his personal qualities are formed.

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Section 10. Regional studies and socio-economic geography

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Energy-environmental limits of existence of the regions under the effect of emergency situations of different origin

Abstract: The article presents methodical tools of calculation of energy-environmental limits of existence of the regions under the effect of emergency situations of different origin. The quantitative values of capacity load of emergency situations on the biosphere of the region are established.

Keywords: emergency situations of different origin, energy-environmental limits of existence of the regions.

Introduction. Today, there is no place on the Earth, within any region, where there are no natural, man-induced and biological-social disasters. Herewith, there isn't a unified method of definition of consequences of emergency situations (ES); all calculations are related to monetary estimate of ES consequences expressed in currency units that are subject to inflation. Moreover, it is difficult to compare ES of different origin. To solve this problem, methodical tools of estimation of limits of existence of the regions under the effect of emergency situations of different origin are proposed.

The task of the work is to estimate the consequences of ES of different origin in one measurement unit (capacity) and determine energy-environmental limits of existence of the regions under the effect of emergency situations of different origin.

Method. All phenomena and processes on our planet, in any region of the world, are of stream-oriented nature in space-time. This determines that all processes and phenomena can be expressed in the stream-oriented nature, in the flow of energy or in capacity [1].

In the context of the above-stated, energy-environmental approach involves the estimation of all processes in any region of the world in measurable values, i.e. units of capacity.

Consequently, there is a way of conversion of monetary units into capacity units. B.E. Bolshakov [1] proposed an equation to convert monetary masses into capacity:

$$P_R = \frac{P_{Watt}}{P_{Money}} \quad (1)$$

P_R – capacity of currency, W/ruble;

P_{Watt} – gross regional product expressed in the capacity units, Watt;

P_{Money} – gross regional product expressed in monetary units, rubles.

The author proposes the following equation to convert damage from ES of different origin to capacity units:

$$P_{ES} = \frac{D_{ES}}{P_R} \quad (2)$$

P_{ES} – ES capacity expressed in capacity units, kW;

D_{ES} – material damage from ES expressed in rubles, ruble;

P_R – capacity of currency, W/ruble.

Accordingly, watts are then easily converted into kilowatts and megawatts. Herewith, in production practice, ES of different origin is usually defined as a combined effect of natural and man-induced character. Consequently, the equation of the definition of capacity of ES of combined nature (natural and man-induced ES) will look as follows. Let's call it full capacity:

$$N_{ES} = N_{ESnat.} + N_{ESman.} \quad (3)$$

N_{ES} – full ES capacity expressed in the capacity units, kW;

$N_{ESnat.}$ – capacity of ES of natural character, kW;

$N_{ESman.}$ – capacity of ES of man-induced character, kW.

Developing the methodical basics of energy-related estimation of consequences of ES of different origin, the author proposed the following possibilities of ES capacity estimation:

$$C_{ES} = N_{es}/S, \quad (4)$$

where C_{ES} – coefficient of capacity load of ES or *density of ES capacity*;

N_{es} – full capacity of ES;

S – area of the region.

Different origin of ES is mainly determined by the manifestation of ES of natural and man-induced character. Consequently, general coefficient of capacity load of ES will look as follows:

$$C_{genES} = C_{esman.} + C_{esnat.}, \quad (5)$$

where C_{genES} – density of ES capacity;

$C_{esman.}$ – density of man-induced ES capacity;

$C_{esnat.}$ – density of natural ES capacity.

To define energy-environmental limits of existence of the regions, including under the effect of emergency situation of different origin, a special parameter «*density of full capacity*» or anthropogenic load expressed in the capacity units is used. The density of full capacity is determined by the ratio of annual total energy consumption (N) to the area of the region (S) with a measurement unit – kilowatt/square meter [2]. Another important indicator for the presented method is *biosphere instability*, the ratio of density of full capacity (anthropogenic load) to A.P. Fedotov constant [3], the mean value of which is 15-70 kW/km².

Taking into account the density of ES capacity, the equation of calculation of biosphere instability will look as follows:

$$N_{\text{biosph}} = P + C_{\text{ES}}/C_{\text{F}}, \quad (6)$$

where N_{biosph} – biosphere instability;

P – density of full capacity or anthropogenic load;

C_{ES} – density of ES capacity or coefficient of capacity load of ES;

C_{F} – Fedotov constant (15-70 kW/km²).

To define the limits of existence of the regions considering the effect of ES capacity, we took into account the following values of capacity load on the biosphere of the region:

1) up to 15 kW/km² – load within norms; 2) from 15 to 70 kW/km² – permissible load; 3) from 70 to 125 kW/km² – significant load; 4) over 125 kW/km² – environmental catastrophe.

Conclusion. A technical result of the presented method is the availability of criteria for the estimation of the limits of existence of regions taking into account the effect of ES capacity, simplicity of calculation, prognostic element of ES consequences and preservation of the region's sustainable development.

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Section 11. Technical sciences

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The analysis of base characteristics and inaccuracies of electromagnetic transducers current to voltage with flat measuring windings

Abstract: article is devoted analysis of base characteristics and inaccuracies of electromagnetic transducers current to voltage with flat measuring windings.

Keywords: current, voltage, electromagnetic transducers, flat measure winding.

At management of continuous processes of manufacture, transfer, distribution and consumption of electric energy accuracy of elements and control system devices as errors in management conduct to a considerable economic damage have great value. Basic elements of measuring and operating systems in electric power industry are primary converters of a current in which quality current transformers are usually used.

Classical single-phase transformers of a current have a difficult converting part, the big indicators of weight and a dimension, are labor-consuming at designing and operation in control systems; do not provide unification of target size at teamwork with modern techniques of processing of the information. They do not consider interference of magnetic streams and the fields created by currents of a three-phase electric network of power supply systems.

The specified circumstances cause necessity of working out and introduction of the reliable, unified, exact electromagnetic converters of a current in voltage, the currents of a three-phase electric network differing from each other both on size considering asymmetry, and on a phase.

In [1; 2; 3] new designs of electromagnetic converters of a current in voltage with flat measuring windings (FMW) primary one-and a three-phase current in secondary voltage with the expanded functionality and the unified target sizes are offered. They consider asymmetry of a three-phase current and allow creating on their basis of system of high accuracy

for the combined management of reactive power of energy systems.

Formulas for building of the steady-state features for secondary voltages of the phases A, B and C three-phase electric network [2; 3]:

$$U_A = 4,44 f W F_{\max A} e^{-\frac{R_{II} t}{L_I}} \pm F_{rem A} e^{-\frac{R_{II} t}{L_I}}$$

$$U_B = 4,44 f W F_{\max B} e^{-\frac{R_{III} t}{L_{II}}} \pm F_{rem B} e^{-\frac{R_{III} t}{L_{II}}},$$

$$U_C = 4,44 f W F_{\max C} e^{-\frac{R_{III} t}{L_{III}}} \pm F_{rem C} e^{-\frac{R_{III} t}{L_{III}}}.$$

The graphs of the steady-state features of the electromagnetic transducers of the current to voltage for one phase are presented on fig. 1–4:

As can be seen from fig.1 and 2, when increase the air clearance Δ , sharply decreases the value of the output voltage U . The best values U are provided at value Δ equal 0,002–0,003 m and count whorl W_{FMW} equal 3–4 (fig. 3). Increase the number whorl of the electromagnetic transducers of the current to voltage promotes more fluent change the value U , change area sections of FMW provides linear change the output value U (fig. 4).

The results of the research of the influence of the temperature surrounding ambiances of current transformer on value U of the electromagnetic transducers of the current to voltage with FMW are presented on fig. 5.

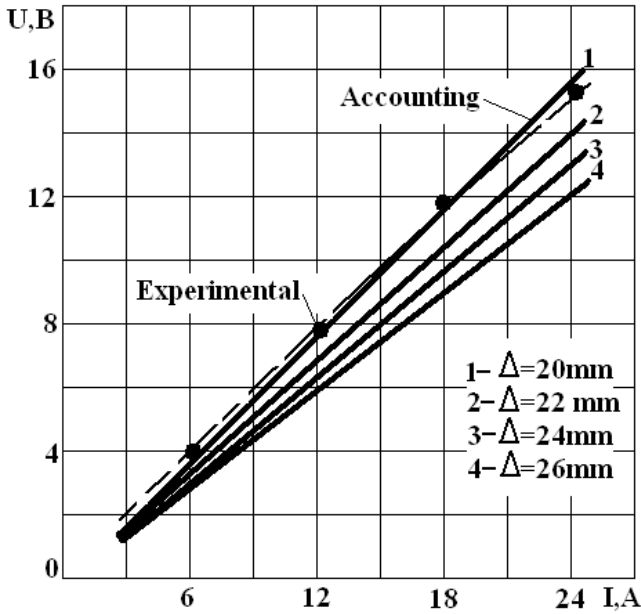


Fig. 1. The steady-state features of output voltage U under different FMW under importances of the air clearance Δ

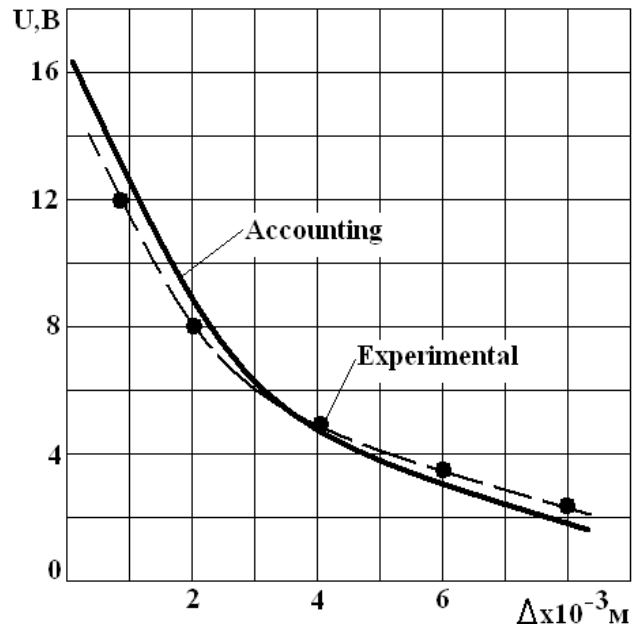


Fig. 2. Dependency of the output voltage U with different importances

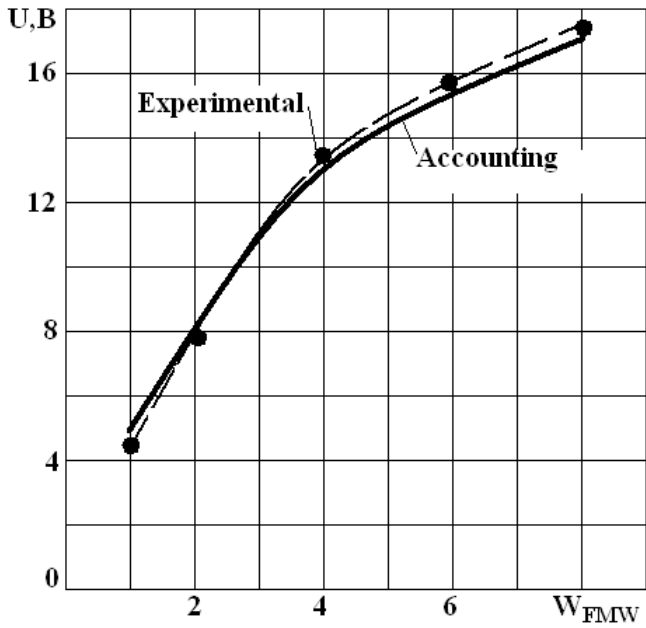


Fig. 3. Dependency of the output voltage U under different importances of the number whorl — W_{FMW}

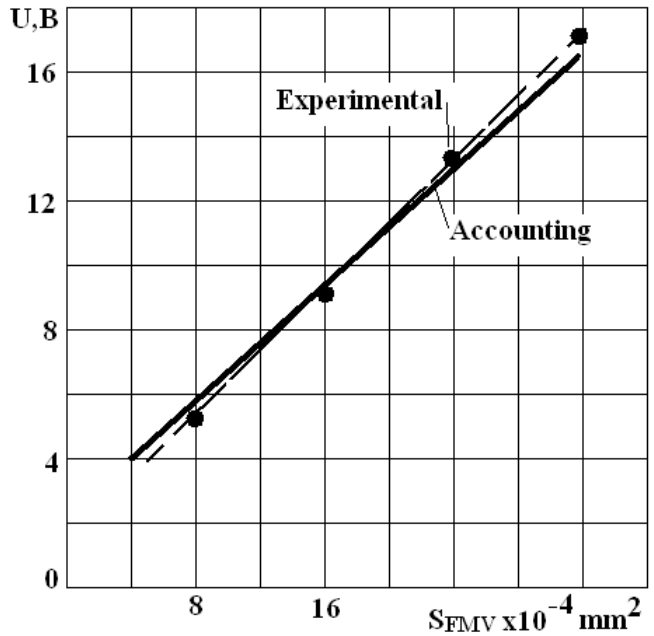


Fig. 4. Dependency of the output voltage U under different importances area sections

What have shown the results of the research, total reliability of the design of electromagnetic transducers of the current to voltage with FMW forms: $R = R_{cat} * R_{par} = 0,98 * 0,98 = 0,96$, where: R_{cat} — catastrophic reliability, R_{par} — parametric reliability fully corresponds to the requirements of combined auto control systems of source of reactive power of energy systems.

For the electromagnetic transducers of the current to voltage with FMW total errors is defined based on four-square inaccuracy windings excitement, magnetite, FMW and measuring scheme: $\delta_{prim.win} = 0,02$; $\delta_m = 0,01$; $\delta_{fmw} = 0,01$; $\delta_{source} = 0,05$.

The entropy importance of inaccuracy for the electromagnetic transducers of the current to voltage with FMW is defined on formula for $\delta_{trans} = k_e * \delta_{\Sigma}$, where: δ_{Σ} — total importance of inaccuracy of the electromagnetic transducers of the current to voltage with FMW, equal 0,11; k_e — entropy factors, having different importance under different law of the distribution (for normal law of the distribution of inaccuracy $k_e = 2,07$). The calculation is installed that entropy inaccuracy of the electromagnetic transducers of the current to voltage with FMW forms $\delta_{trans} = 0,11$. The experimental dates of evidence $\delta_{exp} = 0,21$.

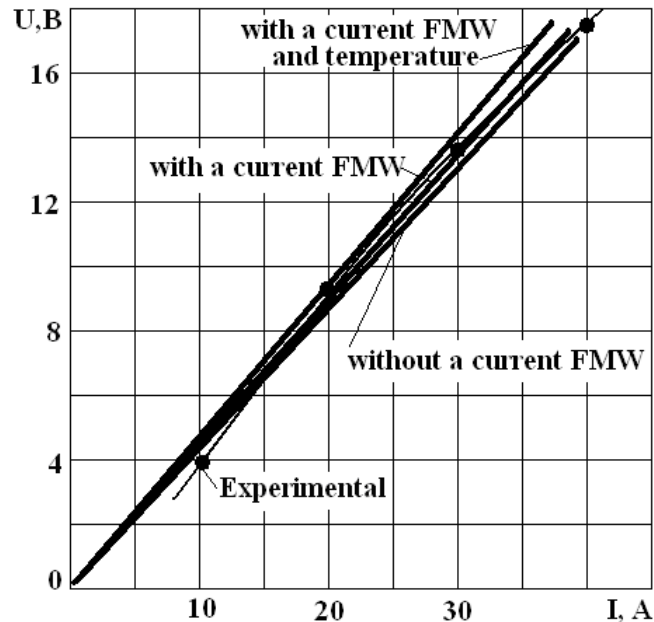


Fig. 5. Research of the sources of inaccuracy output voltage U

Conclusions

1. For the investigated converter of a current in voltage with FMW best values out voltages U are provided at value of the air clearance — $\Delta=0,002-0,003$ m and numbers whorl FMW — $W_{FMW} = 3-4$.

