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Section 1. Archaeology

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Distribution of metal throughout the coastal margins of the Okhotsk Sea maritime region

Abstract: A review of the archaeological record of the appearance of metal in the Okhotsk Sea region and a periodization of the development of ancient cultures in this region are provided in the article.

Keywords: the Okhotsk Sea, coastal territories, Old Metal Age, early Iron Age.

The problem of the appearance of the metal in the Far East is one of the most difficult in the archeology of the region. Researchers ancient past of this region faced with the facts of uneven development of human societies in this part of the Asian continent, caused by natural and historical reasons. Assigns to companies with forms of economy and material culture of the Neolithic appearance, which were away from the more developed communities Bronze and Iron Ages, were used the terms "Remnant Neolithic" and even "undeveloped Bronze Age" and "undeveloped Iron Age" [5]. However, new archaeological materials obtained in the last decades in the Far East, have allowed more thoroughly analyze the available data on the problem and justify the need for the distinguish of the Paleometal era.

Copper products — a small rod of the awl of the rectangular cross section and the composite crankshaft knife with a copper blade and ivory handle (Spafareva site) [10] found in sites of the Tokarev culture (VIII century BC – V century AD) of the Northern Okhotsk coast, as well as found handle cutters equipped with iron blades (the Upper site on Zavyalova Island, settlements Spafareva and Olskaya) [9]. The active use of metal tools of Tokarev people also show a wide variety of bone tools with traces of metal instruments. Many products are ornamented with thin lines, testifying about using iron cutters for their making. Typical for Tokarev culture points and knives made of stone and with a set-off bases and hilts designed with special and pointed side projections, and sometimes a sharp spur at the base, are copies of metal tools or stone replicas.

Ironware penetrated to the Northern Okhotsk coast from Amur and Primorye coastal tribes [3, 190]. Using iron contributed to the development of sea mammal hunting and the making bone tools.

Widespread use of iron instruments in economic activity in the North of the Okhotsk Sea coast existed in the Old Koryak culture (V–XVII centuries) [3]. For early stage characterized by a predominance of stone tools, bone products making not only stone tools, but also metal.

Koryak actively using iron tools (knives and cutters) with the X century, the iron was used in the form of rivets of harpoon heads. At settlement Atargan was found slag. At this time there is flourishing of bone industry. Increases the number of bone arrowheads, leisters points, harpoons heads; combs, needles, needle cases, adzes, hoes, spades. Appear protective plates for wrist, armored plate, flat hunting knives. Prototypes cuirass plates and hunting knives, apparently, are metal products. Harpoon heads become more diverse in forms and specializations. The most typical harpoon heads is with obliquely truncate base and a one basal spur. And some of these heads have a slot for end iron point.

Knives of iron found in Atargan [3, Table. XVIII, 6], Three Brothers [3, Table. XLI, 4] and Astronomicheskaya sites. The iron leister point found in the upper layer of Oksa I [9, Fig. 147, 1]. A charcoal sample from the layer gives a date of 860 ± 40 (Beta- 155136), calibrated date 1040–1260 AD.

The iron rod like point with a small stem [9, Fig. 149, 4], toggle harpoon heads with narrow slits for metal blades at the top, as well as bone, probably a ritual knife with a handle and a circular pommel, copying, apparently, the iron sample was found on the Stanyukovicha site.

Koryak continue to use iron tools in XII–XV centuries. This is evidenced by findings harpoon heads, which equipped with iron blades, bone and wooden handles of knives; the wide treatment of bone using cutting and sawing, the engraved ornament on bone products.

Bronzes found on the Old Koryak sites. The point (the tip-insert with two hanging barbs for toggling harpoon heads) discovered on the Stanyukovicha site, and the button was found on the Svetlaya-2 site. Very interesting finding is the Sung bronze coin from the Srednaya site, which was issued during the reign of Emperor Jen Tsung of Northern Sung Dynasty in 1038–1040 AD [3, 109].

Toward to the middle of the II millennium BC stone and bone tools of the Old Koryak culture have become increasingly

rare. There are products of iron, ceramics is much rarer, and then disappears completely.

Pieces of iron found on the Old Koryak site Kavran (the west coast of Kamchatka), relating to the period XIII–XV centuries. According to R. S. Vasil'evsky [3, 128], the population of Kavran was not only familiar with the use of metal, but, apparently, knew ways to handle it.

It is believed that the main source from which the iron spreads to north Okhotsk coast was the Primorye region.

Metal products found at the number of sites, located to the south-west of Tauisk Bay [9]. Iron tools found at sites Kukhtuy VII and Kukhtuy VIII under Okhotsk, Nagdan site in 15 km. from the mouth of Ulya River and at the site Uyka under Ayan. Materials indicate that the appearance of iron in this area was in the end I millennium BC — the first half of I millennium AD. However, the iron in this period is rarely used. Mainly stone, bone and wood tools dominated. These sites are likely to belong to the early Iron Age or Paleometal.

The Paleometal epoch in Kamchatka spaned more than a thousand years — since the end I millennium BC before the II millennium BC [15]. The end of this era is associated with the appearance of deer-breeding. In this time at the north of the Far East, including the Kamchatka Peninsula, finished goods and fragments of objects of different metals (copper, bronze, iron) regularly receives on exchange from the area on the Okhotsk coast of the Amur Region and southern Primorye through the Japanese and the Kuril Islands. In the I millennium AD polished stone knives and many tools and thinks of bone and antler appeared, and in the II millennium ironmongery (knives and hooks) were found [16: 280, 281]. Traces of iron knife are on a bear canine from the site Red Partisan I, relating to I millennium BC [11, 112]. The wide spreading of bone artifacts in the Old Itel'men monuments I millennium BC probably due to the use of metal tools. Polish knives also show on the use of metal knives in this time that may have copied the metal specimens.

Iron knives (one safe and two fragments) and 18 Japanese bronze coins of during the reign of Kaney and bronze smoking pipe found in the upper layer of Zhupanova site [11, 47, Table. 1]. Layer dated XVII–XVIII centuries. The amorphous bronze plate found in the dwelling on Cape Siyushk [4, 94]. Copper products (arrowhead, fragment indefinite artifact, several amorphous small plates) were found in the Lopatka site [4, 44]. Iron products together with ceramics, typical for late Ainu culture Naiji, found at several localities in South Kamchatka. Bronze coins *Kaneytsuho* found in southern Kamchatka in the Bol'shoy Kamen' site, near the mouth of the river Ozernaya, on the Sivuyskiy Cape of Kurile Lake, in Lopatka I and Ryabukhina sites.

Formerly, researchers have noted the later appearance of metal products in southern Kamchatka and the east coast of the peninsula [4, 167; 11, 190]. It is likely that metal products could get to Kamchatka already in I millennium AD. It is doubtful to attribute sites I and II millennium AD to the Neolithic and to unite sites this time to the earlier period (Tarya culture for N. Dikov) into a common Taryinskuy culture with three periods (Tar'insky, Kronotsky and Nalychevsko-Nikulskiy stages), the existence of which is determined by the period from the beginning of the III millennium BC to the XVII century AD [13; 16, 279–281]. It was not very successful the consolidation of same periods under the title Old Itel'men culture [12].

In the north-western coast of Kamchatka stands the culture or monuments type Tevi [14]. This culture finds most analogies in the Old Itel'men and the Old Koryak cultures, several elements characteristic of Neoeskimo, Aleut and south Okhotsk maritime cultures. Perhaps monuments type Tevi represent one of the local variants of the Old Koryak culture of I millennium AD in Kamchatka. These sites belong to the Paleometal period [15].

Sakhalin archaeologists is noticing the first signs of the use of population metal in complexes of the first half of I millennium BC. Probably, in this time the island cultures were experienced the influence of early Iron Age cultures — Urilskaya (XI–IV centuries BC) and Poltsevskaya (V century BC – IV century AD). Metal products (iron and bronze) arrived on the islands from the mainland.

The Aniva culture (VIII–III centuries BC) is relating for the transition period from the stone to the metal [2]. It is believed that this culture is one variant of generality of final Jomon — early Post-Jomon. Archaeological monuments of this community located on the shores of Aniva Bay and Tonino-Aniva Peninsula. Given the chronology and the metal epoch number of signs (thin-walled ceramic, grinding adzes) the researchers believe that the Aniva culture people were already known with the metal. Since from the middle I millennium BC the Aniva culture coexists with paleometal cultures (Susuya, Nabil and Piltun).

The Nabil culture (X–I centuries BC) selected from the Severo-Sakhalinskaya culture and is located on Northern Sakhalin. Sharp based vessels with the comb ornamentation, the diameter of the mouth of the vessel exceeds the height is characterized for this culture. Nabil monuments of culture are represented by large settlements on the shores of bays and rivers. Winter homes of the Nabil people located in the valleys of rivers and streams. In spring and summer, they migrated to the coast and lived in summer homes. Researchers believe that the people of the Nabil culture already knew metal tools, but mostly used stone tools.

The Piltun culture (V–I centuries BC) was found in the north-eastern Sakhalin near Piltun and Chayvo Bays. Reference monuments are multilayered settlement Kashkalebagsh-2, Chayvo-1, Lebediniy-1. Winter settlements gravitate to the west coast bays and estuaries of salmon rivers and summer seasonal sites located on sand spits between the bays and the Sea of Okhotsk. The materials sites have stone artifacts with high quality grinding, that is testifying about the knowledge of the population of this culture with the metal. The pottery tradition characterizing by the appearance of round-bottomed vessels vase-shaped with comb impressions indicate on connections with continental cultures.

The Bolshebuhtinskaya culture (middle – second half of I millennium BC) allocated on the Lower Amur [17]. Ceramics of the bolshebuhtinsk type found in the north-west coast of Sakhalin (the site Kefi), as well as in the place of the Nevskoe Lake (Zapadnoe 10, Donskoe 3, Berdyanskoe 2) [2]. Apparently the bolshebuhtinskaya culture exerted a certain influence on the development of the culture Paleometal in northwestern Sakhalin.

The Susuya culture (V–IV centuries BC – IV–V centuries AD) formed in southern Sakhalin, but later took up the most part of Sakhalin and spread to the northern part of Hokkaido. Sites of this culture found on the islands Mineron, Rebun and Risiri. Ceramics of the Susuya type was found on the Lower Amur and on Okushiri Island (south-west coast of Hokkaido) [2]. Total of about 50 sites of this culture are known. All sites of the Susuya people linked to the seaside. Usually settlements consisted of a few dwellings. Summer houses located on sand spits at the mouth of the river near the coast. Winter settlements were located away from the sea in the valleys enclosed from winds. The most famous settlements on Sakhalin — Starodubskoe 2, Kuznetsova 1, Ozersk 1, Belinskoe 1, Ust-Ainskoe 1, Chirikova, and on Hokkaido — Onkoromanay. The Susuya culture is considering as a culture of the early Iron Age, and already subsequent cultures Okhotsk ethno-cultural community belong to the early Middle Ages [2; 16, 295–300].

Metal objects were found already at several settlements of the Susuya culture, in connection with which it has been suggested that the further study of its the iron will become ordinary thing for these monuments [1, 158]. The findings of iron tools and careful polishing of stone cutting tools evidenced on the use of metal by the Susuya people. The iron knife with a handle made of deer antlers was found on the floor dwelling in the settlement of Ust-Ainskoe. Several unidentifiable corroded iron objects also were found on another settlement Chirkova-1. Stone polished axes were quadrangular section with right angles, which is typical for metal tools [2].

The local archaeological culture Towada appears in the end of V – beginning VI centuries AD in Sakhalin [6, 201]. Settlements were located in the same places where Susuya people lived, and consisted of slightly semisubterranean dwellings. The Towada people used polished axes and splitting adzes. For the treatment of bone tools they used iron knives.

The Okhotsk culture became widespread in the second half of I millennium BC, which represents local variants or even a chain of local cultures, united in Okhotsk historical and cultural community. Okhotsk culture of Sakhalin dated within the VII–XIII centuries. In Hokkaido Okhotsk culture existed about in the period VI–XII centuries. Okhotsk culture of Sakhalin characterized by a wide use of bone and antler for making various instruments and objects (arrowheads, spears, harpoon heads, leisters, hooks, daggers and other household utensils). Stone tools are very small and presented arrowheads, chopping tools. Okhotsk people actively used tools made from the iron, bronze objects are rare.

Chronological framework of the Early Iron Age in Sakhalin defined within V century BC – XII century AD. Early Iron Age in the Kuril Islands comes later — in I millennium BC. This process involves Post-Jomon community of eastern Hokkaido and the Kuril Islands.

The transition from the Neolithic to Paleometal epoch dated around 2500–2300 years ago [7]. Boundary between the Neolithic and Paleometal in the southern Kuril Islands drew about 2000 years ago [8, 195].

Based on the foregoing review of the archaeological record of the appearance of metal in the Okhotsk Sea region, we can conclude that I millennium BC in this region is a transition stage from the Neolithic to the Early Metal. For Northern Sea of Okhotsk the period from middle I millennium BC until middle I millennium BC can be defined Paleometal era and next V–XVII centuries is Iron Age. For the Southern Sea of Okhotsk Early Iron Age has several other frameworks (V century BC – VI century AD), and further there is Late Iron Age (VII–XVI centuries).