2. When change a temperature surrounding ambiances, inaccuracy of the transformation increases $0,03\%$, wrong fabrication from FMW — $0,07\%$. Accounting entropy inaccuracy of the transducers of the current to voltage does not exceed $0,2\%$, but experimental importance of inaccuracy electromagnetic transducer of the current to voltage with FMW forms $0,21\%$.

3. Application of the investigated converter for automatic control of reactive power in electric networks allows raising service life of electric equipment at the expense of rated voltage.

4. At introduction of converters at 20 enterprises of Republic Uzbekistan at the expense of increase of accuracy of management by reactive power of loss of the electric power have decreased for 15% that corresponds to economy of 1,7 billion sum (370 000 \$)

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Classification of facilities multi parameters experimental measurements of their parameters

Abstract: The problem of classification of objects that are described by many parameters. Evaluated the potential use of the entropy transformations for this task, as well as application of the combined test of nonparametric statistics Bush Wind, to identify objects belonging to the same class.

Keywords: sample measurements, nonparametric statistics, the criterion, entropy conversion.

In the manufacture and release of the first batch of products the problem arises of evaluating the technology of their production through the identification of products whose parameters do not meet the requirements of their tasks and scale. We consider this problem on an example of three-parameter classification of objects. Assume that the requirements set for them. This expectation a_1, a_2, a_3 , scale parameters D_1, D_2, D_3 and correlation coefficients r_{12}, r_{23}, r_{13} . Information about them is contained in the measurements x_1, x_2, x_3 . Statistical connections and differences between them are in the conditional distribution laws $W\left(\frac{x_2}{x_1}\right)$, $W\left(\frac{x_3}{x_2}\right)$ and $W\left(\frac{x_1}{x_3}\right)$. Assuming a normal distribution laws, we examine sample measurements of their entropic transformations of the form $L(x_1, x_2, x_3) = -\ln\left[W\left(\frac{x_2}{x_1}\right)W\left(\frac{x_3}{x_2}\right)W\left(\frac{x_1}{x_3}\right)\right]$. Conditional entropy transformations will be equal to

$$L\left(\frac{x_i}{x_j}\right) = \frac{1}{2} \ln\left[D_i(1-r_{ij}^2)\right] + \frac{\left[\frac{x_i - a_i}{\sqrt{D_i}} - r_{ij} \left(\frac{x_j - a_j}{\sqrt{D_j}}\right)\right]^2}{2(1-r_{ij}^2)}.$$

If you know the sample measurements of parameters M of objects, the way they get one-dimensional transformation entropy M samples $L_m(k) = L\left[x_1\left(\frac{k}{m}\right)x_2\left(\frac{k}{m}\right)x_3\left(\frac{k}{m}\right)\right]$, $m = 1, 2, \dots, M$, $k = 1, 2, \dots, n$, as the sum of the three conditional

$$\text{entropy transformations } L_m(k) = \sum_{i=1}^3 \sum_{j \neq i}^3 L\left[\frac{x_i\left(\frac{k}{m}\right)}{x_j\left(\frac{k}{m}\right)}\right].$$

These M samples are unclassified. To solve this problem we use the statistical criterion proximity Bush Wind, to select objects whose parameters match the specified requirements. As a reference, take the sample $L_1(k)$ and compare it with samples $L_j(k)$, $j = 2, 3, \dots, N$, calculating $M-1$ indicators Bush Wind. They are random variables and sample sizes $n \geq 30$ is described by the chi-square distribution with four degrees of freedom, if the location and scale compared samples are identical. In this case, with a probability of 0.95, the inequality $W \leq 9,5$ [1]. Thus of the N objects can be identified anomalous class and use this knowledge in tasks of inspection control objects.

The Bush Wind test is used to test the hypothesis of equality of expectations and variances of two samples

measurements with unknown statistical laws and is a combination of unique test van der Waerden and criterion Klotz. First, each pair of samples $L_1(k)$ and $L_j(k)$ combined into one streamlined sample $\xi_1 > \xi_2 > \dots > \xi_{2n-1} > \xi_{2n}$ and determines the rank transformations $L_m(k)$ $R[L_m(k)] = \sum_{i=1}^{2n} (L_m(k) - \xi_i) = R_m(k)$, and a rank value $R_m(k)$ calculated indicators proximity and scale of the formulas

$$S_m = \sqrt{2\left(2 - \frac{1}{n}\right) \frac{\sum_{k=1}^n \Psi\left[\frac{R_m(k)}{2n+1}\right]}{\sqrt{\sum_{i=1}^{2n} \Psi^2\left[\frac{i}{n+1}\right]}}},$$

$$T_m = \sqrt{2\left(2 - \frac{1}{n}\right) \frac{\sum_{k=1}^n \Psi^2\left(\frac{R_m(k)}{2n+1}\right) - \frac{1}{2} \sum_{k=1}^{2n} \Psi^2\left(\frac{k}{2n+1}\right)}{\sqrt{\sum_{k=1}^{2n} \Psi^4\left(\frac{k}{2n+1}\right)}}},$$

here — $\Psi(z)$ function of the inverse Gaussian probability integral, for which you can apply an approximation of the form $\Psi(z) = 4,91(z^{0,14} - (1-z)^{0,14})$.

Bush Wind test is a combination of criteria S_m and T_m type $W(m) = -2 \ln\left[2\left(1 - \Phi^*\left(|S_m|\right)\right) - 2 \ln\left[2\left(1 - \Phi^*\left(|T_m|\right)\right)\right]\right]$, here $\Phi^*(z) = 1 - 0,852 \exp\left[-\left(\frac{z+1,5774}{2,0637}\right)^{2,34}\right]$, $z \geq 0$, $\Phi^*(-z) = 1 - \Phi^*(z)$.

The threshold values in the tables are the criterion of mathematical statistics [2, 512].

Using the sequence of tests $W(m)$ distinguish it from those who belong to the first class $R^*\left(\frac{m}{1}\right) = \text{sgn}(W_0 - W(m))$.

Obviously, their relative numbers can serve as an estimate of the production technology objects $P_{11}^* = \frac{1}{M} \sum_{m=1}^M \text{sgn}(W_0 - W(m))$.

We investigate the effectiveness of entropy method using three generators normal random variables with zero mean and unit variance $\xi_1(k), \xi_2(k), \xi_3(k)$, for the sampling of random variables are mutually correlated facilities 1st class conditional distribution laws and parameters $a_{11}, a_{12}, a_{13}; D_{11}, D_{12}, D_{13}; r_{12}, r_{23}, r_{13}$.

$$x_1\left(\frac{k}{x_3}\right) = a_{11} + \sqrt{D_{11}}\left(r_{13}\xi_3(k) + \sqrt{1-r_{13}^2}\xi_1(k)\right),$$

$$x_2 \left(\frac{k}{x_1} \right) = a_{12} + \sqrt{D_{12}} \left(r_{12} \xi_1(k) + \sqrt{1-r_{12}^2} \xi_2(k) \right),$$

$$x_3 \left(\frac{k}{x_2} \right) = a_{13} + \sqrt{D_{13}} \left(r_{32} \xi_2(k) + \sqrt{1-r_{32}^2} \xi_3(k) \right).$$

Using these expressions for M the control objects define their one-dimensional sample entropy transformations $L_m(k) = L_m \left(x_1(k) / x_3 \right) + L_m \left(x_2(k) / x_1 \right) + L_m \left(x_3(k) / x_2 \right)$, here

$$m = 1, 2, \dots, M, k = 1, 2, \dots, n.$$

Assuming that the first reference sample, we calculate the criterion of the Bush-Wind for $W_1 \left(\frac{m}{n} \right)$ three dimensions $n = 10, 25, 50$ and construct a histogram ($M = 1000$), as well as evaluate their expectations and variances. Data for the experiments shown in Table 1.

Table 1

a_{11}	a_{12}	a_{13}	D_{11}	D_{12}	D_{13}	r_{12}	r_{13}	r_{23}
3	4	5	0,5	1	1,5	0,6	0,7	0,8

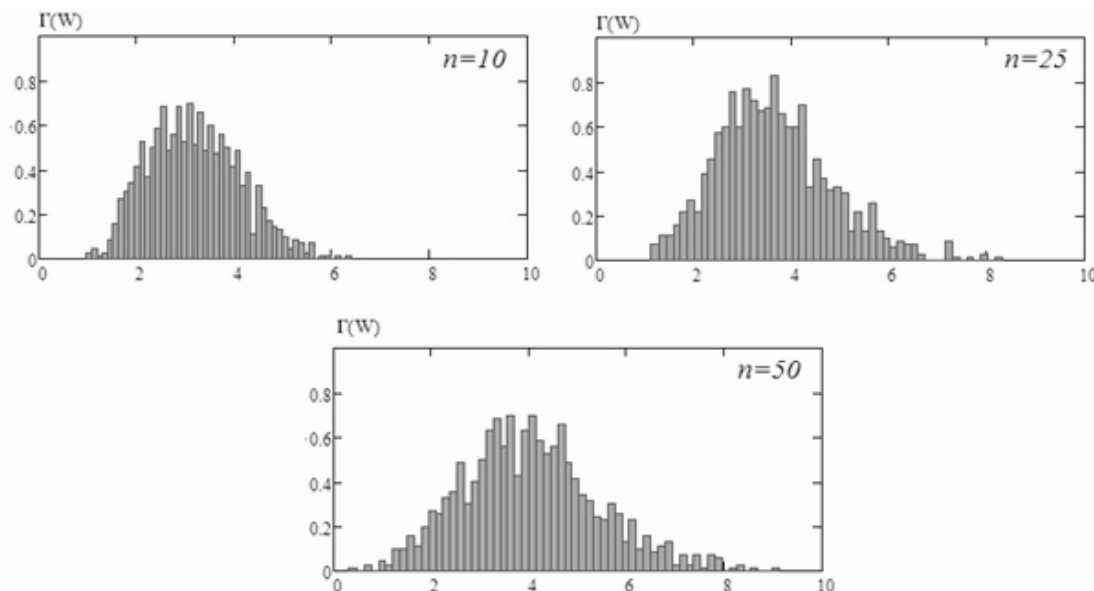


Figure 1. — Histogram indicator Bush Wind entropy of transformations

The threshold values W_0 for these samples are equal lengths of 8.65; 9.09 and 9.5. We define the number of criteria $W_1 \left(\frac{m}{n} \right) < W_0$. The ratio $\frac{M_i}{M}$ is an estimate of the probability of making the right decisions classification: $P_1^* = \frac{M_1}{(M-1)}$, $P_2^* = \frac{M_2}{(M-1)}$, $P_3^* = \frac{M_3}{(M-1)}$.

The experimental results are presented in Table 2.

Table 2

n	10	25	50
P^*	0,637	0,982	0,993
\bar{W}	3,552	5,435	8,863
$\sqrt{D_w}$	0,684	1,071	1,427

Statistics indicator Bush Wind consistent with the

theoretical calculation of the authors, that is subject to the probability distribution chi-square with four degrees of freedom, with $n > 30$. Object recognition as belonging to class 1, increases with an increase in sample size measurements

Suppose that the known parameters of the objects of the 2nd class, differing from those of the 1st class $a_{21}, a_{22}, a_{23}; D_{21}, D_{22}, D_{23}; r_{12}, r_{23}, r_{13}$. We form M the entropy of samples conversion to various embodiments of the changed parameters and spend the factor analysis of their impact on statistical regularities criterion W . Wind. The effect on the efficiency of the labeling only shifts and only the scale only correlation coefficients, as well as various combinations thereof. Table 3 shows the results of numerical experiments. They contain indicators of the probability of recognition of objects Class 2 as objects belonging to the first class, as well as statistics indicator Bush Wind.

Table 3

	$a_{21} = 3 a_{22} = 4 a_{23} = 5 D_{21} = 1 D_{22} = 2 D_{23} = 3 r_{12} = 0.6 r_{23} = 0.7 r_{13} = 0.8$			$a_{21} = 3 a_{22} = 4 a_{23} = 5 D_{21} = 0.5 D_{22} = 1 D_{23} = 1.5 r_{12} = 0 r_{27} = 0 r_{13} = 0$			$a_{21} = 4 a_{22} = 5 a_{23} = 6 D_{21} = 1 D_{22} = 2 D_{23} = 3 r_{12} = 0.7 r_{27} = 0.8 r_{13} = 0.9$		
n	10	25	50	10	25	50	10	25	50
P^*	0,95	0,64	0,05	0,99	0,61	0,04	0,99	0,98	0,9
\bar{W}	5,54	8,08	13,9	6,47	8,31	14,2	3,31	4,13	6,01
$\sqrt{D_w}$	1,816	2,633	2,902	1,039	2,624	3,111	1,274	2,133	2,471

According to the results in Table 3 histogram (Figure 2) indicator Bush Wind samples for different lengths of the original

data in the case where objects of class 2 are different from the objects of class 1 and expectation and variance and correlation.

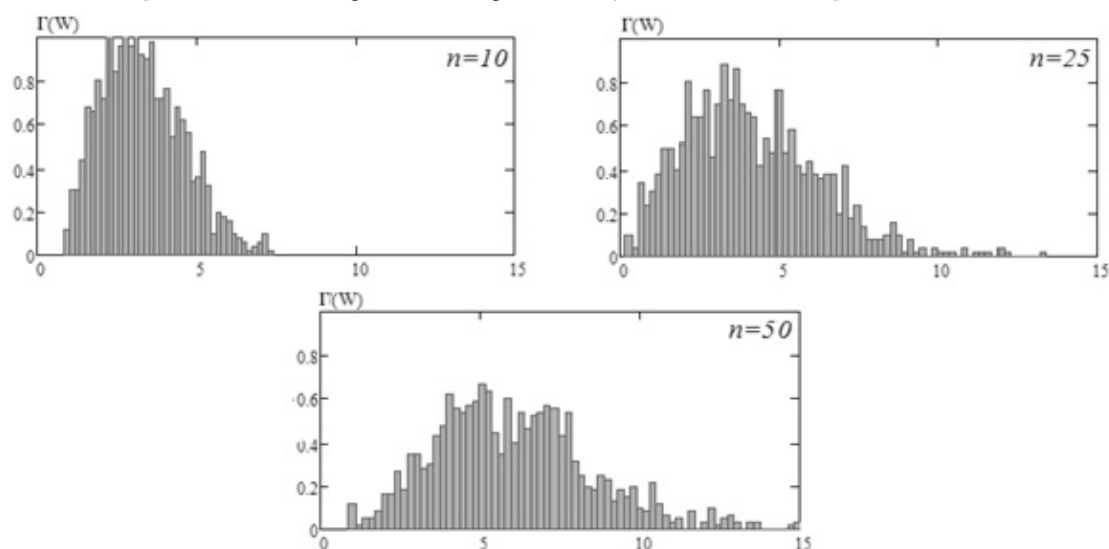


Figure 2. — Histogram indicator Bush Wind entropy of transformations with the recognition of objects of class 2, as objects of class 1.

From the analysis of Table 3 and Figure 2 it is clear that any change in the parameters initial values entails a change in the statistics of entropy change and performance criterion W . Wind. With increasing shift only increases the expectation index Bush Wind, an increase in the dispersion increases as the expectation. With the destruction of the correlation expectation index Bush Wind increases 3 times, and also increases the scale. In the event that changed all the statistics of the input data object recognition occurs with greater accuracy.

Assessing the impact of the volume of raw data on the probability of recognition of objects by class. We studied a sample volume $n = 10, 25, 50$. It was found that at low volumes measurements significantly worsens probability detection measurements of different classes Even if the total difference of all the statistical parameters of $n = 10$ of input data when probability making a wrong decision about 0.9. Therefore, entropy conversion are useful for the classification of objects with large volumes of measurement.

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Section 12. Transport

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Analysis of shunt power track circuit without insulating joints

Abstract: This article describes how to the withdrawal the analytical expressions for determining the maximum value and critical space shunt power track circuits without isolating joints.

Keywords: limiting resistance, the modulus and the argument, the input impedance of the rail line, the equivalent circuit of the track circuit.

Working conditions of track circuits without insulating joints, as well as track circuits with insulated joints to a greater extent depends on the proper selection of the characteristics of limiting resistance. Limiting the magnitude of the resistance depends on the power consumed by the track circuit without insulating joints in both the normal and in the bypass mode wheel set supply end of the track circuit.

Research carried out for track circuits with insulating joints have shown [1] that for each track circuit there are modulus and argument of limiting resistance, in which the maximum power at the end of the rail bypass supply chain is the least Pkzmahn.

To track circuits with insulating joints was calculated that the power Pkzmahn will take place under the condition that $|Z_o| = |Z_{vx}|$ и $|\varphi_o| - |\varphi_{vx}| = \pm 180^\circ$ where Z_{vx} - input impedance between the track circuit start points of the rail line, Z_o — limiting resistance.

The track circuits without insulating joints [2; 3] has a feature that the smallest calculation value when the maximum power supply bypass end is made with the influence of the two train shunts disposed on both sides of the feed end, as shown in the equivalent circuit of Fig. 3.

For the analysis of shunt power track circuit without insulating joints consider it the equivalent circuit in normal mode Fig.1, 2 in bypass mode the supply end Fig. 3, 4.

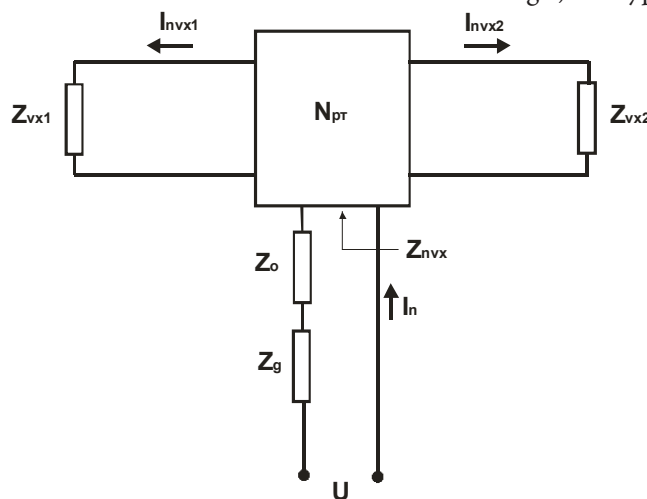


Figure 1. General scheme of substitution of the track circuit in the normal mode

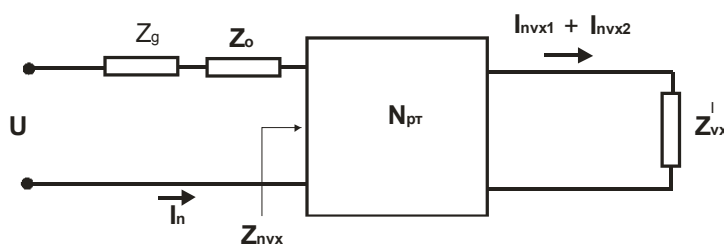


Figure.2. The basic equivalent circuit of the track circuit in the normal mode

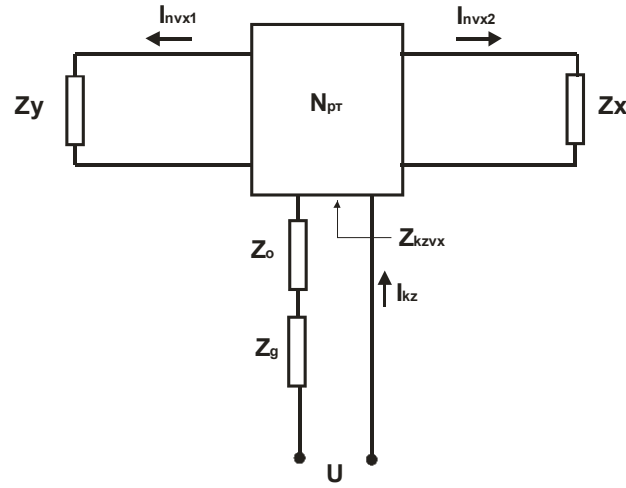


Figure 3. The general scheme of replacement track circuit in the presence of the mobile unit on the feeding end

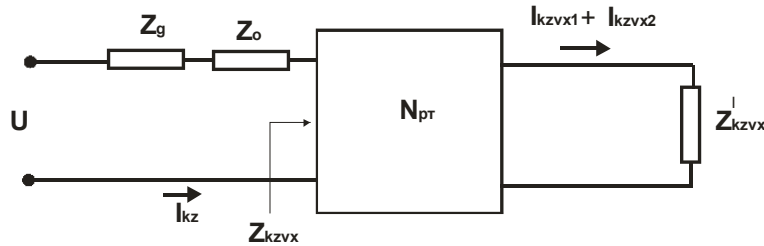


Figure 4. The basic equivalent circuit of the track circuit in the presence of the mobile unit on the feeding end

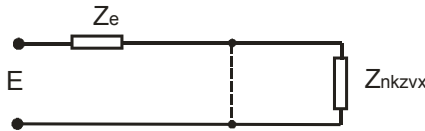


Figure 5. Equivalent circuit of the track circuit

where N_{pt} - four -pole supply limiting resistor between the end and the beginning of the track circuit, Z_{vx1} — the input impedance of the adjacent track circuit from the supply end, Z_{vx2} - the input impedance of the track circuit by the end of the relay, x — the distance from the rail line to the point of imposing the first shunt of train $R_{sh1} = 0$, y — the distance from the rail line to the point of imposing the second of train shunt $R_{sh2} = 0$, z — the resistance of rails, Z_g — internal resistance of the power supply, Z_o — limiter resistance.

The module argument limiting resistance and values of x and y , where is the smallest possible maximum power supply end of the bypass can be determined by equivalent circuits in the normal (Figure 2) and the bypass mode (4).

For the circuit shown in Figure 1.2 we can write:

$$\dot{U}_n = \dot{I}_n (\dot{Z}_g + \dot{Z}_o + \dot{Z}_{nvx}), \quad (1)$$

$$\dot{I}_n = \dot{K}_i (\dot{I}_{nvx1} + \dot{I}_{nvx2}), \quad (2)$$

where

$$\dot{K}_i = \frac{C_{pm} \dot{Z}_{vx1} \dot{Z}_{vx2} + D_{pm} (\dot{Z}_{vx1} + \dot{Z}_{vx2})}{\dot{Z}_{vx1} + \dot{Z}_{vx2}},$$

$$\dot{Z}_{nvx} = \frac{A_{pm} \dot{Z}_{vx1} \dot{Z}_{vx2} + B_{pm} (\dot{Z}_{vx1} + \dot{Z}_{vx2})}{C_{pm} \dot{Z}_{vx1} \dot{Z}_{vx2} + D_{pm} (\dot{Z}_{vx1} + \dot{Z}_{vx2})},$$

\dot{I}_{nvx1} - current, branching into the adjacent track circuit,

\dot{I}_{nvx2} - current flowing through this track circuit,

$A_{pm}; B_{pm}; C_{pm}; D_{pm}$ - the coefficients of four - pole, replacement throttle transformer supply end.

For shunt mode power scheme Figure 3 we can write

$$\dot{I}_{kz} = \frac{U}{\dot{Z}_g + \dot{Z}_o + \dot{Z}_{kzv}}, \quad (3)$$

$$\dot{P}_{kz} = \dot{U} * \dot{I}_{kz} = \frac{U^2}{\dot{Z}_o + \dot{Z}_{kzv}}, \quad (4)$$

$$\dot{Z}_{kzv} = \frac{A_{pm} * \dot{Z}^* x^* \dot{Z}^* y + B_{pm} (\dot{Z}^* x + \dot{Z}^* y)}{C_{pm} * \dot{Z}^* x^* \dot{Z}^* y + D_{pm} (\dot{Z}^* x + \dot{Z}^* y)}. \quad (5)$$

The above equation corresponds to a known equivalent circuit Figure 5, which can significantly simplify the definition of conditions to ensure the smallest possible maximum power at the feeding end of the track circuit in the presence of the mobile unit.

In this scheme,

$$\dot{E} = \dot{U} = \dot{K}_i (\dot{I}_{nvx1} + \dot{I}_{nvx2}) * (\dot{Z}_g + \dot{Z}_o + \dot{Z}_{nvx}), \quad (6)$$

$$\dot{Z}_e = \dot{Z}_g + \dot{Z}_o + \dot{Z}_{kzv}, \quad (7)$$

$$\dot{Z}_{nkzv} = \dot{Z}_{nvx} - \dot{Z}_{kzv} \quad (8)$$

Equation (6) can be written as follows:

$$\dot{E} = \dot{K}_i (\dot{I}_{nvx1} + \dot{I}_{nvx2}) * [(\dot{Z}_g + \dot{Z}_o + \dot{Z}_{kzv}) + (\dot{Z}_{nvx} - \dot{Z}_{kzv})] \quad (9)$$

Replace the value $\dot{Z}_g + \dot{Z}_o + \dot{Z}_{kzv}$ and $\dot{Z}_{nvx} - \dot{Z}_{kzv}$ their values according to the equation (7) and (8), we obtain

$$\dot{E} = \dot{K}_i (\dot{I}_{nvx1} + \dot{I}_{nvx2}) * (\dot{Z}_e + \dot{Z}_{nkzv}) \quad (10)$$

or taking out the brackets \dot{Z}_{nkzv} obtain

$$\dot{E} = \dot{K}_i (\dot{I}_{nvx1} + \dot{I}_{nvx2}) * \dot{Z}_{nkzv} \left(1 + \frac{\dot{Z}_e}{\dot{Z}_{nkzv}} \right) \quad (11)$$

Designating $\frac{Z_e}{Z_{nkzvx}}$ by \dot{K}_c and make the change in the equation (11), we obtain

$$\dot{E} = \dot{K}_i (\dot{I}_{mvx1} + \dot{I}_{mvx2}) * \dot{Z}_{nkzvx} (1 + \dot{K}_c) \quad (12)$$

Short-circuit power is given by:

$$\dot{P}_{kz} = \frac{E^2}{Z_e} \quad (13)$$

Substituting the value of E in equation (12) into equation (13) yields

$$\dot{P}_{kz} = \frac{\dot{K}_i^2 (I_{mvx1} + I_{mvx2})^2 * \dot{Z}_{nkzvx} * |(1 + \dot{K}_c)|^2}{Z_e} \quad (14)$$

$$\text{or } \dot{P}_{kz} = \dot{K}_i^2 (I_{mvx1} + I_{mvx2})^2 * \dot{Z}_{nkzvx} * \frac{1}{\dot{K}_c} |(1 + \dot{K}_c)|^2 \quad (15)$$

If $x, y = \text{const}$ in equation (13) with the change \dot{Z}_o will change only one complex value $\dot{K}_c = |K_c| e^{j(\varphi_e - \varphi_{nkz})}$.

To find the minimum unit value of P_{kz} a given argument φ_o and a constant $(\varphi_e - \varphi_{nkz})$ determine the value of the module $|K_c|$.

Equating modules left and right sides of the equation (15), we obtain.

$$P_{ks} = (I_{mvx1} + I_{mvx2})^2 * K_i^2 * Z_{nkzvx} * \left[\frac{1}{K_c} + |K_c| + 2 * \cos(\varphi_e - \varphi_{nkz}) \right] \quad (16)$$

Examining equation (16) to the max. and min. relatively K_c we obtain:

$$|K_c| = 1 \text{ or } \left| \frac{\dot{Z}_e}{\dot{Z}_{nkzvx}} \right| = 1$$

$$\text{Hence } |\dot{Z}_e| = |\dot{Z}_{nkzvx}|.$$

Thus, the lowest power at the end of the rail bypass supply chain for any argument limiting resistance φ_o and any values of variables x and y will be provided

$$\dot{Z}_g + \dot{Z}_o + \dot{Z}_{kzvx} = \dot{Z}_{mvx} - \dot{Z}_{kzvx}$$

Substituting equation (16) instead of K_c its optimal value — one — get the equation (17) for calculating the lower end of the power supply bypass for given values φ_o, x and y .

$$P_{nkzmaxmin} = 2(I_{mvx1} + I_{mvx2})^2 * K_i^2 * Z_{nkzvx} * [1 + \cos(\varphi_e - \varphi_{nkz})]. \quad (17)$$

From equation (17) shows that when $x, y = \text{const}$ and variables φ_o maximum power at bypass takes the smallest value with increasing difference of the arguments $\varphi_e - \varphi_{nkz}$ up to $\pm 180^\circ$ when $\cos(\varphi_e - \varphi_{nkz}) = \cos(\pm 180^\circ) = -1$. In this case $P_{kzmin} = 0$. Such a case does not occur practically.

The optimum value of the module \dot{Z}_o at which maximum power is minimum is determined by the equation:

$$\dot{Z}_g + \dot{Z}_o + \dot{Z}_{kzvx} = \dot{Z}_{nkzvx}.$$

Equating squares models left and right sides of the equation and solving it with respect to $|Z_o|$, we get:

$$Z_o = -[Z_g \cos(\varphi_o - \varphi_g) + Z_{kzvx} \cos(\varphi_o - \varphi_{kz})] \pm \rightarrow \quad (18)$$

$$\pm \sqrt{[Z_g \cos(\varphi_o - \varphi_g) + Z_{kzvx} \cos(\varphi_o - \varphi_{kz})]^2 + Z_{nkzvx}^2 - (Z_g + Z_{kzvx})^2}$$

For large negative values of the argument φ_o maximum power occurs upon application of the shunt not in the supply end and at a distance from it.

To determine this distance, we use the equation (13)

$$\dot{P}_{kz} = \frac{E^2}{Z_e}.$$

Substituting into this equation instead E and \dot{Z}_e their values from the equations (6) and (7), we obtain:

$$P_{kz} = \frac{|I_{mvx1} + I_{mvx2}|^2 \dot{K}_i^2 |\dot{Z}_g + \dot{Z}_o + \dot{Z}_{mvx}|^2}{\dot{Z}_g + \dot{Z}_o + \dot{Z}_{kzvx}} \quad (19)$$

After substituting in the equation (19) instead of \dot{Z}_{kzvx} its value from equation (5), we obtain:

$$P_{kz} = \frac{|I_{mvx1} + I_{mvx2}|^2 \dot{K}_i^2 |\dot{Z}_g + \dot{Z}_o + \dot{Z}_{mvx}|^2}{\dot{Z}_g + \dot{Z}_o + \frac{A_{pm} * \dot{Z} * x * \dot{Z} * y + B_{pm} (\dot{Z} * x + \dot{Z} * y)}{C_{pm} * \dot{Z} * x * \dot{Z} * y + D_{pm} (\dot{Z} * x + \dot{Z} * y)}} \quad (20)$$

As can be seen from equation (20) when changing the x and y vary only the denominator when the smallest value whose power supply bypass end is maximum. Consequently, it suffices to study at max. and min. Only the denominator of equation (20).

$$\dot{Z}_{ob} = \dot{Z}_g + \dot{Z}_o + \frac{A_{pm} * \dot{Z} * x * \dot{Z} * y + B_{pm} (\dot{Z} * x + \dot{Z} * y)}{C_{pm} * \dot{Z} * x * \dot{Z} * y + D_{pm} (\dot{Z} * x + \dot{Z} * y)} \quad (21)$$

If we denote $\frac{\dot{Z} * x * \dot{Z} * y}{\dot{Z} * x + \dot{Z} * y} = l * z$, then make the change, we get:

$$\dot{Z}_{ob} = \dot{Z}_g + \dot{Z}_o + \frac{A_{pm} * l * z + B_{pm}}{C_{pm} * l * z + D_{pm}} \quad (22)$$

We denote in equation (22)

$$A_{pm} * z = \dot{a}; B_{pm} = \dot{b}; C_{pm} * z = \dot{c}; D_{pm} = \dot{d}, \dot{Z}_g + \dot{Z}_o = \dot{m}.$$

Make replacement, we obtain:

$$\dot{Z}_{ob} = \dot{m} \frac{\dot{a} * l + \dot{b}}{\dot{c} * l + \dot{d}} \quad (23)$$

$$\text{or } \dot{Z}_{ob} (\dot{c} * l + \dot{d}) = \dot{m} (\dot{a} * l + \dot{b}) + \dot{a} * l + \dot{b} \quad (24)$$

Performing transformation, we obtain:

$$\dot{Z}_{ob} (\dot{c} * l + \dot{d}) = \dot{M} l + \dot{N}, \quad (25)$$

where $\dot{M} = \dot{m} \dot{c} + \dot{a}$, $\dot{N} = \dot{m} \dot{d} + \dot{b}$.