References:

1. Василевский А. А. К понятию “неолит” и его периодизации на о-ве Сахалин.//Вперед … в прошлое. К 70-летию Ж. В. Андреевой. – Владивосток: Дальнаука, 2000. – С. 150–160.
2. Василевский А. А., Грищенко В. А. Сахалин и Курильские острова в эпоху палеометалла (I тыс. до н. э. – первая половина I тыс. н. э.)//Ученые записки Сахалинского государственного университета: сборник научных статей. – Вып. IX. – Южно-Сахалинск: СахГУ, 2012. – С. 29–41.
3. Васильевский Р. С. Происхождение и древняя культура коряков. – Новосибирск: Наука, 1971. – 250 с.
4. Дикова Т. М. Археология южной Камчатки в связи с проблемой расселения айнов. – М.: Наука, 1983. – 232 с.
5. История Дальнего Востока СССР с древнейших времен до наших дней. – М.: Мысль, 1989. – 493 с.
6. История Сахалина и Курильских островов с древнейших времен до начала XXI столетия: Учебное пособие для студентов высших учебных заведений региона по специальности «История»/М. С. Высоков, А. А. Василевский, А. И. Костанов, М. И. Ищенко. – Южно-Сахалинск: Сахалинское кн. изд-во, 2008. – 712 с.
7. Кузьмин Я. В., Горбунов С. В., Василевский А. А., Орлова Л. А., Джалл Э. Дж. Т., Бурр Дж. С. Хронология культур неолита и палеолита Сахалина (на основе радиоуглеродного датирования)//Проблемы археологии и палеоэкологии Северной, Восточной и Центральной Азии. Материалы междунар. конф. “Из века в век”, посвященной 95-летию со дня рождения академика А. П. Окладникова и 50-летию Дальневосточной археологической экспедиции РАН. – Новосибирск: Изд-во ИАЭТ СО РАН, 2003. – С. 387–391.

8. Кузьмин Я. В. Геохронология и палеосреда позднего палеолита и неолита умеренного пояса Восточной Азии. – Владивосток: ТИГ ДВО РАН, 2005. – 282 с.
9. Лебединцев А. И. Древние приморские культуры Северо-Западного Приохотья. – Л.: Наука, 1990. – 260 с.
10. Лебединцев А. И. Находки медных орудий на Охотском побережье.//Исследования по археологии Севера Дальнего Востока. – Магадан: СВКНИИ ДВО РАН, 1999. – С. 38–60.
11. Пономаренко А. К. Древняя культура ительменов Восточной Камчатки. – М.: Наука, 1985. – 216 с.
12. Пономаренко А. К. Древние культуры ительменов Камчатки. – П.-Камчатский: Дальневост. кн. изд-во, 2000. – 216 с.
13. Пономаренко А. К. Некоторые итоги исследования неолита Камчатки.//Труды II (XVIII) Всероссийского археологического съезда в Суздале. Т. 1. – М.: ИА РАН, 2008. – С. 261–266.
14. Пташинский А. В. Культура охотников на морского зверя северо-восточного побережья Охотского моря (I–II тыс. н. э.): автореф. дис. … канд. ист. наук. – М., 2002. – 23 с.
15. Пташинский А. В. К вопросу о неолите Камчатки.//Неолит и палеометалл Севера Дальнего Востока. – Магадан: СВКНИИ ДВО РАН, 2006. – С. 78–87.
16. Российский Дальний Восток в древности и средневековье: открытия, проблемы, гипотезы. – Владивосток: Дальнаука, 2005. – 696 с.
17. Шевкомуд И. Я. Большебухтинская культура в Нижнем Приамурье.//Традиционная культура востока Азии. – Благовещенск, 2008. Вып. 5. – С. 158–170.

Section 2. Architecture

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Features of polychromic harmonization of open spaces of living environment

Abstract: The features of a color harmonization of the living environment of open spaces. Necessary to achieve a balance of color combinations of natural and artificial elements of open space living environment. Defined by the leading role played by natural colors and combinations of colors.

Keywords: color harmonization, open space, living environment.

Living environment, being an important component of the architectural environment, includes a set of the architectural spaces and objects intended for people accommodation: residential houses and flats, systems of open spaces, which are located in close proximity to the housing (house adjoining spaces, spaces of the yards, communicative spaces).

Among the most important requirements of the organization of open spaces of the modern living environment we shall distinguish variability and orientation for the individualization of the environment answering to inquiries of particular consumers. It means that zones of open spaces have to be differentiated taking into account dissimilarity of the population groups and ways of life of various types of families.

The efficiency of the coloristic organization of open spaces plays an important role in formation of the visual living environment and promotes detection of unique esthetic characteristics of this environment, and also it can become correcting means for elimination of negative visual parameters [2; 4; 5].

Polychromic integrity of open spaces of the living environment is reached by means of establishment of harmonious links between palettes of elements of the natural and artificial environment taking into account dynamics of lighting and coloristic landscape changes within a day, a season.

Polychromic solutions of open spaces of the living environment with the improved ecological characteristics are based on direct use of coloristic regularities of nature; therefore, coloristic palettes of local natural materials and the local range of plants prevail [2; 3; 7; 8].

As a rule, colors of elements of the artificial environment form group of stable visual and information links, and the polychromy of elements of the natural environment belongs to the group of dynamic links.

Stable coloristic links will organize the main polychromic structure, uniting color schemes of a significant number of facades of houses, and also, fixes the main accents, creating or supporting a certain rhythmic row. One can say, stable coloristic links form a coloristic framework, which fixes characteristics of this environment and actively influences formation of stereotypes of its perception.

It is necessary to consider that in natural environment the color carries out generally two tasks — the function of camouflaging and the function of drawing attention. These functions are transformed for color elements of the living environment thus: for a housing estate neutral colors and nuance color combinations, and for such elements as the equipment of recreation areas, small architectural forms and means of visual information — active colors and contrast color combinations are used [4; 6; 8].

Stable coloristic links promote the organization of system of spatial reference points, which allows inhabitants to identify the environment easily, to associate themselves and the emotional spirit with a concrete place. Dynamic coloristic links help to realize the function of adaptation of the living environment, which relevance increases because of prompt acceleration of rate of life of the modern person.

Visual structuring spaces of the living environment must be carried out taking into account social, psychological and physiological features of perception of inhabitants. It is especially important to consider interests of people with the reduced sight and to increase the level of comfort of visual space, by means of the regulated use of colors and contrast color combinations, visual supportive means, which improve information and orientation qualities of open spaces of the living environment.

Thus it is necessary to pay much attention to the use of color for communication zones with allocation of borders and the directions of the movement, and also to formation of local colors of the recreational zones of the living environment intended for various age groups.

Efficiency of choice of harmonious color combinations for particular fragments of the visual living environment

increases thanks to application of the principle of interested perception of scarce colors, additional to coloring of the local natural environment [1, 10–11].

The important condition of harmonization of polychromic composition of the modern living environment can be considered application of reception of color zoning across and the use of a limited color palette of anthropogenous and technogenic elements, the balanced inclusion of scarce (additional) colors for the surrounding natural environment [3, 125–130].

The method of application of alternation of color modules — shades of one color, similar colors or color combinations of groups of colors — promotes the organization of the complete coloristic environment.

The method of color emphasis gives the chance to draw attention to important visual elements of open spaces of the living environment and to support the necessary level of variety.

The method of seasonal compensation consists in use of the bright warm chromatic shades and combinations, which carry out the function of antidepressants during the autumn and winter period.

The method of inclusion of achromatic shades (mainly white and gray) in coloristic solutions of elements of the artificial environment can be used for demonstration of gradation of reflexes, which are well noticeable at bright lighting. Thanks to such optical effects, and also to the application of the glazed surfaces, the leveling of borders of the object and the light and air environment will be reached.

Using this method in coloristic solutions of natural elements is expedient for correction of dark areas.

It is appropriate to use the method of borrowing of color combinations of natural elements if the natural landscape of this fragment of the living environment possesses high esthetic rates.

On the contrary, the inexpressive natural environment is possible to compensate by means of reception of coloristic enrichment, that is creation of multi-color complex compositions, and the use of contrast color combinations.

The essential role in periodic renewal of coloristic esthetics of open spaces of the living environment is played by seasonal changes of natural elements [4, 20–27]. Therefore coordination of sequence of color dynamics of trees, bushes, lawns, etc. is of great importance.

The system formation of color compositions — active coloristic accents — can be considered as one of the powerful tools of color saturation of the landscape of the living environment. Most of such coloristic elements forms dynamic links and provides the wide range of a variety of open spaces of the living environment.

The use of mobile elements of design from flower plants in containers and elements of gardening of balconies and windows makes it possible to fill the visual living environment with necessary quantity of composite color details.

Planting of surfaces, a widely used eco-design method, is effective to apply both to creation of accents, and as a neutral background.

In the evening and night time coloristic decisions are caused by the use of artificial lighting. Using gradation of shades of artificial lighting, it is possible to renew coloristic solutions of open spaces of the living environment, to allocate new coloristic accents and to reveal new visual characteristics of natural and artificial components. Artificial lighting plays a special role at creation of festive compositions [4, 56–61].

Organization of harmonious coloristic communications of open spaces of the living environment is caused by perception factors in the course of the motion and at rest, sequence of coloristic changes, quantitative and qualitative characteristics.

The movement pattern in the color environment causes the sequence of change of color combinations, and it means that the total effect of perception can have essential distinctions.

It is known that the same color or a combination of colors will be perceived differently by comparison to contrast, neutral or close shades. Besides, movement from a defined coloristic zone into another one can amplify or be neutralized, according to the level of contrast of zones which alternate [7, 13–15].

Thus color doesn't carry out its functions separately, and actively interacts with such means of artistic expression as texture, plasticity, scale, rhythm, etc.

Harmonious coloristic decisions can be considered as powerful tools for activation of mechanisms of formation of open spaces of the modern living environment with the improved environmental characteristics.

References:

1. Ignatyeva N. V. Structure and functions of coloring of the objective-spatial environment (regional features). Ph. D. thesis in Architecture: 18.00.01. – Kharkiv, 2002.
2. Ikonnikov A. V. Esthetic problems of housing construction./A. V. Ikonnikov. – L.: Stroyizdat, 1996.
3. Kravets V. I. Coloristic shaping in architecture./V. I. Kravets. – Kh.: Publishing house at Kharkiv State University, publishing association "Vishcha Shkola", 1987.
4. Kryzhanovska N. Ya. Architectural and landscape principles of residential area design: Textbook/N. Ya. Kryzhanovska – K.,1990.
5. Litskevich V. I. Briefly about the dwelling of the near future./V. I. Litskevich//Housing development. – 2000. – № 8.
6. Prishchenko S. V. Color science: textbook/under editorship of professor E. A. Antonovich. – K.: Alterpres, 2010.
7. Starmer A. The color scheme bible: inspirational palettes for designing home interiors/Anna Starmer – United States by Firefly Books, 2005.
8. Taylor F. Application of the principles of color./F. Taylor. – M.: LLC «Astrel», 2005.

Section 3. Biology

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Inheritance of some traits in honesty (*Lunaria L.*)

Abstract: Inheritance character of the some morphological and physiological traits such as white color of corolla, chlorophyll mutation of "*albina*" type and plant development type was investigated in honesty. Hybridological analysis demonstrated that white corolla color was inherited as monogenic and recessive trait, showing a characteristic 3:1 phenotypical ratio in the second generation of hybrids. It was established that the chlorophyll mutation of "albina" type, which was revealed in the progeny of interspecific hybrids of honesty in *Lunaria rediviva* x *Lunaria annua* cross combination, was controlled by one recessive gene. A simple genetic control of plant development type with the dominance of perennial type and reciprocal effects were found in crossings of *Lunaria annua* and *Lunaria rediviva*.

Keywords: *Lunaria*, inheritance, flower color, chlorophyll mutation of "*albina*" type, plant development type.

1. Introduction

Honesty (*Lunaria* L.) is a cruciferous crop that is used in many different fields of human activity. It is an ornamental garden plant with lilac, pink, red and white flowers. Light-green, green and dark green color of leaves create a very good-looking plants. Due to ecological requirements it can grow in shade and semi-shade. Honesty produces characteristic silver, translucent seed silicula that gave common name of this plant in England — money plant (penny plant) [1].

But this crop is not only ornamental, but oilseeds plant too. Its oil is also known as a lubricant. Lunaria's oil has valuable fatty acid content. It includes important and rare acids, such as nervonic and erucic. Nervonic acid is mono-unsaturated Omega-9 fatty acid. It was found in sphingolipids of white matter human brain. It is also known that this acid takes part in biosynthesis of nerve cell myelin, constituent of membrane phospholipids [2]. The content of this acid in honesty may reach 20–25 % [3].

Honesty plants can be used as a source of 3-ketoacylCoA synthase (KSC) gene as well. This gene increases the content of nervonic acid in transformed yeast and transgenic plants [4].

Lunaria genus includes two species. *Lunaria annua* L. is an annual plant which blooms at the beginning of summer. In some publications this species is named as *Lunaria biennis* with biennial type of development. *Lunaria rediviva* L. is a perennial plant. It is more common in gardens than annual species. Flowering of this species starts in April in the middle of spring and lasts near the month [5].

Now the genetics of this crop remains poorly understood. The inheritance nature of different characters in honesty is not almost investigated and nothing is known about interspecific hybrids as well.

Due to some studies the number of chromosomes is equal for two species of honesty [6; 7]. This information has allowed us to begin the work on obtaining interspecific hybrids, which were first established in Zaporizhzhya National University [8].

The aim of our investigations was to establish the inheritance pattern of some morphological and physiological traits. For this, the crossings between annual and perennial species in reciprocal combinations, as well as between annual samples with different flower color were carried out and the hybrids of the first and second generations were analyzed.

2. Materials and methods

As a material the plants of *Lunaria annua* L. and *Lunaria rediviva* L. species, F_1 and F_2 hybrids between them in reciprocal cross combinations were used. Hybridization between initial species was made in artificial conditions. Parental species, F_1 and F_2 hybrid populations were grown both field and in indoor controlled conditions (18/6 hours day/night, 25 °C, 60–70 % of humidity). F_2 hybrids were obtained by self-pollination of F1 hybrids. The F2 seeds were individually harvested from each F_1 hybrid plant and sown separately.

χ^2 — criteria was used to satisfy the pattern of model segregation [9].

3. Results and Discussion

3.1. Inheritance of flower color in honesty

White color of corolla is well known among the plants. This trait is revealed in many species of *Brassicaceae* family and is controlled by the different ways. White flower colour was observed in *B. carinata* [10]. F_1 progeny after crossing lines with yellow and white flowers showed intermediate (cream-colour) expression while in F_2 a 1:2:1 ratio was found, confirming monogenic inheritance with incomplete dominance. Snogerup et al. [11] in interspecific crossing experiments with *Brassica cretica* found that some F_1 plants were white-petalled indicating dominance of white color over yellow color. In *Brassica juncea* Anand and Mishra [12] indicated the dominance of yellow petal colour over white petal colour. Brar et al. [13] in crosses between yellow-petalled and white-petalled samples of Brassica juncea indicated the dominance of yellow over white color in F_1 and 12:3:1 segregation ratio in F_2 proving the control of this trait by two epistatic genes.