Equating the squares of the moduli left- and right sides of the equation (25) and carrying out the conversion, we get:

$$Z_{ob}^2 = \frac{M^2 l^2 + 2MN \cos(\varphi_M - \varphi_N) + N^2}{c^2 l^2 + 2cd \cos(\varphi_c - \varphi_d) + d^2} \quad (26)$$

Examining equation (26) to the max. and min. relatively l , we get:

$$l = \frac{Q_1}{2} \pm \sqrt{\frac{Q_1^2}{4} - Q_0} \quad (27)$$

$$\text{where } Q_1 = \frac{cdM^2 \cos(\varphi_c - \varphi_d) - c^2 MN \cos(\varphi_M - \varphi_N)}{cdM^2 \cos(\varphi_c - \varphi_d) - c^2 MN \cos(\varphi_M - \varphi_N)},$$

$$Q_0 = \frac{d^2 MN \cos(\varphi_M - \varphi_N) - cdN^2 \cos(\varphi_c - \varphi_d)}{cdM^2 \cos(\varphi_c - \varphi_d) - c^2 MN \cos(\varphi_M - \varphi_N)}.$$

The expression obtained allows to define the value of l at different values Z_g, Z_o and φ_o . After determining the value l of the expression $\frac{\dot{Z} * x * \dot{Z} * y}{\dot{Z} * x + \dot{Z} * y} = l * z$ value of x is determined for various combinations of y .

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Methods for calculating the coefficients of the four-pole rail track circuit without insulating joints for locomotive receiver at service able rail threads

Abstract: The questions derive the equations coefficients rail four-pole track circuit without insulating joints for locomotive receiver at service able rail lines.

Keywords: equivalent circuit, input resistance, wave resistance coefficients rail four-pole, locomotive receivers, transfer resistance of the track circuit.

The main tasks of railway transport in Uzbekistan is modernizing obsolete and outdated systems advanced railway traffic control. For high-quality solutions to these challenges need to accelerate the development and introduction of new and efficient equipment and technologies, to increase capacity and carrying capacity of the railways through the organization of high-speed, and improve the safety of trains. In this regard, you can skip track circuits without insulating joints [2, 168–170] as the primary sensor information.

Track circuits without isolating joints are especially effective when there are no traffic lights on the stretch of travel and traffic control is carried out only automatic locomotive alarm (ALS). In this case, blurred boundaries track circuits without insulating joints has no practical value and can be applied only to track a potential receiver; to the locomotive receiver ALS then presented higher requirements.

Locomotive receiver is activated due to the electro-motive force, which is induced in a locomotive receivers current in the rails figure. 1.

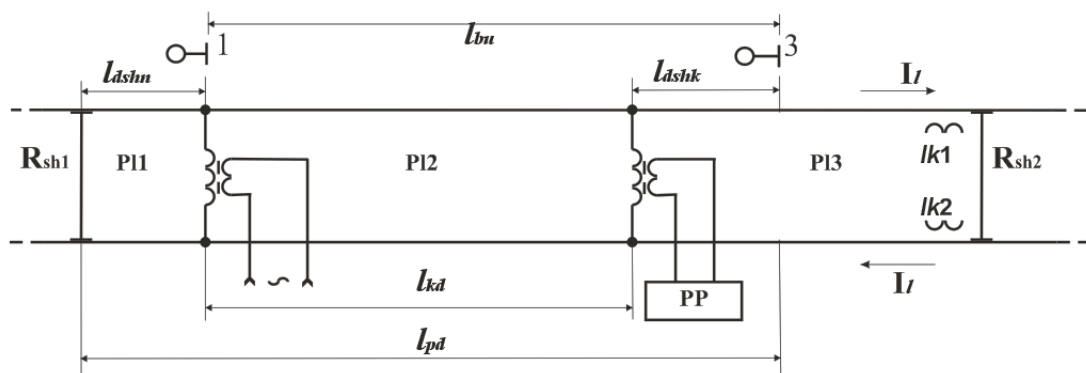


Fig. 1. Schematic of the track circuit without insulating joints when carrying a mobile unit

At the entrance of the train on the track circuit RTS3 from a traffic light at 3 locomotive coils current flows carrying information about the state of the track circuit RTS2 and as you approach the traffic light track 3 receiver PP second track circuit shuts down and stops the supply of signals to the locomotive, but the locomotive begins to flow from the

signal first signal point. The level of this signal depends on the departing train on the track circuit RTS1. Therefore, the calculation must take into account this circumstance.

For output the calculated equations present scheme of track circuits, taking into account the above circumstances, is given in the form of equivalent circuit of Figure 2.

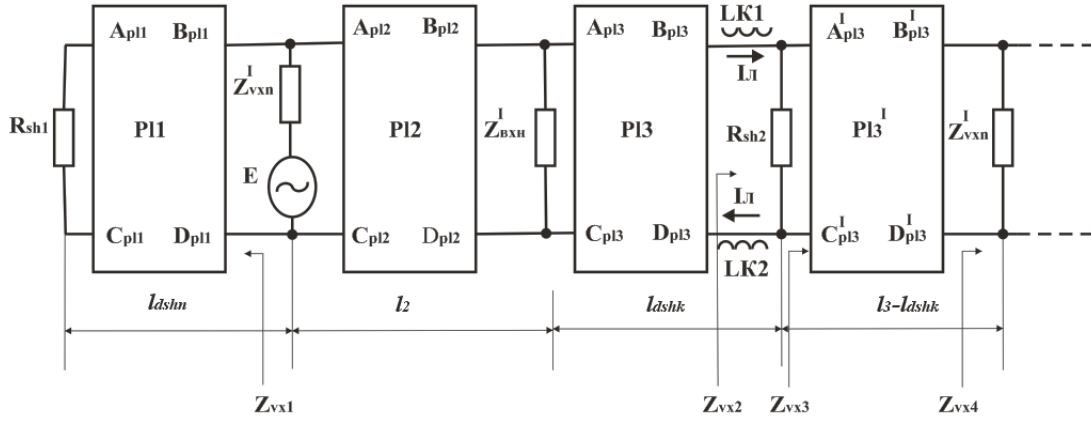


Fig. 2. Equivalent circuit of the track circuit without insulating joints when carrying a mobile unit
 Transform the scheme of Fig. 2, replacing the four-pole circuit Figure 3 and PL1, PL3¹ their input impedance.

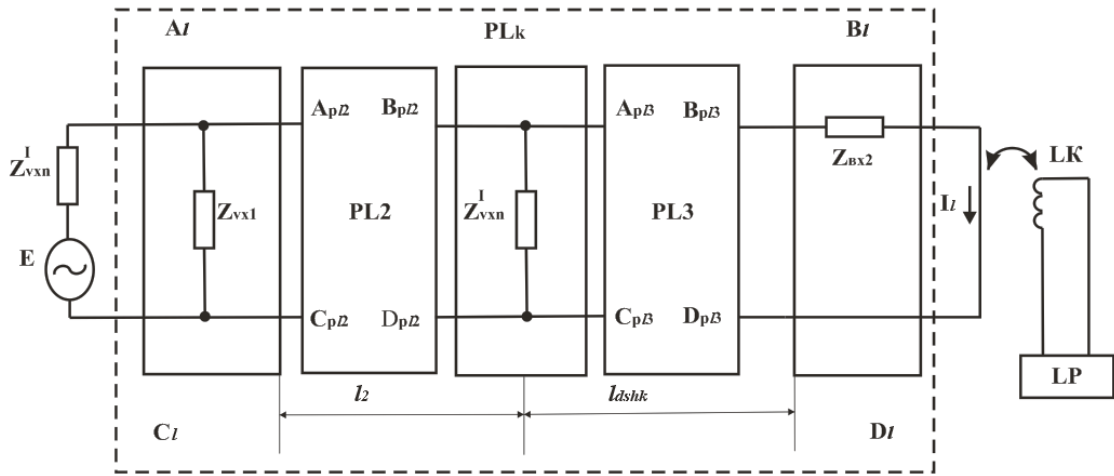


Fig. 3. The converted equivalent circuit of the track circuit without insulating joints

where

$$Z_{vx1} = \frac{Z_{vp1} * sh\gamma_{pl1} l_{dshn}}{ch\gamma_{pl1} l_{dshn}};$$

$$Z_{vx2} = \frac{R_{sh2} * Z_{vx3}}{R_{sh2} + Z_{vx3}};$$

$$Z_{vx3} = \frac{A_{pl3}^i * Z_{vx4} + B_{pl3}^i}{C_{pl3}^i * Z_{vx4} + D_{pl3}^i};$$

$$Z_{vx4} \oplus Z_{vp4};$$

$$A_{pl3}^i = ch\gamma_{pl3} (l_3 - l_{dshk}); B_{pl3}^i = Z_{vp13} sh\gamma_{pl3} (l_3 - l_{dshk});$$

$$C_{pl3}^i = \frac{1}{Z_{vp13}} sh\gamma_{pl3} (l_3 - l_{dshk}); D_{pl3}^i = ch\gamma_{pl3} (l_3 - l_{dshk});$$

Z_{vp14} — characteristic impedance of the fourth rail line;

γ_{pl3} — the coefficient of wave propagation third rail line;

$$A_{pl3} = ch\gamma_{pl3} l_{dshk}; B_{pl3} = Z_{vp13} sh\gamma_{pl3} l_{dshk};$$

$$C_{pl3} = \frac{1}{Z_{vp13}} sh\gamma_{pl3} l_{dshk}; D_{pl3} = ch\gamma_{pl3} l_{dshk};$$

$$A_{pl2} = ch\gamma_{pl2} l_{pl2}; B_{pl2} = Z_{vp12} sh\gamma_{pl2};$$

$$C_{pl2} = \frac{1}{Z_{vp12}} sh\gamma_{pl2} l_{pl2}; D_{pl2} = ch\gamma_{pl2} l_{pl2};$$

Z_{vp12} — wave resistance of the main rail line;

γ_{pl2} — the coefficient of wave propagation main rail line.

Obtain the circuit with five four-pole four-pole by multiplying the coefficients of these factors we get to calculate the current flowing through the coils under the foster locomotive.

$$\begin{vmatrix} A_l & B_l \\ C_l & D_l \end{vmatrix} = \begin{vmatrix} 1 & 0 \\ \frac{1}{Z_{vx1}} & 1 \end{vmatrix} * \begin{vmatrix} A_{pl2} & B_{pl2} \\ C_{pl2} & D_{pl2} \end{vmatrix} *$$

$$* \begin{vmatrix} 1 & 0 \\ \frac{1}{Z_{vx2}} & 1 \end{vmatrix} * \begin{vmatrix} A_{pl3} & B_{pl3} \\ C_{pl3} & D_{pl3} \end{vmatrix} * \begin{vmatrix} 1 & Z_{vx2} \\ 0 & 1 \end{vmatrix}$$

$$A_l = A_{pl3} \left(A_{pl2} + \frac{B_{pl2}}{Z_{vx1}} \right) + B_{pl2} * C_{pl3}; \quad (1)$$

$$B_l = Z_{vx2} \left[A_{pl3} \left(A_{pl2} + \frac{B_{pl2}}{Z_{vx1}} \right) + B_{pl2} * C_{pl3} \right] + \rightarrow$$

$$+ B_{pl3} \left(A_{pl2} + \frac{B_{pl2}}{Z_{vx1}} \right) + B_{pl2} * D_{pl3}; \quad (2)$$

$$C_l = A_{pl3} \left[\frac{A_{pl2}}{Z_{vx1}} + C_{pl2} + \frac{1}{Z_{vx1}} \left(\frac{B_{pl2}}{Z_{vx1}} + D_{pl2} \right) \right] + \rightarrow$$

$$+ C_{pl3} \left(\frac{B_{pl2}}{Z_{vx1}} + D_{pl2} \right); \quad (3)$$

$$D_l = Z_{vx2} \left\{ A_{pl3} \left[\frac{A_{pl2}}{Z_{vx1}} + C_{pl2} + \frac{1}{Z_{vx1}} \left(\frac{B_{pl2}}{Z_{vx1}} + D_{pl2} \right) \right] + C_{pl3} \left(\frac{B_{pl2}}{Z_{vx1}} + D_{pl2} \right) \right\} + B_{pl3} \left[\frac{A_{pl2}}{Z_{vx1}} + C_{pl2} + \frac{1}{Z_{vx1}} \left(\frac{B_{pl2}}{Z_{vx1}} + D_{pl2} \right) \right] + D_{pl3} \left(\frac{B_{pl2}}{Z_{vx1}} + D_{pl2} \right); \quad (4)$$

Substituting the values of Z_{vx1} , Z_{vx2} , Z_{vx3} , Z_{vx3} , A_{pl3} , B_{pl3} , C_{pl3} , D_{pl3} , A_{pl2} , B_{pl2} , C_{pl2} , D_{pl2} in the equation (4), we obtain:

$$A_l = ch\gamma_{pl3} l_{dshk} \left(ch\gamma_{pl2} l_{pl2} + \frac{Z_{vp12} sh\gamma_{pl2}}{Z_{vx1}} \right) + \rightarrow + Z_{vp12} sh\gamma_{pl2} * \frac{1}{Z_{vp13}} sh\gamma_{pl3} l_{dshk}; \quad (5)$$

$$B_l = Z_{vx2} [ch\gamma_{pl3} l_{dshk} (ch\gamma_{pl2} l_{pl2} + \frac{Z_{vp12} sh\gamma_{pl2}}{Z_{vx1}}) + \rightarrow + Z_{vp12} sh\gamma_{pl2} * \frac{1}{Z_{vp13}} sh\gamma_{pl3} l_{dshk}] + Z_{vp13} sh\gamma_{pl3} l_{dshk} * \rightarrow * \left(ch\gamma_{pl2} l_{pl2} + \frac{Z_{vp12} sh\gamma_{pl2}}{Z_{vx1}} \right) + Z_{vp12} sh\gamma_{pl2} * ch\gamma_{pl3} l_{dshk}; \quad (6)$$

$$C_l = ch\gamma_{pl3} l_{dshk} \left[\frac{ch\gamma_{pl2} l_{pl2}}{Z_{vx1}} + \frac{1}{Z_{vp12}} sh\gamma_{pl2} l_{pl2} + \rightarrow + \frac{1}{Z_{vx1}} \left(\frac{Z_{vp12} sh\gamma_{pl2}}{Z_{vx1}} + ch\gamma_{pl2} l_{pl2} \right) \right] + \frac{1}{Z_{vp13}} sh\gamma_{pl3} l_{dshk} * \rightarrow * \left(\frac{Z_{vp12} sh\gamma_{pl2}}{Z_{vx1}} + ch\gamma_{pl2} l_{pl2} \right); \quad (7)$$

$$D_l = Z_{vx2} \left\{ ch\gamma_{pl3} l_{dshk} \left[\frac{ch\gamma_{pl2} l_{pl2}}{Z_{vx1}} + \frac{1}{Z_{vp12}} sh\gamma_{pl2} l_{pl2} + \rightarrow \right. \right.$$

$$\left. + \frac{1}{Z_{vx1}} \left(\frac{Z_{vp12} sh\gamma_{pl2}}{Z_{vx1}} + ch\gamma_{pl2} l_{pl2} \right) \right\} + \frac{1}{Z_{vp13}} sh\gamma_{pl3} l_{dshk} * \rightarrow$$

$$* \left(\frac{Z_{vp12} sh\gamma_{pl2}}{Z_{vx1}} + ch\gamma_{pl2} l_{pl2} \right) \left\} + Z_{vp13} sh\gamma_{pl3} l_{dshk} * \rightarrow$$

$$* \left[\frac{ch\gamma_{pl2} l_{pl2}}{Z_{vx1}} + \frac{1}{Z_{vp12}} sh\gamma_{pl2} l_{pl2} + \frac{1}{Z_{vx1}} \left(\frac{Z_{vp12} sh\gamma_{pl2}}{Z_{vx1}} + ch\gamma_{pl2} l_{pl2} \right) \right] + \rightarrow + ch\gamma_{pl3} l_{dshk} \left(\frac{Z_{vp12} sh\gamma_{pl2}}{Z_{vx1}} + ch\gamma_{pl2} l_{pl2} \right). \quad (8)$$

It is known that

$$I_l = \frac{U_{min}}{Z_{pl}}; \quad (9)$$

$$U_{min} = U_1 + I_l * Z_{vx1}; \quad (10)$$

$$U_1 = I_l * B_l; I_l = I_l * D_l, \quad (11)$$

from whence

$$U_{min} = I_l * B_l + I_l * D_l * Z_{vx1}; \quad (12)$$

$$I_l = \frac{U_{min}}{B_l + D_l * Z_{vx1}}; \quad (13)$$

$$Z_{pl} = B_l + D_l * Z_{vx1}, \quad (14)$$

where

Z_{pl} — the resistance of the transfer track circuit during normal for the locomotive receiver.