Table 1. – Ratio of flower color in *Lunaria* L. genus

Sample	Corolla color		Ratio	χ^2
	lilac (L)	white (W)		
Lunaria annua	+	–	–	–
	–	+	–	–
F_1 *L. annua (L)* × *L. annua (W)*	+	-	–	–
F_1 *L. annua (W)* × *L. annua (L)*	+	-	–	–
F_2 *L. annua (L)* × *L. annua (W)*	19	8	3:1	0.15
F_2 *L. annua (W)* × *L. annua (L)*	21	7	3:1	0.15

Flower color is an important systematic trait. Flower of plants in *Lunaria* L. genus has four sepals and four petals. Sepals may be of light green, green and red-green, lilac-green color. In perennial *Lunaria rediviva* the flower color varies from light-lilac to dark lilac, sometimes with red shade. In annual *Lunaria annua* the same colors as in the perennial one are characteristic and however white color of corolla is well known (fig. 1).

Fig. 1. Different colors of corolla in *L. annua*

To know about the inheritance of white color of corolla several crossings between annual plants with different colors (white and lilac) were made. Hybrid seeds were sown and the plants were analyzed during the flowering. In F_1 generation all plants had lilac corolla of flower. In second generation the number of plants with colored and non-colored corolla was counted. These data are presented in Table 1. How we can see from the table 1, the phenotypic ratio is equal to 3:1 and indicates that the trait of white flower color is inherited as monogenic and recessive trait.

3.2. Inheritance of "albina" chlorophyll mutation

The chlorophyll deficiency of "*albina*" type was found in *Brassica rapa* after seed treatment with ethylene imine [14]. It was derived during study of the inheritance of the chlorotic cotyledon trait. The recessive homozygotes were "*albina*" plants while the heterozygotes were chlorotic cotyledon plants. Similar chlorophyll deficiency is widely known in other crops, for instance, in sunflower [15]. It is lethal and is maintained throw heterozygotes.

In our experiments on interspecific hybridization in *L. rediviva* × *L. annua* cross-combination in second generation the mutation of chlorophyll deficiency of "*albina*" type was appeared at the seedling stage. This chlorophyll mutation is characterized by white cotyledons and it was always lethal (fig. 2). The segregation data in F_2 generation are presented in the table 2. Hybridological analysis showed that this mutation is controlled by one recessive gene (3:1 ratio).

Fig. 2. Normal and with "albina" chlorophyll deficiency F_2 seedlings of honesty

Table 2. – Segregation ratio of normal and mutant plants in F_2 generation of *L. rediviva* × *L. annua* interspecific hybrid

Normal green plants	Plants with "albina" chlorophyll deficiency	Ratio	χ^2
51	16	3:1	0.19

3.3. Inheritance of plant development type in Lunaria genus

The data on inheritance of development type in *Brassicaceae* family are very limited. It was mostly investigated the time of flowering and maturity. Campbell and Kondra [16] found dominance for early flowering and early maturity analyzing parental, F_1, and F_2 populations of oilseed rape. It was established that the time of flowering was polygenically controlled in *Raphanus* genus, however F_1 interspecific hybrids between plants from wild populations of *Raphanus raphanistrum* and *Raphanus sativus* were almost intermediate between the parents [17]. In contrast, McIntyre and Best [18] showed the dominance of the late-flowering allele over early-flowering one in *Thlaspi arvense* because all of the F_1 plants had the late-flowering phenotype and the F_2 generation gave 3:1 segregation ratio of late-flowering to early-flowering phenotypes.

Two species of *Lunaria* genus have the differences in plant development type. One of them is perennial, another — annual. At Zaporyzhyzhya National University the reciprocal interspecific hybrids between these species were produced. Two generations of hybrid plants were analyzed (results are shown in table 3). All F_1 plants were perennials in both cross-combinations. After self-pollination the seeds were harvested and sown separately from each hybrid plant. F_2 hybrid populations in both combinations were studied (table 3).

In F_2 *L. rediviva* × *L. annua* cross-combination annual and perennial plants were found. The plants with annual development type flowered in the year of the sowing at the beginning of the summer (June), they formed the pods and died after that. Plants with perennial type of development in the first sowing year give only leaves and never produce flowers. They are winter-green plants and have a rosette of leaves under the snow. Next spring these plants give new leaves, flowers and produce pods. Perennials save their leaves to the next year and bloomed every spring.

In F_2 *L. annua* × *L. rediviva* cross-combination besides annual and typically perennial plants, the plants with unusual plant development type (we called this type as intermediate) were revealed. Our unusual plants have other path of development. They bloom at the first year, however at the end of vegetation in late summer (August), produce a pods, but not die and save the rosette of leaves to the next year. After winter in the middle of spring (April) these plants bloom the second time, give the pods and after that die. So, they give seeds two times during life cycle. It is interesting to note that in reciprocal *L. rediviva* × *L. annua* combination the plants with "intermediate" type of development were not found.

As we can see from the table 3, in F_2 *L. rediviva* × *L. annua* combination the ratio of perennials to annuals was approximately equal to 3:1. However, the number of perennial plants was bigger than it must be theoretically (113 instead of 98). In reciprocal (*L. annua* × *L. rediviva)* combination, there were three groups of plants. If we combine intermediates with annuals because of blooming in the first year, the ratio of perennials to annuals will be equal to 2.07:1 instead of 3:1. When we summarize intermediates with perennials, because these plants save the leaf rosette and hang out the winter, the ratio of perennials to annuals is transformed to 4.09:1. But, in any way the observed segregation is in accordance with theoretical 3:1 segregation and not contradicts the theory of monogenetic control of this trait. The differences in reciprocal segregations give an opportunity to suggest the existing the mother cytoplasm influence, on the trait of plant development type in honesty.

Table 3. – Ratio of plants with different development type in interspecific hybrids of honesty

Sample	Perennial type		Annual type	Ratio	X^2
Lunaria annua	–	–	+	–	–
Lunaria rediviva	+	–	–	–	–
F_1 generation *L. rediviva* x *L. annua*	+	–	–	–	–
F_2 generation *L. rediviva* x *L. annua*	113 (97.5)	0	17 (32.5)	3:1	9.85 (10.83)
F_1 generation *L. annua* x *L. rediviva*	+	–	–	–	–
F_2 generation *L. annua* x *L. rediviva*	110 (122.25)	21 (0)	32 (40.75)	3:1	1–2.64 2–5.6 (10.83)

4. Conclusions

1. The trait of white flower color is inherited as monogenic and recessive trait.

2. "*Albina*" chlorophyll mutation is controlled by one recessive gene (3:1 ratio).

3. The observed segregation on the trait of plant development type in honesty is in accordance with theoretical 3:1 segregation and not contradicts the theory of monogenetic control of this trait. The differences in reciprocal segregations give an opportunity to suggest the existing the mother cytoplasm influence.

References:

1. Coombes Allen J. The A to Z of plant names. – USA: Timber Press, 2012. – p. 312. – ISBN978–1-60469–196–2.
2. Sargent J. R., Coupland K., Wilson R. Nervonic acid and demyelinating disease.//Med. Hypoth., 1994. – 42: 237–242.
3. Cook C., Barnett J., Coupland K., Sargent J. Effects of Feeding *Lunaria* Oil Rich in Nervonic and Erucic Acids oh the Fatty Acid Compositions of Sphingomyelins from Erythrocytes, Liver, and Brain of the Quaking Mouse Mutant. Lipids. 1998. – 33: 993–1000.
4. Guo Y., Mietkiewska E., Francis T. et al. Increase in nervonic acid content in transformed yeast and transgenetic plants by introduction of a Lunaria annua L. 3-ketoacylCoA synthase (KSC) gene. Plant Mol. Biol., 2009. – 69: 565–575.
5. RHS A-Z encyclopedia of garden plants. – United Kingdom: Dorling Kindersley, 2008. – p. 1136. – ISBN1–4053–3296–4.
6. Krahulcova A. Selected Chromosome Counts of the Chechoslovak Flora III.//Folia Geobotanica et Phytotaxonomica, 1991. – 26, № 3, 369–377.
7. Dvorak F., Dadakova B. Chromosome Counts and Chromosome Morphology of Some Selected Species.//Folia Geobotanica et Phytotaxonomica, 1984. – 19; 41–70.
8. Boika Olena, Lyakh Viktor. Appearance of some morphological and physiological traits in interspecific hybrids of honesty.//Cruciferae Newsletter, 2015. – 34: 5–7.
9. Griffiths A. J. F., Wessler S. R., Lewontin R. C., Gelbart W. M. and Suzuki D. T. An introduction to genetic analysis. 8th ed. W. H. Freeman and Company. – New York: 800. – 2004.
10. Jambhulkar S. J. and Raut R. N. Inheritance of flower colour and leaf waxiness in Brassica carinata A. Br.//Cruciferae Newslett. – 1995. – No. 17: 66–67.
11. Snogerup S., Gustaffson M. and R. Von Bothmer. Brassica sect. Brassica (Brassicaceae) I. Taxonomy and variation. Willdenowia. – 1990. – 19: 271–365.
12. Anand I. J. and Mishra P. K. A mutable gene for flower colour in Indian mustard.//Cruciferae Newslett. – 1985 – No. 10: 38–39.
13. Brar B. K., Dhillon, S. S., Singh K. and Labana K. S. Genetics of qualitative traits in Indian mustard (Brassica juncea).// Cruciferae Newslett. – 1991. – Nos. 14/15: 54–55.
14. Stringam G. R. Inheritance of chlorotic cotyledon in Brassica campestris L. Can. J. Genet. Cytol. – 1969. – 11: 924–927.
15. Lyakh V., Soroka A., Vasin V. Influence of mature and immature sunflower seed treatment with ethylmethanesulphonate on mutation spectrum and frequency. Helia. – 2005. – 43: 87–98.
16. Campbell D. C. and Kondra Z. P. A genetic study of growth characters and yield characters of oilseed rape. Euphytica. – 1978. – 27: 177–183.
17. Panestos C. A. and Baker H. G. The origin of variation in wild Raphanus sativus (Cruciferae) in California. Genetics. – 1968. – 38: 243–274.
18. McIntyre G. I. and Best K. F. Studies on the flowering of Thlaspi arvense L. IV. Genetic and ecological differences between early- and late-flowering strains. Bot. Gaz. – 1978. – 139: 190–195.

Section 4. Geography

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Some aspects of the history and geographical study of the main objectives of researching of place names in Uzbekistan

Abstract: the brief history of geographical research of toponyms in Uzbekistan. The main objects of toponymic investigations which outgo alter the accepting the lan of the rep. of Uzbekistan. "About the nominatia of geographic objects" considered in this article the main scientific works of geographers — toponimist were analysed.

Keywords: geographical names, toponyms, history, classification of geographical names, oikonyms, etymology, standartization, the "Red Book" of geographical names.

Geographical names surround us everywhere. Without exaggeration we can say that we live in a world of geographical names, toponyms. Without them, it is almost impossible to any human activity, they fix the place of our birth, residence, work and others. Many of the events of our lives we perceive through the geographical names.

As you know, toponymy is an integral science that emerged at the intersection of geography, linguistics and history.

History of geographical study of place names in Uzbekistan and Central Asia as a whole is related works of scientists of the ancient period. Toponymic note of our region accompanied by a description or reference to a variety of geographical features such famous ancient writings of Herodotus ("History"), Strabo ("Geography"), Pomiponiya Mela ("Chorography"), Pliny ("Natural History") and others.

Toponymic data scientists of the medieval East has a more scientific approach. In particular, in the writings of Abu Rayhan al-Biruni ("Konunov Masud", "India", "Saydali", X–XI cc.), Mahmud Kashgariy ("Diwan al-lugat Turks"), Ibn Sina ("Sea Shore"), the anonymous author of "Hudud al-olam" a lot of information about the toponymy.

In the work of Z. M. Babur "Baburname" a lot of local history information, but the description of the territories have been used a lot of titles. Also in the works of Abu Hayan (XIII–XIV centuries.) Dzh. Turky (XIV–XV cent.), Ulugbka (XIV–XV cent.), Abulgazi (XVI century) Bukhari (Vazih) (nineteenth century.) there is evidence of toponymy and geographic terminology of Central Asia and Uzbekistan. In the XX century in the geographical study of place names along local scientists have made a great contribution to Russian researchers. Among them we must separate V. V. Bartold, V. P. Semenov-Tyanshansky, E. M. Murzaev. In the history of the study of toponyms in Central Asia occupies a prominent Hungarian scholar, traveler Vamberi (1832–1913). He traveled to Central Asia, in his works "Bukhara Mavarounnahra or history", "Geographical names Central Asia" given about 600 geographical names and terms.

Geographical Names Studies of Uzbekistan and its development is closely linked with the name of H. H. Hasanov. Widely known for his works on toponymy: "Transcription of Geographical Names" (1962, in the Uzbek. language), "From the history of toponymy of Central Asia" (1965, in the Uzbek. language), "Language of the Earth" (1977, in the Uzbek. language), "Secrets of Geographical Names" (1985, in the Uzbek. language), as well as the scientific article "A valuable source toponymie Middle and Central Asia" ("Toponymy of the East", 1962), "Or Taraz Otrar?" ("Toponymy of the East", 1969), "Historical Toponimical scheme of Central Asia" ("Toponymy of the East", 1969) are the most valuable sources of toponymy of Central Asia and Uzbekistan. In his research H. H. Hasanov paid great attention to the theoretical problems of place names, the origin of place names, semantic value, transcription, spelling, etymology, the study of terms related with toponymy and classification names. And also paid great attention to the formation of names using geographical terms. "If you look carefully at the geographical names, a large part consists of two (Issyk-Kul, Denav, Chukursay, Kyzylkum Bobotog etc.), A small part of two or three words (Josh, Zach, Izza, Aral etc.)" [8].

"Transcription of Geographical Names" (1962, in Uzbek. language) is devoted to the transcription and spelling of place names in Uzbek language.

The book "From the history of toponymy of Central Asia" (1965, in the Uzbek. Language) is devoted to theoretical issues of place names, and it contains a toponymic dictionary. The application is given the interpretation of the historical names of Central Asia.

H. H. Hasanov, work "Secrets of Geographical Names" (1985, in the Uzbek. Language) plays a major role in the development of place names in Uzbekistan. It equipped

with etymology and interpretation of certain geographical names of Ubekistan, place names in the works of Beruni and Babur, the types of geographical names by origin, the teaching of place names in geography class in high school, entertaining place names, the transformation of their own geographical names in terms of common nouns. Toponymic Regional Studies, toponymic terminology in different languages, the interpretation of some of the major geographical names worldwide. Each teacher of geography may find entertaining information from this book, various toponymic games, quizzes, crossword puzzles, in general, to conduct a fruitful session. As well as young professionals, geographers, linguists, historians may extend and supplement their theoretical knowledge.

H. H. Hasanov, we can say, is the founder of the scientific school of place names and geographical terms in Uzbekistan.

The former Uzbek toponymists who contributed to the development of the place names in Uzbekistan, is S. K. Karaev [4]. In tnis studies paid great attention to the etymology of place names. Studying ethnotoponym, S. K. Karaev believes that among the geographical names of Uzbekistan there is a large proportion of ethnotoponym, ie geographical names, bearing the names of Uzbek tribes, clans and their numerous small tribal divisions. According to legend, there were 92 Uzbek tribe or family, each of which, in turn, divided into smaller units. Many of them are now crammed, but remained in the names.

Scientific views of Karaev is reflected the works "The Interpretation of Geographical Names" (1978, in Uzbek. language), "Do you know the interpretation of geographical names" (1970, in the Uzbek. language), "ethnonymic" (1979 to Uzbek. language), "The toponymy of Uzbekistan" (1991), "Place-names of Tashkent" (1991, in Uzbek. language), "toponymy regions of Uzbekistan" (2005, in Uzbek. language), Toponymy (2006, on Uzbek. language) and others scientific works S. K. Karaev paid particular attention to the classification of geographical names. Based on scientific opinions E. M. Murzaeva, oikonymy Uzbekistan, he shared in the physical, geographical and social-economic settlement names. According to the scientist to the physiographic oikonymy refers gidrooykonimy, orooykonimy, fitooykonimy, zooykonimy. In the initial stages of the relationship of nature and society a significant part of names associated with nature and natural phenomena.

Social views of S. K. Karaev offers divides into antropooykonimy, etnooykonimy, industrial settlement names, market and transport oikonyms oikonyms social, ideological settlement names, migrooykonimy.

Toponymic questions of Uzbekistan were national in the works of P. N. Gulyamov. It is the most studied geographical terminology and compiling dictionaries. But in his works feature the spelling of names and geographical terms and the translation from Russian into Uzbek. They are co-published a manual for geographers "Toponymy and geographical terminology" (2005, in the Uzbek. language).

A little work on the individual regions of Uzbekistan, for example, from a geographical point of view the study of toponymy of Karakalpakstan waslis engaged by K. Seytniyazov (1998) [5]. His works were studied placenames northern areas of the right bank of Karakalpakstan, ie their typing, mapping, dissemination of geographical names of different types. And also identified areas of geographical names of settlements of tribal composition Karakalpak disclosed etymology of place names, geographical names held correction in Karakalpak and Russian languages, a map of place names of the area.

In addition, the geographic place names were studied by K. Hakimov [6] in Jizzakh region (2010). The paper studied the effect of names on the formation of regional economic, social and geographical features are defined naming patterns of different objects, the analysis of differences between the names of settlements, a map oikonyms Jizzakh region, as well as recommendations on naming newly built settlements.

In recent years, work on toponymy and geographers Yu. Ahmadaliev [1], A. Nizomov [3].

The role of place names of Uzbek in the study philologists and historians. Among them, there ave works of A. Muhammedzhanov, E. Begmatov, T. Nafasov, N. Ahunov, L. Karimova, A. Buriev, Z. Dusimov, H. Egamov, M. Mamedov, S. Naimov, T. Enazarov should be noted.

Mush attention is paid to toponymy currently. After the adoption of the Law "On the naming of geographical features"(12 October 2011) [2], this issue has become more urgent. The Law put before toponymists, geographers, linguists, historians, cartographers following tasks:

1. Preparation of the State Register of existing geographical names of Uzbekistan.
2. Deepening and widening the toponymic researches.
3. Staff training for toponymic resemches Republic, regions, districts and cities.
4. Spelling of geographical names in textbooks, maps, atlases, and paying special attention to the creation of smart toponymic dictionaries.
5. Standartization of Geographical Names of Uzbekistan and foreign countries.
6. Special attention will be paid to the regional toponymic research and the collection of toponymic materials by regions, districts and cities.
7. Creation of thematic toponymic maps by regions of Uzbekistan.

To solve the above problems it is necessary to conduct research on place names to the small territories.

In future, we must pay attention to the deepening and expansion of toponymic research, scientific substantiation of the interpretation of geographical names, the definition of the geographic patterns of distribution of terms and place-names, the creation of toponymic maps and develop recommendations on naming and renaming of geographical names. As a result of these studies, you can create a toponymic atlas, as well as the "Red Book" of geographical names of Uzbekistan.

References:

1. Ахмадалиев Ю. И. Фарғона вилояти топонимлари. – «Фарғона», 2009.
2. Закон Республики Узбекистан «О наименовании географических объектов» – Ташкент, 12 октября 2011 г.
3. Низомов А. ва б. Топонимика. – Т.: «Шарк», 2012.
4. Караев С. К. Ойконимия Узбекистана (историко-географическое исследование формирования названий населенных пунктов Республики). – Автореф. доктор. дисс. – Т., 1998.
5. Сейтниязов К. М. Топонимы северных районов правобережья Каракалпакии. АКД. – Ташкент, 1998.
6. Хакимов К. М. Жой номларининг шаклланишида минтақанинг ижтимоий-иқтисодий географик хусусиятлари (Жиззах вилояти мисолида). АКД. – Тошкент, 2010.
7. Хасанов Х. Х. Географик номлар сири. – Т.: Ўзбекистон, 1985.
8. Хасанов Х. Х. Ўрта Осиё жой номлари тарихидан. – Т., 1965. – С. 32.
9. G'ulomov P. N., Mirakmlov M. T. Toponimika va geografik terminshunoslik. – T., 2005.

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Analysis of eco-meliorative condition for soil of Southern Aral Sea region, and about its mapping

Abstract: This article is about analysis of change of eco-reclamation of soil and methods of soil mapping and the role of cartographic method on research work that is based on critical ecological situation which occurred in Southern Aral Sea.

Keywords: Aral Sea, environmental, ecological, eco-meliorative, eco-degradation, irrigation, soil, map, cartography.

Relationship between nature and human based on certain rules, its violation can lead to the eco-degradation. Aimless irrigation of the Aral Sea's main water sources the Amu Darya and the Sir Darya has led to sharp declines previous of the sea level in the geographical boundaries and to environmental disaster of the Aral Sea [3].

As President Islam Karimov mentioned — "The risk of drying up of the Aral Sea is the most critical issue that has become a national disaster". Drying up South Aral Sea radically changed Aral Sea's natural condition, as a result dangerous ecological situation has occurred [1].

Many research works were carried out and are being carried out on natural environmental landscape and on studies for eco-reclamation of the soil of the region. In the 1980–1990s, including Z. M. Akramov., A. A. Rafiqov., I. A. Hasanov and E. Yu. Safarov came to the conclusion that study of the status of eco-reclamation of the soil and its research it is necessary to implement the cartographic method of techniques.

The major issue of the Aral Sea's ecological disbalance is pouring water to the Aral and balance disorder of regular water supply from water sources like Amu Darya and Sir Darya.

Now a large part of the Amu Darya and Sir Darya's previous wild forest trees in the foothills dried out, and the area of the reeds sharply reduced. Due to the shortage of water, previous productive pastures degraded. Because of the groundwater level went down and the increase in the level of mineralization to 10–15 times, the concentration of salt in the soil has occurred. Currently, vegetation density is extremely loosen on saline soils, topsoil is drying out and wind erosion increased. Where is the existing sandy soil there is sand content can be found. The effects of soil salinity and wind making the pasture condition even worse [2].

Now for a hectare, 9–10 tons of salt comes up with the river water and the bulk of the salt is washed out to the existing drainage network, but in some areas there is no drainage or it is inefficient, in such areas salt regularly gathered. It can be seen on a large scale, particularly in the fields of Karakalpakistan. The existing drainage networks were not projected deeply under land (1.5–2 m.), and the majority of them (30 % –40 %) was muddy and filled with a cane due to a lack of the ability to draw ground water, furthermore drainage networks absolutely does not exist on the 30 % field. For this reason, average strong and very strong the saline irrigated land makes up 53 % of the total area.

Low harvest of agricultural products for Karakalpakistan, associated with much amount of salt in the soil.

Currently, the decline of the Aral Sea level related to changes on surface and groundwater in Karakalpakistan, consequently, there has been a change in the quality of agricultural

soils. The sea level continues to decline and these effects on the quality of land resources in Karakalpakistan. In addition, the deterioration of the quality of agricultural land is concentrated with the natural growth of the anthropogenic impact on the environment [4].

Since that time, mapping the status of soil eco-reclamation was carried out on a large scale.

As you know, the Republic of Karakalpakistan is situated closer to groundwater than other regions of the country. Here, large areas of irrigated groundwater level changes to 1–3 meters. In some smaller irrigated areas, water is stored below 3 meters. Groundwater level of the region depends on the level of water supply and drainage systems.

A reduction in the flow of water from the Amu Darya, insufficient water supply land areas expanded in Karakalpakistan. Part from those above, both the volume and composition of mineral fertilizers on the ground effects on component change of reclamation of irrigated soil.

Since 1999, the State Committee for Nature Protection of the Republic of Uzbekistan Pollution Sources Monitoring (PSM) program monitors soil pollution sources. Toxic substances, mineral fertilizers, toxic chemicals buried reservoirs, oil production bases and industrial facilities that are close to objects areas which used for agriculture land are belong to the PSM.

Total mineral fertilizers, which stored in warehouses on the territory of Karakalpakistan are 17, in Beruni and Chimbay there are 3 warehouses in each district. Highest toxic chemicals warehouse is in Takhiatash [4].

In Khujayli, Chimboy, Amudarya and Kegeyli districts organochlorine pesticides soil pollution rate is 5 times higher than the norm.

The emissions from thermal power station in Tahiatash also have negative impact on soil pollution in Karakalpakistan. The Takhiatash thermal power station hazardous wastes and their placement on the use of the State Statistical Report 2010, in the local company area 168.5 tons of non-neutralized toxic waste was made up, emissions mainly consist of copper, lead and oil refineries. As mentioned above, the underground water level is close to the top soil in Karakalpakistan. To improve soils reclamation condition it is important to keep a standard level of ground water. It can be done when there is just enough length and effective working drainage systems.

We consider that a positive solution to the problem is, it is necessary to carry out the mapping. Soil maps are formed in order to view geographical spread of soils, to learn land cover components and to take into account land resources. Soil map gives opportunity to increase soil fertility, rational use of agricultural land and to evaluate them for this purpose using agricultural and land reclamation measures. Therefore, the maps are provided with cartograms and a special maps defining amount of acid soil, salinity properties and other chemical elements.

In maps taxonomic sections of the soil — type, small type, species, etc. are described. Unit type was adopted as the basic in genetic soil classification. Soil types are divided in to small types. Small types, which related to same type, lie in single genetic layer, but one or a few of them have affective process character (Fig. 1).

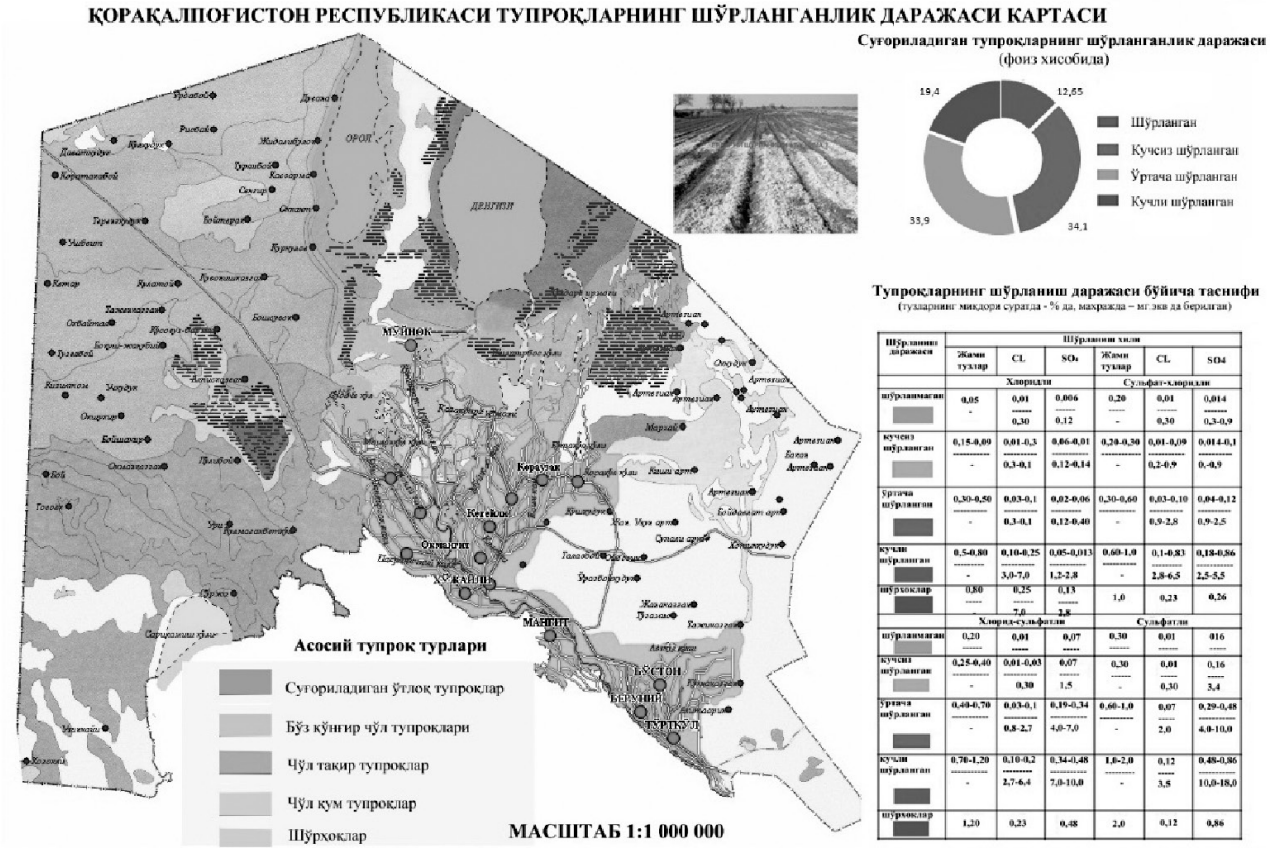

Fig. 1. Soil map for the Republic of Karakalpakistan

Soil is divided into types and small types. They differ from types according to quantity indicators, intensity level, soil formation process and the type development level of soil profile.