Conclusions: The proposed analytical expressions for which you can analyze and synthesis of track circuits without isolating joints for locomotive receiver to develop and track circuits without isolating joints for railway lines in Uzbekistan.

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Ways of increase of heat stability of a cabin of the fire truck

Abstract: Various means of passive heat protection of a cabin are offered for ensuring safe work of the driver of a fire truck in case of destructive fire. On the basis of experimental data and mathematical modeling the heat stability of a car cabin is defined. The comparative characteristic of efficiency of application of various means of heat protection is submitted.

Keywords: cabin of the fire truck, heat current of the fire, heat protection, safe internal environment, heat stability

Most often extinguishing of fires by means of fire trucks is made by supplying of fire extinguishing substances on the hose lines stretched to necessary length. In such cases trucks

are set at a long distance from the front of the flame. However in cases of extinguishing of fires by means of water supply by hydraulic guns it is necessary to approach fire trucks to the

seat of fire. Such conditions are created at extinguishing of forest fires, fires at the gas- and oil-extracting and producing enterprises, timber yards, at elimination of major industrial accidents, etc.

The zone, from which the extinguishing is made, is limited to the maximum length of a stream of fire extinguishing substances and is in close proximity to the object of extinguishing. So, at water supply by hydraulic guns of the trucks length of the stream reaches 60 m, and length of the foam is up to 30 m. Supply of powder is made on distance of 30–35 m, and for trucks of gas-water extinguishing this value makes only 10–12 m.

At fire extinguishing directly from the truck the tactical effectiveness of divisions increases as time of fighting expansion is reduced; besides, length of a stream of fire extinguishing substances increases, as there are no pressure losses in hoses.

Fire trucks are created on the chassis of serial trucks. Knots and component parts of cars are projected and made for operation in the conditions of influence of solar radiation, environmental temperature, wind and rainfall (humidity).

In the zones, which are directly adjoining the fire front, conditions of use of fire trucks cardinally differ from operating conditions of trucks of economical purpose. At extinguishing of the fires fire trucks are exposed to powerful thermal influence that leads to heating of their external surfaces. Truck walls under the influence of heat flows of 7–25 kW/sq.m heat up to 200–400 °C. Internal surfaces heat up to 80–220 °C. These values of temperatures of heating are reached within 2–3 min. and fire extinguishing in such conditions becomes dangerous to the truck.

Duration of fighting work of a fire tanker at water supply by means of hydraulic guns from the tank, and also giving of fire extinguishing substances by trucks of the powder or combined extinguishing in zones of influence of heat emission is commensurable their expenditures over time. It strongly limits duration of safe work on hydraulic guns control. If in due time not to change the fighting position, fire trucks can fail and staff in cabins can get thermal injuries. Thus, safety of the fire truck on the fires is defined generally by the level of its resistance to the influence of heat emission — **heat stability**.

Heat stability of the fire truck is the property to keep during certain time in the conditions of powerful thermal influences the holding and defend ability of the body and the cabin, safe parameters of microclimate in the cabin and heat condition of mechanisms and systems of the truck. Therefore, possibility of fire extinguishing by the fire truck without change of the fighting position will be defined by heat stability.

Especially weak part of the fire truck is its cabin. The driver can maneuver in fire zone, operate the fixed monitor, in case of danger he can bring the truck out of the dangerous zone only until in the cabin the safe microclimate is held [6]. Therefore we must pay paramount attention to the issues of heat protection of the fire truck cabin.

There are two essentially various ways of heat protection of the truck cabin: active and passive. Certainly the effective way of active heat protection has an essential shortcoming: the fire extinguishing substance (water) that could be spent for fire extinguishing is spent for heat protection. Therefore such way is expedient only at stationary installation of the fire truck at a water source; at movement (change of fighting position) of the truck this way is undesirable.

Passive thermal protection is simpler, but at the correct application a rather effective remedy. The advantage of such way is also that it can be applied at production of a cabin as well as in use of the truck and even directly at the place of major fire as a protection express tool.

For the protection of the truck cabin against powerful heat emission the following technical means are offered [8]:

1) filling of the air layer of constructions with heat-insulating material. As heat-insulating material the felted fabric with sheet thickness of 15mm was tested;

2) covering of external surfaces of safeguards with materials with high heat-reflective properties. The walls covered with aluminum foil with thickness of 0,05mm and painted by aluminum paint were tested;

3) shielding of constructions in the air gap (aluminum foil or aluminum paint on one or both walls of the air gap);

4) application of special cockpit windows. Were subjected to tests: windows with the pasted aluminized polyethylene terephthalate film, tinted windows with the deposited oxine-tin-antimony film, organic windows with thickness of 6mm, double windows of the automobile tempered glass and the plexiglas established outside without air gap;

5) use of a mesh screen on windows. The steel mesh by diameter of 3mm with sizes of cells 10mm*10mm, established outside of the cabin windows was applied.

Except individual ways were tested also:

6) complex of heat-shielding means allowing long usual operation of the fire truck equipped by means of heat protection. The complex of means consists of the external walls painted by aluminum paint and air gaps of safeguards filled with mineral wool, sheet plexiglas and the metal mesh at car windows;

7) express tool of heat protection, brought on the special fire fighting equipment and established on the fire trucks arriving to the fire place in possible short terms. The express tool includes pasting by aluminum foil of external surfaces of the cabin, pasting of windows with the aluminized polyethylene terephthalate film and installation on windows of the metal mesh.

Tests of the offered means of heat protection were carried out by theoretical calculations in the program [4] supplemented according to the mathematical model [7] modules of definition of temperature fields in the windows and air gaps of safeguards. Results of theoretical calculations were confirmed by full-scale natural experiments [3]. Divergences between the estimated data and experimental evidence didn't exceed 12–17% for walls of the cabin and 22–25% for its windows.

It is possible to estimate the efficiency of the offered means of heat protection if taking the values of parameters in a cabin of the production car (without the offered means of heat protection) for a standard of microclimatic parameters in

cabin. Comparative efficiency of means of heat protection on the extent of decrease in characteristic temperatures and a heat stream in the cabin in relation to the standard is presented in table 1.

Table 1. – Efficiency of heat protection of the truck cabin

Means of heat protection of the truck cabin	Extent of decrease,%			
	of characteristic temperatures			of heat
	walls	windows	air	flow
Production car (with no heat protection)	–	–	–	–
Heat insulation of walls from inside	15–26	0	12–21	18–41
Aluminum foil outside	68–71	0	35–42	62–71
Painting by aluminum paint outside	23–25	0	14–16	28–34
Aluminum foil in the gap	45–49	0	25–31	46–60
Painting of the gap with aluminum paint	10–17	0	5–11	18–21
Metallized film on the automobile glass	0	44–48	12–16	22–31
Tinted (with sputtering) automobile glass	0	5–7	5–7	9–14
Plexiglas instead of automobile glass	0	10–11	5–8	11–15
Plexiglas + automobile glass	0	13–20	8–11	13–20
Mesh screen on automobile glass	0	24–26	7–8	11–14
Complex of means of heat protection	47–51	38–44	37–47	63–73
Express tools of heat protection	70–74	66–70	55–71	94–95

Note. The concept «characteristic temperatures» designates medium-volume air temperature in the cabin and temperatures of internal surfaces of the warmed elements of safeguards.

It should be noted that the means protecting nontransparent safeguards reduce temperature of walls and practically do not influence windows temperature. The means protecting windows reduce only the temperature of glasses and reduce the rate of heat stream passing through windows. But as temperatures of walls determine the average air temperature and heat stream in the cabin, the values of the last decrease when using all without exception of means of heat protection.

For determination of the most admissible level of external heat influences and assessment of efficiency of the offered means of heat protection it is necessary to be set by limit the values of microclimatic parameters in the truck cabin and to define the limits of heat stability of cabins with various means of heat protection.

The major heat factor defining the microclimate in the cabin and safety of the person is air temperature. Physiological researches established values of limit temperature: 60–70 °C — at humidity up to 20% and 50 °C — at humidity of 70–75% [1, 10].

The cabin walls heat up in the first place under the influence of heat stream of the fire. From them then the air heats up and warmth on the interior of the cabin and on the driver is emitted [2]. Normative documents limit temperature of heated surfaces in systems of heating with value of 95 °C [5]. According to the researches conducted by all-union scientific research institute of labor protection (Tbilisi City) for the limit temperature of heated surfaces of protections the value of 100 °C in the absence of direct contact of the person's body with the heated surface is accepted.

The other, not less important factor of heat impact of the fire on the person is the heat emission. The person can be vaguely long without any protective equipment under the influence of heat emission with intensity of 1,0–1,4 kW/sq.m [9]. For staff of fire divisions the admissible value of density of heat stream the value of 2,5–3,0 kW/sq. m. is accepted at which firefighters can be in a usual canvas suit without additional resources of heat protection for a long time, and 4,2 kW/sq.m at which firefighters can work in fighting clothes and helmets with protective glass [9; 10].

On the fire the impulse wave at explosion can also represent danger to the truck and the person. With an excessive pressure of the impulse wave of 20–40 kPas damage of design of the truck is already possible (first of all destruction of windows) and easy damages of the person (bruises, dislocations, temporary loss of hearing), deadly damages of the person are possible with an excessive pressure of 100 kPas and more [10]. However serial cargo and fire trucks are not designed for resistance to the influence of impulse wave and are not tested.

This means that limit thermal parameters of microclimate in the cabin should be considered as the following: radiation temperatures of walls — 100 °C; average air temperature in the cabin — 60 °C; intensity of heat stream in the cabin — 2,5 kW/sq. m. On the basis of these limit parameters of microclimate in the cabin the levels of heat loading of the cabin at which its heat stability persists (table 2) are determined by mathematical model [7].

Tables 2. – Limits of heat stability of the truck cabin of ZIL-131 (ЗИЛ-131)

Means of heat protection of the truck cabin	Heat stability of the cabin, kW/sq. m.			
	in consideration of characteristic temperatures			in consideration of heat flow
	walls	windows	air	
Production car (with no heat protection)	1,7	2,5	4,6	8,0
Heat insulation of walls from inside	2,4	2,5	6,1	10,2
Aluminum foil outside	13,6	2,5	11,0	19,2
Painting by aluminum paint outside	3,5	2,5	6,1	10,6
Aluminum foil in the gap	5,9	2,5	8,5	14,9
Painting of the gap with aluminum paint	2,8	2,5	5,6	9,6
Metallized film on the automobile glass	1,7	7,2	6,1	10,1
Tinted (with sputtering) automobile glass	1,7	2,9	5,1	8,8
Plexiglas instead of automobile glass	1,7	3,0	5,2	8,9
Plexiglas + automobile glass	1,7	3,7	5,6	9,2
Mesh screen on automobile glass	1,7	4,1	5,2	8,9
Complex of means of heat protection	6,4	6,4	13,3	20,1
Express tools of heat protection	16,9	16,8	39,0	>50

According to the results, the greatest impact, of all thermal parameters, on the person in the truck has the temperature of surface of safeguards. According to calculation the cabin of the production car persists heat stability only at the power of heat stream of 1,7 kW/sq.m (on wall temperature). The trucks equipped with means of thermal protection provide a safe microclimate in cabins at big levels of heat emission of the fire. As to be expected, the heat stability of cabins of the trucks equipped with a complex of means of heat protection and express tool of heat protection is of the maximum value (respectively 6,4 kW/sq.m and 16,8 kW/sq.m on windows temperature).

Thus, for providing a safe microclimate in the cabin of the fire truck various means of passive heat protection of the

cabin are offered. The efficiency of the offered means was estimated in accordance with the maximum value of heat stream at which the truck cabin keeps heat stability. The heat stability of the truck cabin was checked in four thermal parameters of microclimate: temperatures of internal surface of the warmed wall and the warmed windows, air temperature in the cabin, heat stream in the cabin.

The decrease value in parameters of microclimate in the cabin at application of various means of heat protection changes in very wide limits. According to these values the most effective, as to be expected, are the offered complexes of means of heat protection.

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Section 13. Philosophy

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Abdul Ghaffar Khan and Mohandas Karamchand Gandhi: The ethical point of view

Abstract: The figure of Abdul Ghaffar Khan is analyzed in the light of the similarities between his non-violent ethic and that of Gandhi. Several similarities will be found, but there is a fundamental difference: while Gandhi bases his method on morality, Khan bases it on religion, on the Quran.

Keywords: Abdul Ghaffar Khan, Mohandas Karamchand Gandhi, nonviolence, religion, ethics, Khudai Khidmatgar

1. The figure of Abdul Ghaffar Khan

The figure of Abdul Ghaffar Khan (popularly known as Badshah Khan) is little known in the Western countries, but his relevance in recent history of India and Pakistan has been testified in some biographical studies [3; 4; 5; 6; 13; 14; 19].

During the British rule in India, he played a key role in the structuring of the Pathan freedom movement, the revival of Pathan nationalism and the adoption of nonviolence in the Pathan society. As is known, the North-West Frontier Province played a crucial role not only in the nonviolent claims for independence in India, but also in the geographical re-shaping of the Frontier.

Abdul Ghaffar Khan was born on 1890 at Utmanzai in the Peshawar region from a *Khan* of the Mohammadzai clan. He «came from a remote area of Hashtnagar near Charasadda, from a zone of India that was not even a full-fledged province at the time of his birth, and he was the product of a village school; the highest formal education he ever received was for one year as a day scholar at the Mayo College in Aligarh» [1, P. 22]. He was not a man of letters, ad «in sharp contrast to Gandhi or Nehru or Azad or Patel, he was a man of very large silences. [...] there is no Indian leader of his stature about whom we know so little» [1, P. 22].

From his early age he began to approach nonviolence rejecting the pervasive honor code of his people, the Pathans (or Pashtuns), «one of the most violent peoples of the earth» [20, P. 9]. His proselytism against of the use of force and the obligation to avenge the honor in the blood (the *badai*) pervaded his life. Furthermore, he succeeded in realizing a project that even Gandhi was unable to accomplish: the creation of the first nonviolent army of the story, the *Khudāyī Khidmatgār* — the servants of God — who opposed nonviolently and with dedication and courage to the British colonizers.