Large-scale map creating work in field filming or aerospace materials are carried out on the basis of decryption, small-scale maps formed by large-scale maps generalization. Soil types in nature are usually invisible to observer, so the outlines of boundaries on the map are conventional. Geologist and cartographers work together to create a map, for them it is necessary to know the nature of the soil cover of territory. To illustrate soil cover on small-scale maps the main demand is laws of soil formation in territory, their wide areas, the spread along vertical zones and the correct description of the processes that make up the soil. Based on a small-scale maps large-scale maps are formed, in this the main map creating method is generalization. The main purpose of the generalization method — description of the specific typical zonal and regional soil characteristics depending on the scale and purpose of map. V. M. Fridland divides generalization work in to 3 methods that carried out during soil mapping:

1) soil classification, methods of mapping that about soil domination, or soil components and soil cover in the area;

2) work on the composition of the soil, the soil cover components of the composition, their interactions and geometrical properties;

3) generalization work on classification and ways to summarize the contents depending on the nature of the soil cover.

The most widespread method is first one, it is approved in the practice of general maps production, this method has been going on since the first steps of soil cartography. Prevalent method of genesis, structure and properties of agro production soil based on unification of the one soil contour. If there is a soil with contrast and different genesis types, they are mapped by dividing them in to soil complexes or compounds [5].

In fact, mapping is one the important factors in the study of the status of environmental reclamation, increasing soil fertility and high harvesting.

References:

1. Islam Karimov. At the dawn of the twenty-first century: a threat to security, the conditions of stability and progress. – Uzbekistan, 2011.
2. Abdullaev S. A., Namozov H. K. Soil Reclamation. – Tashkent: Uzbekistan National Encyclopedia, 2011.
3. Akramov Z. M., Rafiqov A. A. Aral now and in the future, – Tashkent: Uzbekistan, 1989.
4. Rafiqov A. A. Process of desertification of Southern Aral. – Tashkent, 1997.
5. Safarov E. Yu., Prenov Sh. M. Design and creation natural maps. – Tashkent: "University", 2011.

Section 5. Hydrology

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Hydrological regime of the lower reaches of Amudarja river in the conditions of intensive economical use of water resources

Abstract: In the article the issues of the change of Amudarja river flow along its length and in time in the conditions of intensive use of water resources are considered. The main attention is paid to the study of influence of the big irrigation canals on the decrease of the river flow, especially in the low reaches.

Keywords: water resources, hydrological regime, water intake, flow decrease, available water supply of the territory.

Introduction. The rise of the intensive use of the water resources for different economical purposes causes substantial changes of the water regime of rivers. In the conditions of Central Asia with developed irrigated agriculture and considerable water consumption for the industrial purposes the influence of anthropogenic factors had deep impact on the change of hydrological regime and overall decrease of the river flow. Amudarja river and especially, its low reaches are among these rivers.

The general theoretic and methodical issues of the research of hydrological regime of low reaches of Amudarja river in the natural conditions are described in details in the works of A.K. Proskuryakov [4], M.M. Rogov [6], V.L. Schultz [11]. Afterwards, in the conditions of intensified anthropogenic impact on the river flow these matters were considered in the works of I.A. Shiklomanov [10], F.E. Rubinova [7], V.E. Chub [9], F.Kh. Khikmatov [8] and others.

Familiarization and analysis of results of the above mentioned and other literary sources [1; 3] demonstrated that despite the voluminous number of publications, the hydrometeorological aspects of territorial redistribution of Amudarja river flow and water supply of its low reaches were not considered as the interrelated problem. That is why, **the objective** of this work is the study of dynamics of the water intake from Amudarja river by the big irrigation canals and their impact on the water supply availability in its low reaches. For reaching this goal we considered the following **main tasks**: study of dynamics of the use of water resources of Amudarja river; assessment of the water intake impact for irrigation purposes on the change of Amudarja river flow along its length and in time; assessment of the water economy measures carried out in Amudarja river basin on the current and future water supply availability of its low reaches.

Background materials. For the solution of these problems the materials of standard hydrometeorological network observations of Amudarja river flow and big irrigation canals obtained from Uzhydromet, Ministry of water economy and agriculture of Republic of Uzbekistan, as well as results of studies on this problems published by former researches were used as the main background information. It should be mentioned that the materials of observations on big irrigation canals taking water from Amudarja river were used as the main initial data.

Results and their discussion. The territory of Amudarja low reaches is located down Tyuyamuyun waterworks facility and is one of the regions, where anthropogenic activity has a strong impact on the river water regime. At present 2336.5 thous. hectars of land usable for irrigation are located here. During the recent years about 697 thous. hectars of land are used for the irrigated farming.

In the second half of 50-s and beginning of 60-s of 20th century the intensive hydroeconomic construction development was observed in Amudarja river basin. In the middle and low streams of Amudarja river a number of new big irrigation canals were constructed. Currently, more than 60 canals take water in the middle and low streams from Amudarja river for irrigation. The biggest of them in the middle river stream are: Karakum canal (where the water intake in vegetation period reaches 800–850 m^3/s), Karshi main canal (350–375 m^3/s) and Amu-Bukhara canal (400 m^3/s). Downstream Amudarja river the water is taken in by Shavat, Tashsakin, Pakhtaarnin,

Kyzketken and other canals the maximum discharge values of which in vegetation period are 200–350 m^3/s.

In the result of the more intensive water intake along the river length the significant reduction of the volume of Amudarja river takes place. This process is especially manifested in the middle river flow, and it intensifies more in its low reaches. The Fig.1 shows that since the middle of 50s up to the beginning of 80s the volume of water intake in the middle stream from Amudarja river by all canals is being increased. During the next years the water intake to canals was stabilized. However, in 2001 the least volume of water intake was observed in all canals during the last 30 years which is caused by the low water. This is especially observed in Karakum and Karshi main canals. In whole, during the last decades (2000–2012) the total mean year water intake from Amudarya river by big canals in its middle stream is 17,9 km^3 a year. During 2000–2012 their extreme values were distributed as follows: mean maximal mean year water intake corresponds to 2006 (20.2 km^3), while the minimal one corresponds to 2001 (12.9 km^3).

The analysis of the available hydrological materials shows that the general regularity in the long-term variations of water availability along the river length was stable up to the end of 50s of 20th century. Anthropogenic changes of the river flow were especially revealed since the beginning of 60s of the 20th century. This is determined by the intensive development of irrigated areas and building of the hydraulic works in Amudarja river basin [7]. According to this, the water regime of Amudarja river up to 1960 can be considered as the conventionally-natural one.

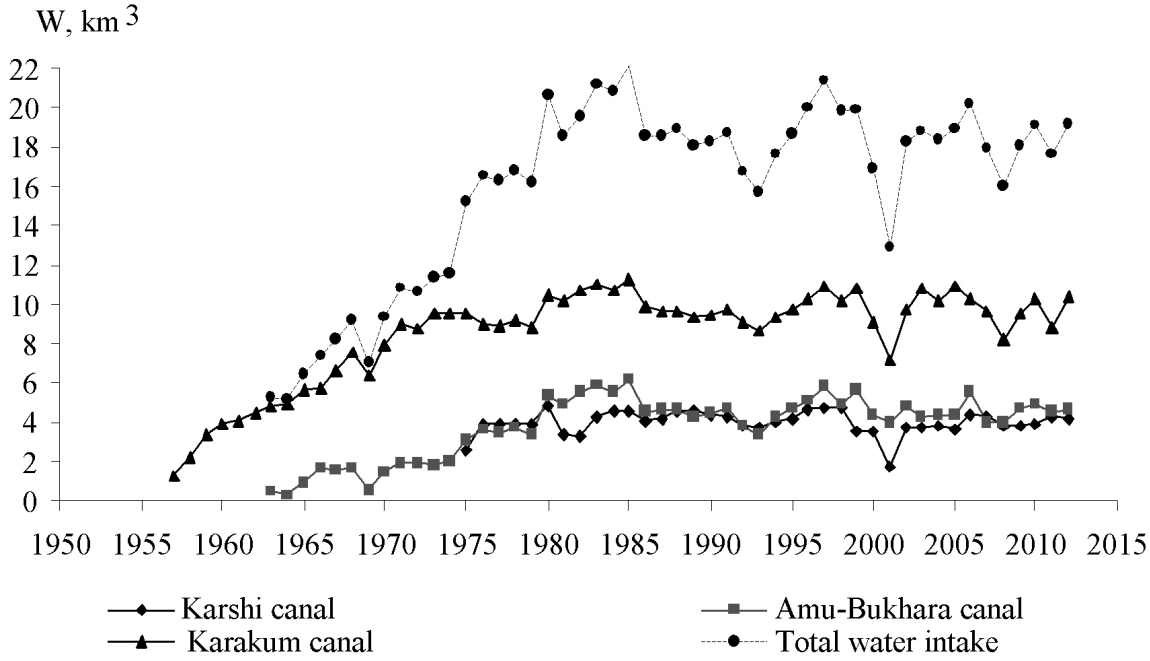

Fig.1. Dynamics of water intake from Amudarja river by the big main canals in its middle stream

The data of observations at Kerki hydrological station characterizes the liquid flow regime in the upper part of Amudarja river in the natural conditions up to 1960 as during this period the water intake for irrigation upper Kerki town was not more than 0.5–1 % of the river flow registered in this cross-section. With putting the Karakum canal into operation the water intake was about 10 % of the river flow in this cross-section. In the conventionally-natural period the water intake in Kerki — Chatly section was almost constant, being 10–19 % of the river flow near Kerki town. Since 1960 the water intake in this section reached 20–28 % of flow near Kerki town [2]. Due to the construction and putting Takhiatashash water distributor into operation in 1974 the water flow became to be fixed in Samanbai cross-section opened 15 km. down Chatly cross-section. In the result of these measures the data for Chatly-Samanbai can not characterize the natural regime of Amudarja river [5].

In general, the analysis made with the account of impact of anthropogenic activities on Amudarja river flow has made it possible to divide the whole investigated period to the following two periods: the conventionally-natural period (CNP); period of intensified impact, i. e. the period of the intensive economical use of Amudarja river resources.

In its turn, the second period was divided to the following rated periods: 1) 1931–1954; 2) 1955–1966; 3) 1967–1979; 4) 1980–1990; 5) 1991–2011. In distinguishing these rated periods the years of putting of big irrigation canals and other hydraulic works into operation were taken into account.

The first of these periods — 1931–1954 characterizes the conventionally-natural period when the impact of the economical activities on Amudarja river flow was minimal. The second period is characterized by the intensive hydroeconomic use of water resources of Amudarja river basin. That is why the selected rated stages of the second period are also distinguished by the intensity of the water resources use. The calculations made for the study of the change of the annual flow of Amudarja river made it possible to estimate their changes in time and along its length (table 1).

Table 1. – Changes of the annual flow of Amudarja river in time and along its length

Hydrological station	Investigated periods									
	CNP		The period of the intensive anthropogenic impact							
	1931–1954		1955–1966		1967–1979		1980–1990		1991–2011	
	Q, m^3/s	W, km^3	Q, m^3/s	W, km^3	Q, m^3/s	W, km^3	Q, m^3/s	W, km^3	Q, m^3/s	W, km^3
Kerki	2096	66.1	1805	56.9	1639	51.2	1298	40.9	1402	44.2
Tyuyamuyun	1966	62.0	1718	54.2	1359	42.8	893	28.2	854	26.9
Chatly-Samanbai	1534	48.4	1197	37.8	803	25.3	183	5.77	235	7.41

The digits shown in table 1 show that in 1931–1954, i. e., during the conventionally-natural period the mean annual volumes of Amudarja river flow were 66,1 km^3 near Kerki town and 48.4 km^3 near Samanbai village. Thus, during this period only 73.2 % of the annual flow passing through the cross-section near Kerki town up reached Samanbai section. That is why, the further calculations made for the other accepted rated periods we made referring to these flow correlations, i. e., the ones which were registered in the cross-sections near Kerki town and Samanbai village during conventionally-natural period.

In the first rated period due to the intensive development of irrigated lands in the middle and low stream of Amudarja river the big main Karakum, Karshi, Amu-Bukhara and other canals were put into operation. This caused the substantial increase of water intake from the river. In the result of this, water intake from the river began to increase both along its length and in time. During this period the annual water intake in the middle stream increased from 9.1 to 26.3 km^3 while in the low reaches it increased from 12 to 3.8 km^3. It was observed that along the length of the studies river the annual water volume decreased from 56.9 to 37.8 km^3 in average (Table 1).

The analysis of the fulfilled calculations has shown that in all rated periods along the length of Amudarja river the tendency to the decrease of water flow was recorded. In the second rated period the annual water volume in Kerki cross-section was 51.2 km^3, in average, and in Tyuyamuyun it was 42.8 km^3 and in Samanbai it was 25.3 km^3 a year. The average annual decrease of the river flow recorded in Samanbai cross-section is 59.1 % in relation to the upper cross-section of Tyuyamuyun.