However, we must specify that Abdul Ghaffar Khan's nonviolence, although conditioned in the mature period by

the Gandhian message, originated long before he knew the Mahatma and was characterized by a deep knowledge of the Quran and a deep internalization of its message of peace.

In 1910 he decided to serve his people (In the conviction that «Pathans hate compulsion an dictation of any ttype, but their own free will, they are prepared to work in unity and co-operation with others in this country as well as their brethren of the tribal territories, who have so long been kept aloof from us and forced to have a life unworthy of a people») [12 p. 4] and began to set up a method and some institutions that would change the fate of the Frontier. Nonetheless, this method, similarly to that of Gandhi — who believed his «opinions to be not final» [8, P. 5] — has been never really structured because Khan was primarily a man of action rather than contemplation. There are no methodological texts or essays directly related to him. The only testimonies of his struggle come from the interviews of former *Khudāyī Khidmatgār*, or transcriptions of his speeches in Indian National Congress.

2. The centrality of the religious aspect in Badshah Khan

In the study of the figure of Badshah Khan what will be fundamental to remember is the centrality of Islam religion in his thought and in his world view. In particular, some aspects of it were very inspiring to him.

First, «the Quran indicates with very specific dictates the situations in which the use of force is permitted and the rules governing it. The use of the force is an answer, and should never consist of aggression; moreover, the violent practice should not continue longer than the necessary, which means that revenge or rage cannot be allowed under any circumstance» [20, P. 8].

Secondly, moderation and forgiveness were central in the Quran and appeared in the verse 126 of the Surah of the Bees: «if you punish someone, do it to the extent of the damage suffered. If you are patient it will be better for those who were

patient too» [17, P. 241]. It is said that after the revelation of this verse, the prophet Mohammed exploited every opportunity he had to recommend moderation and forgiveness to his comrades and to all the worshippers.

Finally, in the Sunnah of the Messenger, war obeyed (and still obeys) to precise rules. According to the divine prescription, in fact, war was only possible for defensive purposes, but should never tend towards excesses or cruelty. It was considered an exceptional condition to be completed as soon as possible. In this context, also the military actions were governed by a clear ethic code prescribing that prisoners were to be treated with humanity, receive the same treatment of Muslim fighters and should not be subjected to torture in order to extract information. Moreover, houses should not be destroyed, waters polluted, trees cut and the animals killed.

This was the Islam inspiring the political and social action of Badshah Khan. A testimony of love, faith and compassion not only for humanity but also for the other creatures of the world and for the environment.

When he was 20 years old, he opened his first school — the *Dar-ul-Ulum* — at Utamanzai. The first alternative to the British education model. In it, students (mostly farmers) received not only a religious training, but also an education that set them free from illiteracy (learned to read and write) [18, P. 18].

Because of his political activism, after this period, he constantly went in and out of prison. In 1923, when he was released from prison for the umpteenth time, he established the *Pakhtun Jirga* — the Youth League — and launched a new series of activities whose aim were a series of progressive and liberal reforms. One of them was his own magazine, *The Pakhtun*, which challenged the practice preventing woman from actively participating in social life. «He encouraged them to come forward, as already did by the women of his family. His sisters became more and more active in the movement, until 1930, when they were completely free to go around the districts of the Frontier and held speeches [20, P. 107]».

Ghaffar's use of religion and tradition as a means to communicate the new requirements and changes needed was a bridge between the past and the present. It gave new life to religion instead of marginalize it.

However, the most original and interesting contribution produced from Ghaffar to the liberation struggle was the creation, in 1929, of the *Khudāyī Khidmatgār* [11; 15], the first professional nonviolent army in history. Their members were Pathans converted to the nonviolent principles. Dressing a distinctive red shirt, they went through the villages to serve and to support projects of social reconstruction as the opening of new schools, the maintenance of the order, the proselytism against the *badai*.

«One who aspired to become a *Khudāyī Khidmatgār*, declared on solemn oath: "I am a *Khudāyī Khidmatgār*, and as God needs no service I shall serve Him by serving His creatures selflessly. I shall never use violence, I shall not retaliate or take revenge, and I shall forgive anyone who indulges in

oppression and excesses against me. I shall not be a party to any intrigue, family feud and enmity, and I shall treat every Pakhtun as my brother and comrade. I shall give up evil customs and practices. I shall lead simple life, do good and refrain from wrong-doing. I shall develop good character and cultivate good habits. I shall not lead any idle life. I shall expect no reward for my services. I shall be fearless and be prepared"» [12, P. 14–15].

A solemn declaration that the Servants of God respected even when the British acted inhumanly as in the occasion of the sit-in held on 23rd April 1930 at the bazar of *Kissa Khani*, in support of the Salt Satyagraha, where the British ordered troops to open fire with machine guns on the unarmed civilians.

It comes out clear that the religious aspect was the most important characteristic of the ethics of Abdul Ghaffar Khan and of the *Khudāyī Khidmatgār*. «Muslim religious teachings and Ghaffar Khan's re-interpretation of religious values, although springing from what has been perceived as a non-pacifist tradition, provided a clear antidote to violent conflict, encouraged activists to avoid intolerance toward other people, and enabled them to overcome their time-honored inclination to use violence against adversaries, both in interpersonal and intergroup conflicts. Indeed, religious values laid the foundation for encouraging people to choose nonviolence in principle» [10, P. 65].

3. Gandhi's thought

The thought of Gandhi relative to *satya* and *ahimsa* was influenced by Hinduism but also by ideas and readings pertaining to several other religions, the Gospel for example.

The starting point was self-analysis, a necessary tool for the man who, tended to the discovery of the *Truth*, first inside himself, and then in relation to others. This is a subjective and therefore partial truth, because the *Absolute Truth* was knowable only to God (which is why Gandhi come to say «Truth is God») [9, P. 70–71] and man would fulfill the moral obligation to «live according to the truth as he can perceive it, and, in doing so use the most pure means of nonviolence» [9, P. 70]. Only after having found this partial *Truth* man would be able to live ethically in Love and Faith.

On the concept of love, Gandhian ethics shows the traces of the influence of Lev Tolstoj's thought. In fact, Tolstoj rejected the classical dualistic conception distinguishing between individual ethics and the ethics of the group, claiming that there was only one ethics, the ethics of love «valid for both individuals and groups, prohibiting any form of violence or coercion and prescribing to undergo the sufferings in his own person whenever this is the only alternative to impose them to others» [2, P. 382]. An idea of pure love negating every kind of pressure or force. This is the reason why Tolstoj's thought did not represent a real alternative to violence.

However, Gandhi, did not give up the political struggle but spoke of *ahimsa*: the absence of the desire to harm, kill, nonviolence, love. «The true *ahimsa* should mean absolute freedom from will, from the wrath, from the hatred, and su-

perabundant love for everything» [7, P. 234–235]. This reading of love and the related nonviolence became the only form of active fight that, to the use of force, opposed moral and mental resistance in the conviction that the patience and the sufferings showed could convince the other of the error of his reasons.

This type of conversion to the good was only plausible only if we believed in two fundamental assumptions: on the one hand, the principle for which the man was born good and could be converted to the good in any moment of his life through acts of sacrifice; and on the other hand, the belief that *ahimsa* means love in the sense St. Paul [16, P. 13, 1–13] gave to the term: a sentiment pervading all the actions done by man.

The instrument to implement this philosophy was the *shatyagraha*, a word formed by *satya* meaning truth and *agraha* meaning firmness. From their composition derived the “true strength”, “firmness in truth”, and “firmness in a good cause”.

4. Conclusion

What clearly comes out from this analysis is that Badshah Khan's ethics and that of Gandhi are very similar. Both make references to a God, to the unconditioned love for all God's creatures, to the sacrifice and the service for the others. But there is a fundamental difference: while Gandhi's method is only influenced by religion and tends to universalism, Khan's references to religion, and hence to the Quran are much more evident. Maybe because of the education he received, the geographical location, and the people to whom this message was addressed (i. e. the Pathans), the message of Abdul Ghaffar Khan seems to be more anchored to the context of development.

This aspect cannot necessarily be considered a limit, and could be an essential element to encourage the diffusion of the principles of non-violence, tolerance and universal love among the Muslim populations practicing a more radical Islam.

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Value paradigm of education: challenges of time

Abstract: The article considers the problem of values and goals of education, which is current for the European and Russian educational space in the context of integration. The author attempts to trace the process of formation of a general value paradigm in the modern realia of the information-oriented society.

Keywords: philosophy of education, value paradigm, goals of education, integration, social values.

Introduction. Information-oriented society that is replacing the post-industrial one has brought about a need to form a value paradigm reflecting the peculiarities of a new social order, which is cardinally different from the previous one. Today, knowledge, creative out-of-the-box thinking, high level of general and professional education play a leading role in the society. The notions «value paradigm» and «knowledge paradigm» are often viewed as identical phenomena. The spheres of education of the Russian and European society gradually integrate despite the difficulties. The search for common components of the value paradigm while preserving national identity does not only intensify the process of rapprochement but also enriches bilateral educational theory and practice. We share the opinion about the need to research the scientific heritage of the leading Russian and foreign scientists in the sphere of philosophy of education and axiology in order to generalize the experience and apply it in practice. The goal of our research lies in the analysis of the approach to the ideals of education by the outstanding philosophers of our time V. V. Rozanov and J. Ortega y Gasset.

Research results. In recent decades, the attitude to the philosophical heritage of Rozanov, which is an ambivalent, sharp and controversial view of the events of the time the scientist lived in, has been changing gradually. The philosopher pointed out many drawbacks of the Russian enlightenment sometimes showing excessive emotionality and maximalism in enunciating his views. Many things pointed out by V. V. Rozanov almost one hundred years ago are typical for the Russian system of education today: it is discussed, criticized and disputed without making a transition to practical application. The main idea of V. V. Rozanov's philosophy of education is as follows: national education and upbringing, teaching oriented at a personality and developing the personality is not used sufficiently. V. V. Rozanov emphasized that cultural achievements of the developed European countries will bring benefit to the national enlightenment and they should be used appropriately without losing the national identity thereat. It is remarkable that the International Congress held in 1990 under the authority of the Institute of languages and literature of Eastern Europe of Milan University was dedicated to the philosophical heritage of V. V. Rozanov. It was noted in the research materials that the idea of goals and values of education expressed by the phi-

losopher was close to both the European and Russian societies. The reform of Russian education given the difficulty of the issue of formation of the value paradigm was aimed at realization of the most important long-term goal — social and economic growth and increase of the country's prosperity. Young generation — university graduates, bachelors and masters of the highest qualification — is called to solve this task. In our understanding, a new educational paradigm should be based, primarily, on the national value paradigm of the philosophy of education, progressive ideas of Russian philosophy, including the philosophical heritage of V. V. Rozanov. The analysis of the ideas of the outstanding Russian thinkers as an integral system shows their significance, but, often, remaining only theoretical heritage; there is no sufficient demand for them in the practice of education reformation. Generalizing the main goals and values of education expressed by V. V. Rozanov, we consider it justified to note that the creation of the value paradigm of education answers the challenges of time in respect of the higher education; although, V. V. Rozanov did not classify the higher professional training into a separate area of research at that time.

The value problem interested V. V. Rozanov since student time. At the third year of history-philological department of the Moscow University, the young scientist presented a tractate «Goal of human life» to the scientific community, where the contemplations about the human happiness were completed with the thoughts about the conscious life of the man governed by the goal. Initially rejected work was published only in 1892 in the journal «Issues of philosophy and psychology», books 14 and 15, and later it was included in the author's collection «Esthetic understanding of history» [2].

The basis of the philosophy of education should be comprised of the system of social values and the national consciousness can become one. V. V. Rozanov wrote in the essay «Groundlessness of the Russian school» that «... national consciousness is thrown somewhere at the back yard of our state and social usage. The philosopher accentuates attention on the fact that education, pursuing «faraway goals», should not lag behind the level of moral and mental development that was reached by it before. In the article «Revolutionary shiftlessness» written in the summer of 1917 for the collection «Black fire», V. V. Rozanov notes that he was distressed due to the absence of identity in the Russian people for long, «...

compiled, imitative people taught by the foreigners to the core that can't produce anything original for itself» [3,389–395]. In the section «About gymnasium reform of the seventies», the philosopher addresses the system of classic education defended by M. N. Katkov and which, in the understanding of V. V. Rozanov, was quite fruitful and stimulated to think «... classicism is the only means in Russia to become a mentally independent country equal among equals in the family of the most enlightened European nations» [1, 169–179].

The understanding of V. V. Rozanov of the philosophy of education as an integral essence and system didn't find sufficient reflection in the pedagogical theory and practice. Although, the reform of the higher school is performed quite actively, there are still arguments about the borders of national identity and there is no unified opinion with regard to the level of inter-influence of European and Russian systems of values and an opportunity to somehow regulate this process. The decrease of value-educational component and narrowing of the educational process to innovative technologies provokes concern in both pedagogues and philosophers. In the realia of Russian educational system, a growth of attention to the patriotic education as an attempt to preserve this axiological phenomenon in the structure of the personality of a school child or a student is observed [6]. Philosopher E. A. Ruzankina reckons that in the future, the traditional forms of university or academic institution will only form a part of a wider area of knowledge production; herewith, the notion and logic of the technology transfer will shift to the center of the value system of the research university [5].

Spanish philosopher and publicist J. Ortega y Gasset was always a supporter of the European path of development for the Spanish society, which lagged behind in its cultural development compared to the leading European countries at the beginning of XX century. Special significance is given to the reform of the university education by the philosopher, the main provisions of which were set forth in a speech before the students of the Madrid University in 1930 and then in 1931 before the students of Grenade University. The main provisions of the speech were published under the name of «Mission of a university». The Spanish philosopher understood the values of the higher education in the context of those problems that took place in Spain at that point of time. Although, unlike Spain, the Russian education does not have a task to liquidate illiteracy today; however,

the importance of the set tasks of social and economic development of the country requires a high professional and personal preparation. Speaking about what a university should be like, J. Ortega y Gasset puts the task of cultivating important cultural areas of knowledge to the first place to primarily make a cultural personality answering the level of time out of an average person. The second task is to make the average person a good professional — a doctor, judge, and mathematics or history teacher. The philosopher divides the notions «science» and «profession» thinking that science requires a special, rare talent that cannot be possessed by everyone. Any average person can become a good professional and should not be distracted by scientific researches that he cannot comprehend. «... a historical importance of the need to return the university its main goal — to «enlighten» a man, cultivate the culture of time, open a big modern world with all clarity and certainty, where the man should organize their life and obtain authenticity» [4, 55].

The problem of search of value bases of education is not only a Russian phenomenon. European educational system influenced by the philosophical pragmatism and democratic ideas of pedagogy by J. Dewey is also in the search of value paradigms that are primarily viewed today within the frames of globalism [7]. On the one hand, the society dictates the man a set of certain values transferring them through education, Russian or European, and, on the other hand, the society leaves so much to the man within the frames of free choice. An attempt to avoid «europization» against the background of critical reflection should not prevent the understanding of the highest values of educational work on the formation of a personality with freedom of choice.

Conclusion. The study of the views of V. V. Rozanov and J. Ortega y Gasset on the values of education gives us a picture about an approach to understanding of the content of reformation in different countries, commonality of separate problems and a need to analyze the experience of the best universities and fruitful ideas. In the modern information-oriented society, the integration looks as an inevitable phenomenon accompanied by the value paradigm similar in the content. At the same time, one should emphasize the insufficient details of the problem of value bases of education in the national axiology. Summarizing the above, one can note the practical significance of the research for the development of additional special courses on axiology and philosophy of education.

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Section 14. Economics and management

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Economic-ecological elements in neo-institutional economic theory

Abstract: The article considers the Economic-Ecological Elements neo-institutional economics, economic and environmental transaction economics conventions.

Keywords: neo-institutional economics, transaction, economic-ecological science

The institutional structures, as a rule, do not arise spontaneously because a special role in this process is played by the informal rules that determine the moral — ethical standards of behavior. With all the variety of institutional conditions in each country is dominated a certain model of the institutional environment, which reflects the level of economic development, social, cultural and historical features of society.

The purpose of this work is to describe the methodological transformations of neo-institutional economics in the process of its genesis, with special consideration of its thesaurus.

Realization of this goal requires a synthesis of the achievements of the various areas of economic knowledge presented in the following work. The institutional approach to the study of economic processes occupies a special place in modern science. The historic priority in the formation of an independent research program of institutional economic theory belongs to the American school. Fundamentals of its methodology are contained in the writings of T. Veblen, J. Commons, W. Mitchell [4; 18; 19]. Much later arise a new institutional economics, whose methodology was developed by R. Kose, D. North, O. Williamson et al. [19].

In the domestic scientific environment, the methodology of neo-institutional economic approaches studied by V. Geyets, A. Gritsenko, V. Dementieva [6]. The works of I.M. Vakhovich, Z.V. Gerasimchuk, V.A. Golyan, B.M. Danilishin, V.M. Tregobchuk, M.A. Hvesik, I.A. Aleksandrova, A.I. Martienko [1–7; 15; 16] are devoted to the institutional transformations in the economic and environmental sector.

However, it should be noted that in most cases we investigate the importance of an individual institutions while the characteristics of the institutional environment is still poorly understood. This category is either not considered at all, or it is given the secondary importance [18].

In modern economics the particular attention in the questions of property is given in general to the institutional theory. However, it should be noted that the institutional theory approaches to the issues of property from the legal point of view [5].

For the economic and environmental aspects there is not any unified concept or tools which provides it and covering all the stages of social reproduction of basic economic and super-structural (political, legal, scientific, educational, and others) relations of ownership to the natural objects [12].

The controversy arises from the fact that representatives of economic science consider that “property» is a legal category [9], and the legists believe that it is an economic category [1].

Property — is an economic category, through which is manifested the nature of relationship of social systems, collective groups of individuals, with the objects of the material world and the results of material production, its objects and things [1]. law Institute — is the system of unrelated legal norms, relatively isolated from the others, which are regulating certain group (type) of homogeneous social relations. Institutions of law are an essential link in the whole system of law. As a rule, each branch of law has certain law institutions as its independent structural unit [9]. The Environmental law institute -is a relatively isolated a set of environmental standards and principles that govern and protect the homogeneous ecological relationships [15].

Under the term opportunism (fr. Opportunism — opportunism from the Latin. Opportunus — comfortable, convenient, easy) is often enough understood the behavior, the aim of which is to provide benefits by dishonest means (opportunism). B. Korniychuk believes [10, p. 245], that the opportunism is the behavior, which aimed at the pursuit of self-interest and is not limited by considerations of morality, that is, with the use of deception, cunning and guile. This view is shared by P. Milgrom and John Roberts, who believe that opportunistic behavior — is “selfish behavior which is not constrained by considerations of moral order” [14, p. 379]. Transaction realization of property relations are economic and legal relations on the transfer of economic and legal rights of the subject of natural capital and receiving an income from its operation, as well as all the other economic and legal rights and obligations according to the “bundle” of rights considered in the context

of the ownership of natural resources [11]. The transaction may have a one-time character or repeated many times. It can be aimed at a complete change of ownership or only transfer the right of use of the natural capital.

Change processes of transactions can be classified as follows by areas of exchange of objects of the property:

— The transaction on the exchange of ownership and natural capital objects between the owner and user of natural;

— The transaction on the exchange of property to a natural capital object and execution by other subject the specific complex of works on protection, restoration and reproduction of natural resources;

— The transaction on the exchange of ownership to a natural capital objects and to the investment capital of its other owners;

— A loan transaction under the ownership for the objects of natural capital (mortgage) [12].

In our opinion the neo-institutional economic and ecological concept should be based on five "pillars". These pillars: economic and legal relations, economic relations of property, contractual relations and economic and environmental transaction, opportunistic behavior. Such a statement is intersected with the views of other Ukrainian scientists — institutionalists, [11; 16].

Each of these "pillars" can be represented as a vertex of a pentagon (economic and legal relationship (L), the economic relations of property (P), the contractual relationship (C) and economic and environmental transaction (T), opportunistic behavior (O)), which is formed by vectors. The main vectors are forming an appropriate cycle: $L \rightarrow P$; $P \rightarrow C$; $C \rightarrow T$; $T \rightarrow O$; $O \rightarrow L$.

Each of these vectors has its economic and environmental exegesis and institutional interpretation and can be described separately.

Connection between the economic and legal relations and the formation of economic relations of ownership is obvious, A.I. Martienko describes it as follows [11]: Institutional theory puts in the first place and focuses on the legal issues of expression and securing property. However, the legal issues of ownership are secondary and objectively reflect the basic relations of production, which are based on property relations [12].

The connection between the property (P) and contractual relationships (C) on the economic and environmental sphere is shown in the following ... Treaty, being an agreement between the various actors in the field of environmental management may include regulatory standards for the sides, establishing not only the rights and duties, but also specific rules of conduct. The main purpose of the contract is in the regulation of people's behavior in the framework of the law by designation of its borders and determine the consequences of violation of the relevant requirements [11, p. 10].

Interconnection between the contract (contract, Conventional) relationship (C) and transactions (T) has the following feature: not all types of transactions (eg, transaction rationing, transaction management, transaction transaction [22]) associated with the contractual relationship, but contractual relations are realized, usually through transactions.

As a rule, a contract (convention) is static, and the transaction is a dynamic display of the contractual relations.

Transaction – is a strategic relationship in the course of economic activity, the transactions - are actions that forms the motivation for economic activity.

Economic and environmental transaction can be considered as part of the deal of usage of nature, which, in its turn, can be described by the following heuristic formula:

Usage of nature = Transformation of resources + Economy-Environment transaction

Under the economic and environmental transaction is understood an elementary economic interaction between the subjects of usage of nature, which determines the shape, direction, contents and motivation related resource transformation in the process of usage of nature.

The connection of transaction (T), including economic, environmental and opportunistic behavior (O) is manifested in the behavior of economic agents, which, in accordance with its own interests, prejudicing the interests of the partners, including environmental, economic and environmental interests.

A significant part of social institutions - traditions, customs, legal norms – is admitted to minimize the negative effects of bounded rationality and opportunistic behavior [2]. The intention of institutions to restrain opportunistic behavior of economic and economic-ecological studies is becoming a source of legal relations and legal institutions (L).

Conclusions:

1. Methodological approaches of neoclassical direction of the economy are not enough demand in the process of forming the basis of modern economic reforms. However, namely the neoclassical theory, which describes the subtle mechanisms of self-regulation of a modern society based on economic, social and psychological motivation is able to clarify the processes of market formation as well as decision-making. As shown in the presented work the attribute of cyclic recurrence and coherence appears quite clearly in neoclassical economics.

2. Methodological commonality which is manifested in the properties of cyclic recurrence, systemic, synergies and special significance of communication mechanisms between the neo-institutional and economic and environmental (ecological) theory allows to use the methods of neo-institutional theory in the application for solving economic and environmental problems.

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The mechanism of competitiveness management of production infrastructure of international airports in the global air transportation market

Abstract: The main task of the article is to justify the mechanism of competitiveness management of the production infrastructure of international airports in the context of globalization.

Keywords: airport, production infrastructure, competitiveness, world market of air transportation.

In the modern conditions of production internationalization and liberalization of the world economy, integration and globalization, the acute problem is the increasing of the competitiveness of production infrastructure of international

airports (PIIA) in the global air transportation market. The production infrastructure of international airports occupies a special place in the world economic system. It is a complex dynamic subsystem of the global production infrastructure,

which is necessary to create the conditions for the effective functioning of the airports. Competitiveness of production infrastructure of international airports affects the competitiveness of the airports, industries, national economies into the world economy as it is an important factor in the localization of economic activity and ensuring of the world trade, increasing the mobility of production factors, regional economic development and socio-economic development in general.

Based on the works of famous scientists — Belobaba P., Button K. [2], Canning D., Charlotte N. [3], Dobbs R. [4], Forsyth P. [5], Gillen D. [6], Jonkhoff W., Kanaya H. [7], Kapur A., Kessides I., Manshanden W., Odoni A., Pedroni P., Reynolds T. [1], Rus G., Vega H., Winston C. — we have initiated research the particularly of improving the competitiveness of productive infrastructure of international airports in the context of globalization [8; 9]. However, the improving of the competitiveness of production infrastructure of international airports as components of a global industrial infrastructure is a relatively new process, which is not sufficiently studied by economics yet. This confirms the relevance of the study.

Production infrastructure of international airports essential role in shaping the global economic system and dynamic development of the global aviation market indicate the need to develop and implement management mechanism competitiveness of production infrastructure of international airports in the global air transportation market (Fig. 1).

We believe that the mechanism of competitiveness management of production infrastructure of international airports in the global air transportation market is part of the mechanism of functioning of the global aviation market and that it is a subsystem that is associated with management of the impact of different levels (global, regional, national) through the implementation of principles, methods, forms and tools of influence on competitiveness of production infrastructure of international airports with coordination of interests of all stakeholder groups in the strategic development of airport infrastructure.

The mechanism aims to achieve its strategic goal — increasing PIIA competitiveness in the world market of air transportation in the global competition.

To achieve this goal affect resource constraints that depend on the conditions of the global aviation market and are influenced by many factors: political, legal, economic, technical, natural-geographic, socio-psychological, demographic. Therefore, the introduction of PIIA competitive management mechanism is necessary to take account of the prerequisites of the global aviation market.

At the base of system of competitiveness management of production infrastructure of international airports through the proposed mechanism is the management of airport infrastructure competitiveness factors, which eventually creates additional competitive advantages for the national economy in the global economic system, promotes economic and social growth.

Commitment to systematic, strategic importance, priority, synergy, commitment, consistency, flexibility, hierarchy

principles will promote the formation of scientific management mechanism dynamic model of PIIA competitiveness, which will be able to evolve due to changes in the global environment.

Given the multi-level system of PIIA competitiveness management requires separation the methods of regulation, coordination and cooperation. The regulation method primarily applied by global aviation institutions at the regional level and is used in the liberalization of airspace. A method of coordination appears in close contact of all levels of institutional support of PIIA competitiveness management. The method of cooperation is used at the regional level in the form of intensive intergovernmental cooperation, at the national level it is used for institutions implementation, developed at the global or regional levels. These methods will effectively organize activities aimed at resolving the issue of increasing the PIIA competitiveness in the global aviation market. It should be added that at the national level the country-specific techniques of PIIA management competitiveness are used.

By the means of influence on the object of control it will be appropriate to use political, administrative and legal, organizational, economic and socio-psychological methods.

Mechanism of PIIA competitiveness management involves the introduction of a number of instruments, one of which is the integration of airports. In the airport sector there is both vertical and horizontal integration. The combined efforts of the airports, airlines and other service companies to provide integrated air freight services allow you to create global service network that ultimately enhance competitive advantages of PIIA in the global aviation market.

In the order to increase the PIIA competitiveness we also offer the implementation of tools such as improving the efficiency of state regulation in the field of PIIA competitiveness, creating conducive conditions to the business at the airport or in the immediate vicinity, PIIA integration in the transport system, introduction of modern integrated information technology. It is important to stress that the list of specific instruments varies due to changes in the global aviation market, the appearance of new tools, improving the basic elements of PIIA management competitiveness, that is the objective process of renewal.

The mechanism of strategic management of production infrastructure of international airports competitiveness in the global air transportation market effectively implemented in the technology of management. In applying the process approach that considers the general functions of management as interrelated, the management technology of PIIA competitiveness is used through rational and logical consistency of decision-making and implementation of specific measures.

Thus, it should be noted that developed by us structure and content of management mechanism of PIIA competitiveness in the global air transportation market is a universal scheme and can be used as the base model for the management of airport infrastructure competitiveness of any airport in the world economic system.

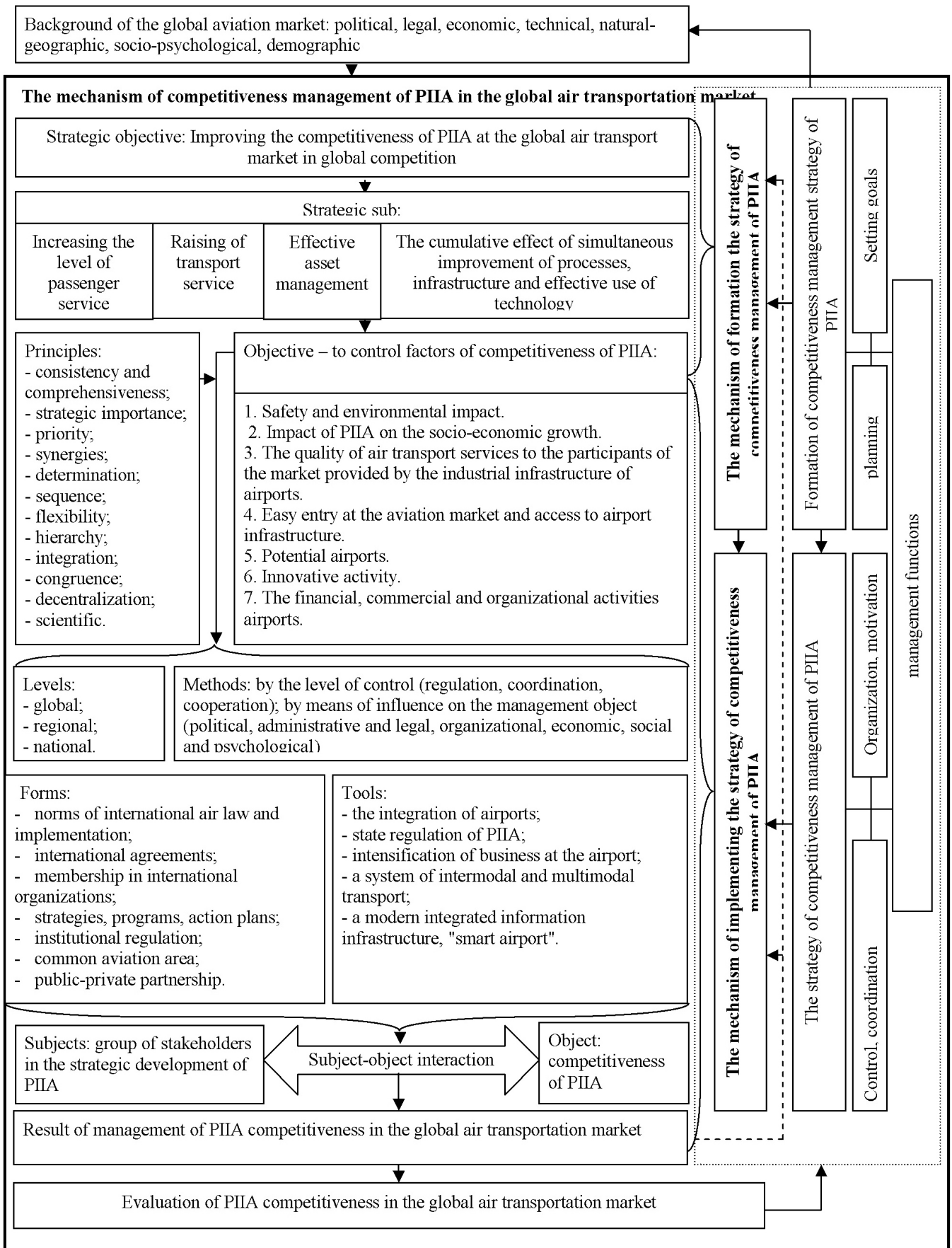


Fig. 1. The mechanism of competitiveness management of production infrastructure of international airports in the global air transportation market

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Section 15. Science of law

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Conceptual problems of specialized courts system formation (case study labour justice)

Abstract: In the Concept of long-term social-economic strategic development of the Russian federation for the period until 2020, which was ratified by the edict of the Government of the Russian Federation dated from 17 November 2008 № 1662-p in order to increase the effectiveness of political and legal institutions and to provide the enforcement of the Russian Federation legislation, the judicial reform was named. This reform provides efficiency and justice of the court decisions. In this regard the matter of creation of specialized courts, which would improve the quality of case consideration, is broadly discussed.