Similar situation (i. e., flow reduction) is also observed in the third and forth rated period. In Kerki cross-section in the last rated period the mean annual flow volume was 44.2 km^3, in Tyuyamuyun — 26.9 km^3 and in Samanbai — 7.41 km^3 a year. These volume values near Kerki town are only 66.9 %, in Tyuyamuyun — 43.3 % and in Samanbai — 15.3 % in relation to the conventional-natural period. This was caused by the increase of water intake from Amudarja river as well as the uneven water distribution along the river and canal length. As a rule, in the result of this, the upstream water users are in more beneficial position than the downstream ones.

The degree of Amudarja water resources use is definitely characterized by the factor of the flow intake which equals to the correlation between the total water intake upper the investigated cross-section and the inflow from the flow formation zone. This factor is determined by the water supply availability of the river and water supply availability of the year, from one side and by the level of the economic use, from another side. At every level of the water-economy construction activities the factor of the flow intake is increased from the high water availability years to the low water ones. The factor of the flow intake is increased in time and along the river length.

Table 2. – Mean annual factor of the flow intake from Amudarja river during 1946–2010

Rated period	The source of the water intake	
	Middle stream	Down stream
1946–1950	0.02	0.18
1951–1955	0.02	0.17
1956–1960	0.06	0.22
1961–1965	0.14	0.37
1966–1970	0.16	0.36
1971–1975	0.33	0.83
1976–1980	0.50	1.43
1981–1985	0.81	5.04
1986–1990	0.90	2.29
1991–1995	0.63	1.43
1996–2000	0.92	3.09
2001–2005	0.86	3.08
2006–2010	1.04	3.87

The analysis of results of the fulfilled calculations has shown that in the middle stream of Amudarja river the factor of the flow intake during the investigated period was increased from 0.02–0.06 to 0.92–1.04, while in its low stream it increased from 0.17–0.18 to 1.43–5.04 (Table 2).

The main conclusions. Thus, the information presented above gives us the reason to conclude that the development of the new irrigated length, putting of the big irrigation canals into operation and construction of hydraulic structures in Amudarja river basin in a whole, caused the flow redistribution in time and along the river length. During the implementation of these activities the substantial changes in Amudarja water regime have taken place. This defines the necessity of the further detailed studies of hydrological regime of Amudarja low reaches to guarantee the water supply availability of the Priaralje region.

References:

1. Adenbaev B. E., Khaidarova O. A. The dynamics of the use of Amudarja water resources and water supply availability of its low reaches.//Proceedings of Geographic Society of Uzbekistan. – T. 42. – Tashkent, 2013. – P. 156–160.
2. Adenbaev B. E., Kurbaniyazov A. K., Umarov A. Z. Problems of the water resources use of the transboundary rivers of Amudarja river basin.//Proceedings of Geographic Society of Uzbekistan. – T. 43 – Tashkent, 2014. – P. 160–163.
3. Dostai Zh. D. Management of the hydrological ecological system of the Balkhash lake. – Almaty, 2009. – 263 p.
4. Proskuryakov A. K. Water balance of Amudarya river in the cross-section from Kerki town to Nukus town. – L. Gidrometeoizdat, 1953. – 89 p.
5. Ресурсы поверхностных вод СССР. Средняя Азия. Бассейн р. Амударьи. – L.: Gidrometeoizdat, 1971. – V.14. – Issue 3. – 471 p.
6. Rogov M. M., Khodkin S. S., Revina S. K. The hydrology of the mouth part of Amudarja river – M.: Gidrometeoizdat. 1968. – 268 p.
7. Rubinova F. E., Kakurina E. G., Matveeva O. S. Change of Amudarja river flow under the impact of the construction of hydraulic works in its basin.//Proceed. of SANII. – 1980. – Issue 77 (158). – P. 80–89.
8. Khikmatov F. Kh., Adenbaev B. E., Ibraev R. A. Dynamics of the river water inflow to the delta of Amudarja river.//Proceedings of Geographic Society of Uzbekistan. – V. 31. – Tashkent, 2008. – P. 57–59.
9. Chub V. E. Climate change and its impact on the nature resource capacity of the Republic of Uzbekistan. – Tashkent: Sanigmi, 2000. – 252 p.
10. Shiklomanov I. A. The influence of the economical activities on the river flow. – L.: Gidrometeoizdat, 1989. – 333 p.
11. Shultz V. L. The rivers of the Central Asia. – L.: Gidrometeoizdat, 1965. – 692 p.

Section 6. History

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Further Investigation into the Origin of Cuprous Material used for the Ifè Brass Heads

Abstract: So far studies show that material used for the Ifè heads is not local to the area. As these heads continue to grow in popularity even after 100 years of their discovery, absolute knowledge of their true source becomes imperative. This study attempts to push the knowledge frontier in this regards.

Keywords: Cuprous Material, Ifè heads, Brass, Yoruba metal.

Introduction: Cuprous alloy among the Yorùbá.

In Yorùbá, copper is *bàbà*. Its alloy has been an important medium for artistic and spiritual expression among the Yorùbá since antiquity. While the Ifè brass heads [1, 150–155] are relatively popular, they are not the only signs of the importance of copper alloy — particularly brass — in the area. Adepegba recounts *Ifa* verses and praise poems dedicated to Osun, the goddess of river Osun. The verses include *Ose tura*; where Osun is referred to as the wealthy owner of enormous amount of brass, stating that "she" (Osun) owned so many brass items, "she" required shelves to store them all [2, 102–103]. One of Osun's praise songs states *"she who lulls her children with brass"*. This suggests the plentiful nature of brass in the era Osun lived and the amount of wealth she possessed in brass. Shrine objects used for Osun worship are all made of brass. The objects found in the shrine and used in the deity's worship include brass bangles, comb, hair pin, lidded containers and fan [2, 108].

Brass is an alloy of mainly copper and zinc. Curiously, zinc has no name in Yorùbá which suggests that the element — zinc — was not known to the Yorùbá of the early times in its natural state. Copper on the other hand, though known to the Yorùbá, was not found in Yorùbá land or anywhere nearby. Relatively recent discoveries by some scholars suggest a possible large scale copper mine in the Benue basin area of Nigeria which is on the other side of the Niger River [3, 27–36]. Invariable it appears that the combination of copper and zinc to form brass was imported to the Ifè/Yorùbá area around the tenth to fifteenth century.

Furthermore, *Ifa* worship is believed to have existed since the earliest times according to Yorùbá oral tradition. If ample mention is made of *ide* (brass) in the verses of *Ifa* incantations, the question arises — how did the "creator (s)" of *Ifa* worship know about brass if it was to arrive in Ifè area only around eleventh century? Two possibilities presents here. First, it may be that *Ifa* worship and poetry began much later than claimed by oral tradition. From the traditional accounts of the arrival of Oduduwa (the progenitor of the Yoruba race), it situates the beginning of *Ifa* worship probably around eight hundred to eight hundred and fifty Common Era [4, 85]. Tradition states that when Oduduwa arrived Ile Ifè, he met Setilu (also called agboniregun), an old man credited as the founder, custodian and propagator of the *Ifa* secrets and worship as revealed to him by Olodumare (the Supreme Being) [5, 32–4]. If the 850 CE date for the arrival of Oduduwa to Ifè is one to go by and currently Ifè archaeology puts the beginning of the use of brass in the area at about $10^{th} - 11^{th}$ century, there appears to be a gap of 200 years still unaccounted for. With the above scenario one is pressed to consider a much later date (than 850 CE) for the commencement of *Ifa* worship in order for *Ifa* verses to capture the aboriginal use of brass in Ifè area.

Another possibility is that the working and use of brass in Ifè predates the current presentations of archaeology and art history. If the corpus of *Ifa* is as ancient as tradition suggest (in some traditions first millennium BCE is proposed), then one may consider earlier dates for brass activities in Ifè.

In all, there is as yet no trace of local production of brass in ancient Ifè and as Adepegba notes — there appears to be no genealogical root for brass casting in Ifè [6, 32–34; 7, 19–25]. Though traditional brass casters in other areas of Yoruba land like Obo Ayegunle, Idomowo, Ijebu-Ode, Ibadan, Ilobu, Ogbomosho and Ilorin all claim to have some link or the other with Ifè, none of them are originally from Ifè. Traditional histories obtained from the different sites suggest that the centres directly or indirectly originated from Ifè. There exist minor technical differences in the various locations. For example, the materials used for the core and outer moulds vary and the deity worshiped by the casters also differs from place to place. In Ijebu, Obalufon (a king in Ifè) is worshiped as the patron of the casters, while Ogun (god of iron) is worshiped together with Obalufon in

Obo Ayegunle. Ogun is solely worshiped by the casters in Ogbomosho, Ibadan, Abeokuta and Ilorin [7, 19–25]. Ben Oluyemi, who was interviewed by this researcher in Ifè in 2011, is the last surviving early 20th century brass caster in the ancient town, he is also not a native of Ifè but resides there. He was trained in brass casting by the National Museums authority. Oluyemi is originally from Efon Alaye in Ondo State. This further suggests a possible external influence on ancient Ifè brass casting industry.

Origin of the cuprous material for the Ifè heads

Different resources were reviewed and employed in the quest for the possible origin of the materials used for the Ifè brass heads. An important approach used was the evaluation of the percentage chemical content of the alloys used for the Ifè heads. Harold Baker has published the breakdown of the percentage chemical content ratio of the Ifè heads in 1965 [7, 23]. Warner and Willett also presented in some details, the percentage composition of Ifè and Benin brass in comparison [8, 142]. The analyses presented by both works show that about two-thirds of the Ifè heads are brass, while the rest are copper.

In the ancient times, the percentage composition of constituents in alloys are a unique signature to different sources or locations. The reasons for this uniqueness may be due to the different process of smelting, type of ores used and other peculiar practises that may be attached to particular groups of people. One of the methods used by researchers to trace the possible origin of metal works or at least to relate certain works to others is the analysis of the percentage composition. Composition affinity here refers to the correlation or degree of resemblance in the ratio of the constituent elements in an alloy. Because the percentage constituent is reasonably peculiar to different location and time, a composition affinity evaluation is therefore a veritable means of associating works from different areas with consideration given to variables like the time frame under study, the smelting practises of the area (s) under study and type of ore used.

This approach was the basis for Warner and fagg's comparison of the Ifè and Benin brass/bronze heads [8, 142–156]. To relate or compare a number of works with another, certain mathematical realignments are done in other to put the various data in the same format for comparison. The mean of the percentage ratio of constituent elements found in the alloy under evaluation is calculated from the data derived by chemical analysis. The mean of the different alloys to be compared are then simply related to each other to ascertain correlation or otherwise.

In line with this study's enquiry to seek out the origin and possible relationship of the cuprous alloy art of Ifè with other parts of the world (but particularly northeastern Nigeria), this researcher carried out a basic correlation evaluation between the results from Harold Baker's analysis of thirteen Ifè brass pieces and data of several brass samples from different areas of the world that may provide clues to the source for the materials used to make the Ifè heads. The different locations were selected based on their historic importance to pre 17th Century brass casting and their geographical alignment with information in the myth of origin of the Yoruba people. The following areas were selected for correlation with the Ifè results; Diama, an important brass location near Maiduguri in the Northeastern part of Nigeria with coverage up to the chad basic and parts of Northwestern Cameroon. Benin; a very important city in West African brass civilisation. Outside Nigerian locations were Turkmenistan, Ma'den Ijafen, Tiberias, Europe and India. The following are the outcome.

Discussion of the Results

It has already been established that most of the metal Ifè heads are brass objects and likewise the Daima cuprous objects are mostly brass. While brass is generally defined as a mixture of about seventy percent copper with mainly zinc, this mixture however usually contain other "impurities" which will appear as trace elements. The trace elements in copper-zinc alloy includes lead, tin, antimony, nickel and arsenic. To test for any meaningful affinity or difference in the chemical composition of these alloys, one must look to the supplementary (in this case zinc) and trace elements. It is usually in their ratio that the researcher may identify the unique nature of the material used for the object under evaluation. The Table 1 show the mean distribution for zinc (Zn), lead (Pb) and tin (Sn) from the brass alloy of different selected locations.

Table 1. – Table showing mean distribution for percentage ratio of zinc, lead and tin in Brass alloy from different locations

LOCATION	% Zinc (Zn)	% Lead (Pb)	% Tin (Sn)	Source
Ifè	12.5	10.7	1	[10, 23]
Daima	15.6	2.5	1.5	[8, 176]
Benin	13.2	9	1.1	[11, 142]
12th – 13th Century European	12.3	8.6	3.4	[8, 146]
Tiberias, Israel	12.5	10.9	1.3	[11, 37–9]
Ma'den Ijafen, Morocco	20.0	0.3	*n.d	[12, 151]
India	16.2	9.8	20.7	[13, 127]
Turkmenistan	16.0	12.0	6.6	[8, 126]

Note: * — Not detected

From the Table 1 presented above, it makes clear that there is no positive correlation between the elements of the Ifè and Diama brass pieces. The only close relationship may be seen in the tin ratio and this is not enough to relate the two locations. The difference in margin for lead content is significant and while Ifè brass is noted for particularly high levels of lead, it clearly presents a premise for the dissociation of these two locations on the basis of character of material. The table suggests that the materials used for the Diama brass, either does not share the same source with those of the Ifè brass or different ores, practice and technology were used in the manufacture of the brass. However, this does not necessarily negate the possibility that the workmen who made the brasses from the two locations are from the same stock. Skilled workmen have been known to be dexterous with material medium for their work. This implies that a good caster can work with different composition of metals as there is no line dividing a brass caster or bronze caster. All the metals within the same family including lead and/or pure copper can be worked by any smith or caster. This was confirmed to this researcher by Ben Oluyemi an Ifè veteran caster.

Further, the mean distribution for the three elements under consideration shows a closer relationship between the Ifè brass and those from 12th – 13th century Europe than those from Benin. This means there is a significant difference in the source and/or type of material used for casting in Benin and Ifè. So far there appears to be sparse evidence to support a relationship between the Benin and Ifè pre 17th century brass casting civilisations as purported by oral tradition from both locations. Scholarly work must continue to explore the gaps between Ifè and Benin as it is difficult to believe that there was no technical interaction between the two location because of their proximity and intertwined relationship since antiquity. In spite of the apparent similarity between Ifè and 13th century Europe however, there is a noticeable difference in the lead and tin content of the Ifè brass when compared with those of 12th – 13th century Europe. The high tin content presents a pronounced deviation from the Ifè standards. While one can reasonably relate the data from the Ifè and European samples particularly because of their similar high lead content, a conclusion cannot be reached. In rationalising the data one must consider that the actuality of high lead content in the 12th – 13th century Europe stock occurs only in a few of the samples out of a horde of 200 specimen analysed for the period [15, 146]. The implication of this is that it will be difficult to categorically generalise that 12th – 13th century European brass is characterised by high lead content. The occurrence of high lead may very well be isolated and as such cannot appropriately represent the content character of the period and location. This disparity therefore snags any hypothesis that may presents a common source for the materials and technique of 12th – 13th century European brass and that of Ifè.

Though the sample from Turkmenistan possessed a reasonably high amount of lead which is similar to the Ifè brass, it however features a high tin content which is contrary to the Ifè ratio. This short fall makes it difficult to see a possible relationship with the constituent character of the two locations for the tested samples. Also, very importantly, as published by Thornton [11, 126 –127], the brasses from Turkmenistan and its environs (Uzbekistan and Northern Georgia) were found to be dated ca. 3rd millennium BCE. This timeframe is too far off from the eleventh to fifteenth century CE under consideration by this study, hence, no direct relationship can be considered. However, because of the rich deposits of copper, zinc and leads in Uzbekistan, neighbours such as Georgia, Turkmenistan, southern Russia and the Caspian depression became popular for their brass casting industry around the late second millennium. The casting culture flourished and influenced the surrounding areas over a long period of time, though it is thought that the influence became heightened around the late eight century CE after the Islamic take over. Under Islamic rule, certain elements of the indigenous culture of the area were absorbed and propagated in favour of the Islamic overlords. By the time the Roman Empire collapsed the Middle East cuprous culture was already close to its climax as it had absorbed a great deal of knowledge and skill from the Romans [12, 69–76].

Ifè brass is known for its relatively high lead content which has given it the accolade leaded brass. It has been suggested that the high lead content of the Ifè brass as it is with many West African brasses is as a result of purposeful addition of lead in other to lower the melting point and to improve fluidity of the alloy [13, 95]. Warner and Willett suggested that the high lead content may be due to the addition of lead rich manillas to the copper alloy [8, 142]. However, further analysis also by the duo show that the manillas may be the explanation for the relatively high lead content in the Benin brass but the same cannot be said for the Ifè brass. They argued that if the alloy's high lead content is as a result of the addition of lead rich manillas, there should be a corresponding high level of antimony — One of the trace elements found in copper alloys and also a major constituent element in lead rich manillas. Ifè brass presents low antimony which suggests that the high lead content is not from the addition of leaded manillas. This study suggests an alternative explanation for the high lead content in the Ifè brass. The levels may be the result of any of the following reasons. The Ifè metallurgist may have added lead itself deliberately to increase the volume of the alloy produced. This practise is not altogether uncommon particularly in the Mediterranean and Near East axis. Ponting hints at this in his study of Post-classical Bet She'an copper alloys [14, 1316]. The process of adding lead directly has its appeal which includes the slight lowering the melting point but there is also an unpleasant side to it. Intentionally adding lead to copper-zinc alloy creates structural weakness for the brass because lead is insoluble in copper [14, 1316]. Consequently master casters use such procedure very carefully in a manner

that it does not compromise the structural integrity of the alloy particularly if the piece is to be hammered to shape and desired fineness. Lead ore is available and accessible in Ifè. This is evident in the use of lead for the veneration of Obatala — The god of creation. Also, because lead is a cheap, it may have been used to achieve greater productivity. Therefore, rather than the addition of lead rich manillas, lead itself may have been added to increase the mass of the alloy — this is sometimes done by cementation. The northeastern Nigerian brass casters on the other hand may have no desire or need to add lead to their alloy as they are not known to make pieces that require a large amount of metal. Unlike the Ifè casters who make near to life and life size human portraits requiring quite an amount of metals, the northern artisans focus more on small items such as rings, pins, small jewellery and the likes. This may account for their low lead content as noticed in the Daima samples. On another hand the Ifè brasses may use very high lead content ores. Since the Ifè brass works are produced almost solely by casting, an ore that is especially good for casting and at the same time rich in lead which renders a lower melting point is Caldarium. Though particularly popular in Islamic metallurgy, the ore is believed to have been used first by the Romans and later adopted by the ancient Islamic world after the collapse of the Roman Empire [14, 1375]. Caldarium does present qualities that would entice metallurgist of ancient Ifè to make it their choice additive material for casting.

It is very plausible that being very popular in the Islamic areas of Asia Minor and parts of north-eastern Africa, caldarium filtered into southern Sudan and many tropical areas of Africa through skilled itinerant artisans and adventurers. Therefore the possibility that Ifè brass casting materials and possibly technology may have come from the Near East/early Islamic world is quite reasonable based on deductions from the history of the spread of casting cultures in the eastern part of Asia Minor. The very strong similarity between the component ratio of the Ifè brass and the tested samples from Tiberias; a city located in the north-eastern part of Israel in Fig. 1 gives support to the pursuance of this hypothesis. The brass objects studied for this comparison were of the Fatimid period — this is between nine hundred and fifty CE to the early tenth century CE. This time frame relates directly with the early beginnings of the Ifè dynastic rule. Six different elements were used in the evaluation between the materials from the two locations under comparison — Ifè and Tiberias (see Table 2).

A high degree of correlation was found on all six elements. Werner and Fagg had concluded that the materials used for making the Ifè heads was rich in arsenic with a high average mean of 0.35 percent and yet also distinguished by low nickel content [8, 145].

Table 2. – Table showing mean percentage composition of trace elements in Brass samples for Ifè, Tiberias and Benin

Location	Trace Elements			Source
	% Nickel	% Arsenic	% Antimony	
Ifè	0.03	0.35	0.22	[8, 146]
Tiberias	0.09	0.31	0.29	[12, 37–39]
Benin	0.22	0.12	0.50	[8, 147]

The mean figure for arsenic found in the brasses from Tiberias shows a markedly close and similar high average of 0.31 percent and an equally low nickel average. The Benin average mean for arsenic was however 0.12 percent, which is a significantly lower reading.

The correlation between the two locations for all six supplementary and trace elements suggests that the materials used in both locations may have come from the same source. Further, one may reason based on inferences from the data that there was some degree of contact and possibly interaction between the artisans and/or traders who conduct business in the two regions. These itinerants may be responsible for the transfer of knowledge from the Near Eastern region of Tiberias to the lower ends of southern Sudan.

Conclusion

After careful correlation analysis and consideration of other secondary data like local tradition of origin and ancient geographical interactions, one will find that the percentage constituent figures of the Ifè brass heads is most correlated with the results from Tiberias in northern Israel. Though Werner and Willett earlier concluded that the materials used for the Ifè brass may have come from the lower Saxony in north Germany, this researcher proposes that rather than the lower Saxony, the now Middle East, particularly the region of Teberias in Israel must be presented and considered. This is primarily because of the striking similarity in the composition ratio of the elements found in the copper alloy used in both areas.

Based on evidence from the correlation of the supplementary and trace elements found in the Ifè brass and those from the region of Tiberias in Israel, and other factors such as local casting practise, literature on constituent ratio of alloys and location, history of the caldarium ore and traditions of interaction between the Islamic areas and the Yorùbá people, this researcher concludes that the materials used for the Ifè brass objects possibly came from the ancient Islamic areas of the Near East and Northeast Africa. The implication of this is that there is a high probability that the casters who made the Ifè heads also came from the those regions as itinerants or at least interacted with the Yorùbá at some point. In the further pursuance of the above stated position, one must examine the possible authors of the Ifè brass heads and how the Ifè metallurgist came in contact with the materials used.

References:

1. Ifè brass heads are part of a group of naturalistic head sculptures, found in and around Ile Ifè; the spiritual capital of the Yorùbá in the early 20th century. They are mostly made of brass, bronze, stone and terra cotta. For detailed introduction, see: Meyerowitz H., Meyerowitz V. Bronzes and Terra-Cottas from Ile-Ifè.//The Burlington Magazine for Connoisseurs. – 1939. – Vol. 75. – No. 439. – P. 150–55.
2. Adepegba C. Osun and Brass: An Insight into Yorùbá Religious Symbology In Osun across the waters/Eds.: J. Murphy, Mei-Mei Sanford. – Indiana: University Press, 2001. – P. 102–112.
3. Chikwendu V. E., Farquhar R. M., Craddock P. T., Shaw T. and Umeji A. C. Nigerian Sources of Copper, Lead and Tin for the Igbo-Ukwu Bronzes.//Archaeometry. – 1981. – Vol. 13. No. 1. – P. 27–36.
4. Aimiuwu O. E. Oduduwa.//Nigerian Magazine. – 1971. – No. 107. – P. 85–90.
5. Johnson S. The History of the Yorùbá: From the earliest times to the Beginning of the British Protectorate. – Lagos: CSS Limited, 1921.
6. Adepegba C. Yorùbá Metal Sculpture. – Ibadan: University Press, 1991. – P. 32–34.
7. Baker H. Examination of Ife Bronze Heads.//Man. – 1965. – Vol. 65. – No. 10. – P. 23–24.
8. Warner O., Willett F. The Composition of Brasses from Ife and Benin.//Archaeometry. – 1975. – Vol. 17. – No. 2.
9. Connah G. Three Thousand Years in Africa. – Cambridge: University Press, 1981. – 176 p.
10. Ponting M. The Scientific Analysis and Investigation of A Selection of the Copper-Alloy Metalwork from Tiberias In Tiberias: excavations in the house of the bronzes. – Hebrew: University of Jerusalem, 2008. – P. 37–39.
11. Thornton C. Of brass and bronze in prehistoric Southwest Asia In Metals and mining: studies in archaeometallurgy/Eds.: S. LaNiece, D. Hook, P. Craddock. – London: 2007. – P. 123–135.
12. Craddock P. T. The Copper Alloys of the Medieval Islamic World – Inheritors of the Classical Tradition.//World Archaeology. – 1979. – Vol. 11. – No. 1. – P. 68–79.
13. Shaw T. Spectrographic Analyses of Igbo and other Nigerian bronzes.//Archaeometry. – 1965. – 8. – 95 p.
14. Ponting M. T. East meets West in Post-Classical Bet She'an: The Archaeometallurgy of Culture Change//Journal of Archaeological Science. – 1999. – 26. – P. 1311–1321.

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Development of the society of the middle ages Naxkshab

Abstract: Southern Sogd (Naxkshab) one is ancient country of Central Asia. In the article is analyzed scientific principles of progress society early middle ages of Naxkshab.

Keywords: early middle ages, Naxkshab, handicraft, ceramist, terracotta, symbiosis, metallurgy, glass-making.

The territory known since the early Middle Ages as a Naxkshab, in ancient times, according to written sources, called Ksenippa [1, 85–94]. Based on the opinion of the Israeli researcher Shauket Shaul, the famous French archaeologist Franz Grene noted that "the terms Knesippa and Ksane are different forms of pronunciation of single-rooted term Naxkshab". If this assumption is true, the name of Karshi oasis in the whole path of historical development has always been Naxkshab and only after the conquest of the Arabs became a Nasaf [2, 260].

Until the formation of early medieval craft production in Naxkshab as in other historic areas, preserve and develop pottery traditions of ancient times. However, with the advent of the banks of the Syr Darya Chionites pastoral communities, and later replaced Ephtalites very graceful and harmonious pottery objects of antiquity came several sets of ceramic products, differing in form and colors of the old materials. A similar picture is observed not only in ceramic complexes Naxkshab V–VI centuries, but in the ceramic basic agricultural oases of Central Asia.

In the archaeological literature there is an opinion that the cities of Central Asia in its early medieval development is a stand-alone locks fortress or a cluster of houses, and even Samarkand was added to a number of cities. According to the proponents of this idea around these fortified castles were huge empty space on the site which later formed densely built neighborhoods. However, the study of ceramics Yerkurgan quarter shows that in the V–VI centuries, the houses were built very tight, and along the side of the road from the southern to the northern gate of the city, located homeownership masters ceramists.

Quarter ceramists, in turn, consisted of group workshops, owned by five major, patriarchal individual genera, uniting the family of potters.

Households ceramics consisted of 3–4 or even 6–7 rooms. Some of the houses are open to the main entrance there was a street of the city through a very narrow corridor into the inner room of the house. Such a provision in the quarter is a sign of ceramists high cost of land within the city. Detection of helical residues "ladder" in the household № 8 confirms that, in order to ensure the housing member of the family, based on the financial possibilities of the population was made to build a two-storey house.

In an effort to meet the needs of the population ceramic workshops were working very intensively. That is why we reject the theory that "in the early Middle Ages some specialty shops reached its climax so much that they began to produce ceramic products of a specific type". But it would be wrong to say vkorne that have artistic value, elegant small plastic products, including "terracotta statuettes, vessels with false figures zoomorphic, anthropomorphic theme" produced all the potters. Such "out of serial" products are essentially pieces of art could only be very talented and experienced craftsmen, which is confirmed by the results of archaeological excavations.

Excavation № 5, Manufactured in the northern quarter of ceramists, including laid there microstratigraphic pit revealed that ceramic production continued here continuously since the first century BC up to the V–VI centuries BC, and thus handed down as a dynastic profession. Our assumption is confirmed by the fact that pottery production continued in the southern part of the quarter and in VII–VIII centuries, even when the city, which existed on the site Yerkurgan, fell into decay [3, 205].