Many options of the most acceptable judicial system structure are offered. Case study labour justice the necessity of specialized labour courts establishment and foundation in the Russian Federation is considered. The reason is the huge amount of labour relations cases and the specificity of the court procedure.

On the basis of procedural peculiarities of labour disputes resolution and settlement in the Russian Federation research and analysis of the foreign experience the author offers a concept of labour justice formation in the Russian Federation and formulates the definition of a specialized court.

Keywords: specialized courts; judicial system; system of justice; specialization of judges; labour justice; labour courts; labour relations; individual labour disputes; collective labour disputes; labour procedural law.

From the beginning of the nineties of the twentieth century the establishment of specialized courts deciding financial, labour, patent, tax, administrative, family and other types of disputes [2, 1; 5; 8, 44–46; 10, 9; 12; 13] was continually offered in legal literature.

The resolution of Federation of Independent Trade Unions of Russia General Assembly Executive committee dated from 17.09.1997 № 6–3 "On measures for reinforcement of social and labour employees' rights protection" entails the preparation to the establishment of labour procedural legislation and formation of specialized labour courts. In accordance with the article of the Federal Constitutional Law dated from 31.12.1996 № 1-FKZ «On the Court System of the Russian Federation» stipulates constitution of specialized courts.

Many different opinions are expressed in the scientific literature on the matter of specialized courts, judges' specialization and the optimal judicial organization.

It seems that the courts' specialization is stipulated a variety of causes: firstly, their establishment would inspire the reinforcement of the judicial system; secondly, consideration and settlement of a concrete category of cases provides higher professionalism of judges; thirdly, special jurisdiction courts provide the promptness of court proceedings.

Thus specialized court is a government body of judicial branch of power administering justice while resolving disputes and considering triable concrete categories of cases under civil, administrative and criminal proceedings.

The specialization is possible under following characteristics: object; subject structure of the participants. But from our point of view the primary criteria of the specialization is the subject structure of the matter in controversy parties.

Foreign experience shows that in practice specialized labour justice is necessary as it encourages the effective labour disputes resolution. Labour courts were created in many countries but it is necessary to highlight the countries where regular courts are not involved into considering labour relations disputes. These are, for example, Germany, Israel, France, Finland. Countries which have special judicial assemblies in regular courts are Italy, Japan, the Netherlands. Employment tribunals operate in Great Britain and the USA. Tribunal system encourages the fast and effective disputes consideration.

In many countries labour court decisions are one of the labour law sources [10, 96].

Article 37 of the Constitution (passed by nation-wide voting and dated from 12.12.1993) human and citizen right to individual and collective labour disputes with use of stated in

the federal law ways of their settlement including the right to strike.

Labour legislation does not give a definition of “a labour dispute”. It only divides it into two types — individual and collective — and settles the rules of its resolution. We suppose that labour dispute is a conflict between employee and employer on the matters of labour conditions appliance which are stated by labour legislation norms, by collective and labour contracts which were not considered by employee and employer.

There is a variety of discussions on the matter of reasons and conditions of labour disputes appearance [1, 176; 3, 182–184; 14, 14]. We suppose that the circumstances causing conflicts between labour relations subjects connected with appliance, interpretation or ignorance or incorrect interpretation of a legal act, local normative act, labour contract should be treated as reasons to labour disputes appearance. Labour disputes appearance conditions become concrete reasons in a labour dispute.

Thus we can conclude that juridical facts, caused conflicts between labour relations subjects, in other words any violations of employee’s rights and his obligations to the employer should be understood as reasons to labour disputes appearance.

Thus when the parties do not perform labour rights and obligations, stipulated by an employment agreement, conflict occurrence is possible.

Let us consider a labour dispute and demonstrate the ways of its solution. For instance, an employer does not timely pay salary or illegitimately withholds some part of salary. In accordance with the employment and labour laws, an employment agreement has a refundable character. An employee performs work in a certain labour function at a charge. One of the main obligations of an employer in accordance with the article 56 of the Labour Code of the Russian Federation is the obligation to pay salary to an employee timely and in full. The Constitution of the Russian Federation (art. 37) and Labour Code of the Russian Federation (art. 21) state that an employee is guaranteed a right to receive salary within the legal period.

In accordance with the article 236 of the Labour Code of the Russian Federation, when an employer violates the term of payment of salary, vacation compensation, dismissal payments and (or) other payments, due to an employee, it must pay these with interest (monetary compensation) at the amount not less than one three hundredth of the active official bank rate of the Bank of Russia for the amounts not paid in time for each day of delay, starting from the day next to the stipulated period of payment till the day of actual pay off inclusive.

Pecuniary compensation in accordance with the 236 of the Labour Code of the Russian Federation is accrued on the amounts due to an employee, i. e. the amounts, received after withholding of tax on individual income (hereinafter referred to as TIPI). The compensation paid is an income that is exempt from taxation in accordance with the p. 3 of the article

217 of the Tax Code of the Russian Federation. If the said compensation exceeds the minimal amount, stipulated by the Labour Code of the Russian Federation, the amount of excess is also exempt from TIPI in accordance with the letter of Ministry of Finance of Russia dated 28.11.2008 № 03–04–05–01/450.

When salary is withheld, an employee may use his or her right to self-defense (suspend work). This right is provided by Resolution of Plenum of Supreme Court of the Russian Federation dated 17.03.2004 “On application by courts of the Russian Federation of Labour code of the Russian Federation”. The labour Code of the Russian federation states that an employee may suspend work in the case of delay of salary payment for more than fifteen days for the entire period until payment of the withheld sum, except for the cases, when such suspension is not allowed (art 142 of the Labour Code of the Russian Federation).

An employer may be subjected to administrative or criminal liability for failure of timely payment of salary.

Individual disputes are resolved by labour disputes commissions and courts. Pursuant to statement 1 part 1 art.22 of Civil procedure code of the Russian Federation and articles 382. 391 of Labour code of the Russian Federation cases on disputes which occurred from labour relations are subject to regular courts.

In accordance with Labour code of the Russian Federation courts directly consider individual labour disputes upon application of:

- 1) Employee — about reinstatement of employment irrespectively to the reasons of labour contract termination, about the change of date and formulation of the dismissal reason, about the transfer to another job, about the pay of forced unemployment time or the pay of salary difference for the time of lower paid job performance, about employer’s wrongful action or omission of act while processing and protection of personal data;
- 2) Employer — about employee’s reimbursement of damage caused to the employer unless otherwise stipulated by federal laws;
- 3) About the refusal to hire;
- 4) Persons working under labour contract for employers-individuals, who are not sole proprietors, and religious organizations employees;
- 5) Persons who suppose they were discriminated.

Labour disputes consideration in court has its procedural peculiarities. Firstly, only labour disputes commissions (LDC) are entitled to labour disputes consideration as well as courts. They are formed in enterprises and organizations from an equal number of employees’ and employer’s representatives. However civil procedure norms do not regulate the matter of dispute transfer from LDC to the court. Secondly, labour law principles are different from the civil procedure law principles. They express essential characteristics of norms of this law area and are formulated in art. 2 of Labour code of the Russian Federation. Thirdly, according to the general rule of territo-

rial jurisdiction the case is considered upon the registered address of the defendant (art.28 CPC RF). Fourthly, according to the part 1 art. 392 LC RF the employee has the right to file a lawsuit to court seeking individual labour dispute resolution within three months from the day he found out or must have found out that his right was violated; regarding dismissal disputes — within one month from the day he was issued a labour book; regarding the cases of material damage reimbursement caused to the employer from the employee — one year since the date of damage discovery. It is always difficult to define the starting date of this period. Fifthly, taking into account the adversarial principle as provided for by art.12 CPC RF and the provisions of the art. 56 CPC RF which state that each party has to prove the circumstances it refers to as to the basis of its demands and responses, the obligation to prove the presence of facts obstructing the person referring to the additional (new) evidence to provide it to the first instance court is lied on that person. But not all testation provided by the parties to the court can be accepted. The court estimates the evidence from the point of their relevance, admissibility, credibility. Sixthly, while considering labour disputes it is necessary to take into account the specificity of labour legal personality of labour relations parties. So, labour dispute cases between a shareholder who is an individual and a corporation, other business partnership participant or company and this business partnership or company are subject to regular courts.

In the case of a problem occurrence, if the dispute appeared between the above-noted subjects is a labour one, the courts have to define that these relations are based on the agreement between the employee and the employer about the paid personal performance of labour functions by the employee (work due to the position in accordance with job pattern, profession, specialization noting the qualification; concrete type of work instructed to the employee), employee's compliance with internal code of labor conduct while providing the employer working conditions as provided for by labour legislation and other normative legal acts, collective contract, agreements, local normative acts, labour contract (art.15 LC RF), and also if the case is subject to this court [11].

Individual labour disputes which are not regulated by the employee and the employer who is an individual but not a sole proprietor on their own are considered by courts only.

Seventhly, it is necessary to take into account the peculiarities of considering other categories of cases. In particular considering recovery of wages cases. So, while considering cases initiated by the employee labour relations with whom are not ceased on the matter for the recovery of accrued but not paid wage it should be taken into account that the employer's allegation itself for the default of the term for the worker to go to court can not be the grounds for the refusal to satisfy the requirements. This is because in the considered case the time limit for having recourse to the court is not defaulted as far as a violation of a long-term nature, and the employer's obligation to pay the salary to the employee timely and in full (the more delayed sums) persists within the validity period of the

labour contract. Eighthly, it is necessary to take into account that while filing a lawsuit to the court making claims which result from labour relations including failure to perform labour contract provisions or their defective performance which have civil legal nature only employees are free from paying duties and court costs.

Chapter 61 of LC RF as general provisions of collective labour disputes consideration order stipulates the provisions about collective labour disputes consideration in the form of conciliation procedures consisting of collective labour disputes consideration by the conciliation commission in order to resolve it with the participation of a mediator and (or) in labor arbitration; about the acknowledgment of a strike as the way to resolve a collective labour dispute; about the lock-out prohibition.

From legal viewpoint, a conciliation commission is the jurisdictional agency that contributes to settlement of a collective labour dispute and consists of representatives of these parties. Emergency of legal personality of the conciliation commission is connected with the peculiarities of its formation. This agency develops upon an initiative of one of the parties from the moment of appearance of collective labour dispute (conflict) with equal number of representatives of the parties. Thereat the parties independently set forth the requirements to the candidates for the conciliation commission members. In this aspect a special education and professional training and so on is of great importance.

In accordance with the part 1 of the article 403 of the Labour Code of the Russian Federation, not later than the next business day after the day of composition of a statement of disagreements by a conciliation commission the parties of the collective labour dispute are obliged to hold negotiations on consideration of the collective labour dispute with the participation of a conciliator. In case of failure to achieve agreement of the parties of the collective labour dispute a statement on refusal of the parties or one of the parties to hold this conciliation procedure and they commence to negotiate on consideration of the collective labour dispute in labour arbitration.

A conciliator has the right to [4]:

- 1) request and receive from the parties necessary documents and data, On the collective labour dispute;
- 2) within the process of consideration of the collective labour dispute hold if necessary joint or separate meetings of the representatives of the parties;
- 3) offer his or her own possible variants of solution for the collective labour dispute;
- 4) sign decisions, adopted by the parties of the dispute with his or her participation.

The conciliator is obliged to keep national security information, official secrecy, commercial or other secrets protected by law when performing his or her functions during participation in the conciliation procedures.

Foreign experience increases the significance of state conciliators — specially appointed civil servants and government bodies. For example in Finland a so-called state conciliator is

appointed, in Federal Republic of Germany a conciliator at the ministry of labour is performing, who participates in the settlement of disputes when agreements are concluded on the federal level. International practice distinguishes compulsory and voluntary mediation. When the compulsory mediation takes place, the parties must participate in negotiations, the mediation procedure itself. When it is voluntary, they consider just propositions of a conciliator.

In Russia the recommendations on organization of work on consideration of a collective labour dispute with participation of a conciliator are approved by Decree of Ministry of labour and social development of the Russian Federation dated August 14, 2002 No. 58. A conciliator may be any independent specialist, engaged in the participation in solution of the dispute according to will expression of the parties, which is executed in the form of minutes of meeting of their representatives. Consideration of the collective labour dispute with participation of a conciliator is completed with adoption by the parties of an agreed resolution in written form or creation of a statement of disagreements.

In accordance with the part 2 of the article 401 of the Labour Code of the Russian Federation, the parties are obliged to hold negotiations on consideration of a collective labour dispute in labour arbitration not later than the next day in the following cases:

- after composition of statement of disagreements on completion of consideration of the collective labour dispute with the participation of a conciliator;
- after expiration of a period, within which the parties of the collective labour dispute must reach agreement regarding the nominee for conciliator;
- after execution of the minutes on refusal of the parties (one of the parties) of the collective labour dispute from the consideration of collective labour dispute with the participation of a conciliator.

In the presence of consent of the parties of the collective labour dispute to consider the dispute in a labour arbitration, they conclude a corresponding agreement, on the basis of which its decision becomes binding for the parties.

The labour arbitration considers applications of the parties of the collective labour dispute; receives necessary documents and data, relating to this dispute; informs in case of necessity the governmental authorities and local government bodies on possible social consequences of the collective labour dispute; passes a resolution on the essence of the collective labour dispute.

The result of consideration of the collective labour dispute in the labour arbitration is adoption of a decision on settlement of the dispute. It is composed in written form, signed by the industrial arbitrators and given to the parties of the collective labour dispute (recommendations on organization of work on consideration of a collective labour dispute with participation of a conciliator are approved by Decree

of Ministry of labour and social development of the Russian Federation dated August 14, 2002 No. 59).

The Labour Code of the Russian Federation points out the possibility of execution of compulsory arbitration in the cases, when performance of strikes is restricted or prohibited by law.

The decision is made taking into account all the circumstances of the case in strict adherence to active laws and other normative legal acts in the sphere of labour. If the parties fail to arrive at an agreement on creation of a labour arbitration, its composition, rules and empowerment, the decision on these matters is made by a corresponding agency for settlement of collective labour disputes.

Employees are entitled to use the right to strike in cases when all the measures for realization of the said procedures have been used, but the dispute remains unsolved or an employer and (or) its representatives do not perform the agreement achieved. The decision on announcement of a strike in accordance with the part 1 of the article 410 of the Labour Code of the Russian Federation is adopted in two ways:

1) by employees of an organization at a general meeting (conference). Proposition on carrying out a strike is brought up at a meeting (conference) at the suggestion of representative body of employees, heretofore authorized by them for settlement of the collective labour dispute;

2) by a trade union, representing the employees. The decision on declaring a strike, adopted by a trade union (association of trade unions), approved for each organization by a meeting (conference) of employees of the given organization.

In Russia there are different points of view on the matter of labour justice development: labour courts as well as other federal courts must be included into judicial system of the Russian Federation [7]; it is necessary to create Labour procedure code. This is because, first of all, of a particular subject composition of labour relations, that is why it is exceedingly important to administer procedural rules instead of creating new structures, in particular — labour courts [6]; one of the effective ways of resolving labour disputes is the establishment of arbitration courts [9].

After making a research of different points of view we suppose that it is necessary to establish Judicial divisions considering labour relations disputes in regular courts in Russia. As part of the Judicial division may be formed judicial panels. Judicial division in its activity will follow Labour procedure code. The specialization of Judicial division considering labour relations disputes should include cases resulting from individual and collective disputes. The procedure of these cases consideration will have its peculiarity.

In conclusion we would like to note that the establishment of specialized labour courts, from our point of view, will provide reliable, effective and professional protection of citizens' labour rights.

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