A survey of households ceramists Yerkurgan shows that almost was not revealed standard 3–4 or 5–6 room houses. On the contrary, each household -oriented production of ceramic products, based on their capabilities had a big, multi- sector. There were open and very small farms of 2–3 rooms.

Households potters were well adapted both for life and for work. Here are workrooms, kiln, a potter's wheel, home sanctuary, a guest room, "internal" room and a winter.

Due to the fact that a certain part of the quarter of potters was opened fully, to reveal fine detail, paints a picture of their everyday life. Among them should be noted sufa square shape (stone) in the premises of the sanctuaries, which are usually staged idols made of wood, terracotta or just clay. For example, in the household № 3 was found the upper part of the clay figurines, which are well preserved left side of the face shape hairstyle, black left eye and a large mole, painted in red. Since the idol was kept close to the sacred fire, his face is often covered with soot, but again and again restored. On a broken part of the figurines are observed layered traces of paint and wash. In the rest of the statues should be worn clothes that were washed from time to.

Archaeological research conducted on the site Yerkurgan allowed to trace a number of customs and rituals of the cult character. Thus, one of the workshop buildings surveyed had a room № 28 this section prayer, which was accessible only through № 27, after the worship of the deity. This is evidenced by the presence of the marble pedestal with top ceramic stand. Upon entering the room № 28, it had a special fence. Coming into this room, potters brought with them samples of their products, prepared for roasting to the rite of sacrifice to the deity of fire. Fragments prepared for firing pottery were found in this area.

In studying ceramics quarter observed the following: after a sprawl management, it becomes a separate, or conversely, by combining several individual farms receive one major.

Ceramists, along with its main products — tableware, produced a large number of terracotta figurines zoomorphic, anthropomorphic character, and then engaged in their implementation.

Layer V–VI centuries on the sites of Karshi oasis made to date mainly "miniature jug Naxkshab". First we thought that the oldest were small jugs and later appeared slightly larger vessels. However, in the course of the excavations, which were carried out in the quarter ceramists Yerkurgan were raised and jugs of both volume and finding them in a single layer made us reconsider the earlier view. Thus, in layers V–VI centuries Karshi oasis along with miniature jugs were also larger.

The exact stratigraphic complexes prepared us in the quarter ceramists V–VI centuries, show that they are fundamentally different from the systems of the former period. However, this period can be dated to the era Ephtalites as complexes retain a clear ethnic lines. For this reason, the complexes of this period combine culture and Ephtalites Sogdians, and we call it a period of "Sogdian-Ephtalite symbiosis". The archaeological materials, this fact is reflected, as studying them we can trace going back to the ancient traditions of local cultures Connect farming communities.

S. K. Kabanov assumed that the image "of the ruler Naxkshab" refer to the III–IV centuries, and this finding is relevant to Parthia. In our opinion, this image should be dated V–VI centuries, and it is likely to be the image of "deified ruler Naxkshab".

Pottery continued to develop Yerkurgan and VII–VIII centuries. One of the most characteristic features of ceramic production in this period was its output outside the settlement. So, in the end Yerkurgan VI–VII century, all the early ceramic furnace were transferred outside the farm.

Another characteristic feature of the industry is the emergence of craft dishes as if in imitation of gold and silver, that is, sprinkled with mica surface of tableware, as well as widespread vessel with a spout — drain, with patch to stick anthropomorphic and zoomorphic themes.

In the southern part Yerkurgan during excavations revealed Karaultepa ceramic complexes of the second half of the VIII- IX century, first half. The thing is that in these complexes proved to be a few pieces of cookware coated with glaze of dark green color and blood vessels, resembling Sogdian mugs. Consequently, the dating of these systems is no doubt that late 20-ies VIII century.

In Central Asia, the production of glass products is rooted in the mists of time. It is known that in ancient times was

made a lot of jewelry, especially necklaces. In ancient times, in the southern regions of Central Asia appeared glazed dishes, but it is not widespread. After the conquest by the Arabs in the region once again penetrated the technology of manufacturing glazed ceramics and IX–XIII centuries, its production reached its highest point of development. For the manufacture of glazed ceramics has developed several such schools as Samarkand, Ferghana, Tokharistan and others.

Since ancient times Naxkshab different from other oases its development of metallurgy and metal processing features [4, 28]. Stratigraphic pit inherent in the quarter Metalworkers allowed to come to the conclusion that the dynasty of metalworkers conducted here its traditional activities from the middle of I- millennium BC up to the early medieval period. The study of early medieval ceramics quarter showed that metalworkers lived large patriarchal families and produce the products according to the demands of the time, the market. Historically, artisans engaged in jewelry business, metalprocessing, glass-lived in the neighborhood. Very often, the master engaged in core activities, side handle other work. Thus, the metal if necessary, to produce a variety of glass products and ceramic artists in the warm season produces ceramic products, the cold could be engaged in carpet weaving or woven fabric.

A very characteristic phenomenon of everyday life metalworkers was the location of their shops close to the houses. Archaeological surveys show that their shops were always separate from the residential buildings. As you know, the workshops were usually located near the bazaars in city squares or roadsides of the main roads.

Discovered on the site Kultepa armaments and household equipment does not lag behind in the quality of such metal products Panjikent, who was known as one of the largest craft centers Metal Processing your time [5, 65; 6, 50].

On the ruins of Penjikent it was received extensive archaeological material, as well as findings that determine the level of development of metallurgy and metalworking, which falls between "Sogdian — Turkic symbiosis". This industry has developed synchronously in the territories Naxkshab.

During excavations in the ancient settlement Naxkshab was found only a few glass bottles. Judging by the small size they were intended to hold women cosmetic balms based on plant essential oils. Glassmaking different areas of Central Asia produced glass vessels such as small size, as well as on Yerkurgan. In Penjikent masters produced little more than 5 kinds of bottles. They differ from each other by the presence of a variety of patterns welded from the outside.

In Central Asia, including in the Karshi oasis glassmaking began to gain momentum with the arrival of the Arabs in the region. Glass produced in large cities consisted of five minerals silica oxide, calcium, magnesium, sodium and potassium. Production of various types of glass vessels was intensively developed in the IX–X centuries [7, 28].

It is known that Ephtalites established their dominance in Naxkshab in 468 year, according to Chinese sources in the period from 558 to 568 years the leader of the Turks managed to conquer Silzibul Ephtalites. During the Sassanid rule Hormizd V (579–590 years) the talented Iranian commander Bahram Chubin anticipating the threat from Sogd, undertook a campaign against Maverannahr and managed to occupy Samarkand.

According to M. E. Masson, the right bank of the Amu Darya River to keep the basic rate was the city of Qala-Zahhaki Maron, who is of Armenian manuscripts referred to as "Kazbiyan". 35 km. south-west from the city of Karshi and still is Kasbi village in whose territory remained very high fortress. We assume that is mentioned in Armenian sources "Kazbiyan" is the hill overlooking the village in Kasbi. In the realm of central confederation of Sogd observed constancy of the ruling.

So, speaking about the Big and Small An in the Bukhara oasis Chinese sources report that 627 year ruling dynasty is not changed, in Fergana IV century ruled a dynasty, rulers of Samarkand and pedigree goes back to the Yuezhi. In general, all this means that during the wars of conquest the conquerors left local rulers in the same status, charging them with responsibility for their collection, temporary taxes. Ephtalites, and a little later the Turks to adhere to this way of controlling local populations.

Capital of the state Ephtalites was Badia, which was located in the vicinity of the modern city of Kunduz. However, in written sources reported that the governor comes here only for three months and hibernates in a huge yurt. In one of this fact it can be concluded that the governor of the country came from the pastoral tribes.

Whatever it was, when Ephtalites as later in the Turks, their policy was aimed at maintaining the existing system, which does not hurt either craftsmen or farmers or herders. Despite the fact that the country was conquered during the war, the local handicraft production did not stop, but on the contrary — will soon be fully recovered, began to develop more intensively.

According to reports, the economic, political and cultural life in the upper reaches of Kashkadarya at the beginning of VII century, was much more developed compared to the other possessions of Sogd. In "Tanshu" (618–907) found evidence that after the administrative reform of 658–659 years. Shi ownership was converted into a district Kui-sha or Kye-Shuang and it was composed of possession of a neighboring Nashebo, i. e. Naxkshab. That is why the cache in this period was the largest holdings of the Sogd, who was one of the first to establish diplomatic relations with China. Must be in this period Naxkshab admitted on a domination of Kesh. Probably for this reason, the Chinese called it "Little Shi". Addition Aultepa settlement between Kesh and Naxkshab, the emergence of Naxkshab dishes sprinkled with mica, distribution of ceramic products in the form of zoomorphic figures confirm the nature of the expansion of the sphere of influence of Kesh in Sogd. In the production of ceramic production, metalworking and glassmaking Naxkshab felt the proximity of the handicraft traditions of Samarkand.

In the Chinese sources there are indications that, in 657, the Western Turk Empire defeated confederation Kahn. In 658, the Samarkand again spoke to the political arena. In VI–VII centuries in Kesh dominated Turkic dynasty. Data from written sources say that while Samarkand Sogd submitted to such ownership as Maymurg, Ishtyhan, Kesh and Naxkshab.

The constant shortage of water in the Karshi oasis influenced the appearance of historical towns, their development and even handicrafts. Because people always had to depend on water resources, one of the capital cities Naxkshab (Arabized form of Nasaf), not by chance formed on the banks of Kashkadarya, at the head of water distribution.

If at first the main factor in the development of the city were water, then later by factors become more and development of handicraft production, agriculture, and is also very important was finding a city at the crossroads of major trade routes of transit.

In the era of the Arab conquest of Central Asia, the Kashkadarya oasis turned into one of the main centers of persistent resistance to the invaders. Perhaps that is why in the arch Shullyuktepa fortress, built in the early Middle Ages, is still preserved in the Kashkadarya oasis as one of the highest. One of the cities with similar high strength and was Kaspi (Cesbio).

At the end of the VIII century Nasaf became the focus of the fight against the Arab conquerors. A craftsman from the area of Merv Mukanna became the leader of the uprising that swept the population Nasaf and Kesh. An important role in the armed anti-Arab movement was played by the population of the city Subahu (The ruins of this ancient city are located near the modern highway Karshi- Guzar and referred to by local people as Uliktepa (City of the Dead)). When in 806 in Samarkand fight broke out against the Arabs, once again came to the aid of Nasaf.

Some time later, when the south came to power Tahirids, Nasaf was a part of Samarkand.

Already in the Islamic period, Nasaf became a major center of metal processing industries, the level of which can be judged by the content of multilayer garbage pits Shullyuktepa workshops. The presence of numerous large cities and developed during the early Middle Ages in the lower reaches of Karshi oasis (Nasaf concerning, Altyntepa, Kasbi, Bezden et al). Says that in these settlements flourished craftwork. Since the period of the rule of the Samanids in written sources began to appear a lot of mention of Nasaf and its surrounding towns.

References:

1. Ртвеладзе Э. В. Александр Македонский в Бактрии и Согдиане. Историко-географические очерки. – Т., 2002.
2. Раимқулов А.А., Хидирова Г. Насаф-Қарши ўрта асрларда. – ИМКУ-35, – Т.:“Фан”, 2006.
3. Исамиддинов М., Яркулов А. История ремесленного производства Нахшаба. – Т.:“Янги нашр”, 2014.
4. Пругер Е. Горный промысел Южного Согда-Кеша. – Т., 1986.
5. Распопова В. И. Металлические изделия раннесредневекового Согда. – Л., 1980.
6. Распопова В. И. Металлические изделия из Пенджикента. – Санкт-Петербург: «Формика», 1999.
7. Аминджанова М., Сайко Э. Керамика, стекло и фарфор в Средней Азии. – Т.: «Узбекистан», 1968.

Section 7. Materials Science

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Study of impact of Al_2O_3 nanoparticles on aqueous solution of carboxymethyl cellulose (CMC)

Abstract: It was investigated the stability of nanosystems using modern analytical methods. It has been established that the role of the Al_2O_3 nanoparticles is dual. A very strong dependence of the concentration of nanoparticles is detected and interpreted in this manuscript. We support our conclusions by employing FT-IR spectroscopy. It was noted that the rheological parameters of carboxymethyl cellulose improved after nanoeffect.

Keywords: Al_2O_3 nanoparticles, carboxymethyl cellulose, FT- IR -spectroscopy, nanostructure, destruction.

Introduction

In recent years there has been a great deal of research on the subject of nanostructured materials. The superior behavior of nanomaterials compared to the parent materials originates from nanoparticles grain boundary, surface area per unit over mass or volume, size, purity and perfection of the particles [1]. Among these materials nanostructured surfactant-polymers are of special interest, including the nanostructured carboxymethyl cellulose (CMC).

Nanomaterials based on nanostructured carboxymethyl cellulose (CMC) widely used for electrical, electronic goods and in oilfield operations, including drilling and enhanced oil recovery. Now it's very important using a nanotechnology as one of the scientific directions of the XXI century in oil recovery processes (EOR), obtainment of various liquid systems in presence of nanoparticles and their application in different areas of oil industry [2–5].

Many nanostructured materials have been and are being prepared with increasing control over molecular configurations, conformations, and supramolecular assembly. These nanomaterials place an increasing challenge for characterization techniques to confirm the proposed structure and morphology [6]. From these methods Fourier Infrared Spectroscopy is very interesting and gives important informations about structure change.

Nanostructured polimer blends open up a new arena for polymer blends, and research shows that nanoblends have outstanding optical and mechanical properties.

The exceptional properties of nanoheterogeneous materials result both from the nature of each component, the size scale, the degree of mixing between the two phases, and the surface area-to-volume ratio. Therefore, significant performances of the resulting materials can be reached by tailoring the interfaces. Due to their features, nanoheterogeneous materials have been involved in a plethora of niche markets linked, for instance, to new generations of smart textiles, photovoltaic and fuel cells, antennas and satellite communications, optoelectronics, new catalysts and coatings, smart therapeutic vectors with controlled drug delivery properties, new ultrasensitive sensors, cosmetics, smart papers, and so on. The chapter is an overview of the current state of knowledge in processing, manufacturing, characterization, and potential applications of the most common polymer nanocomposites, with a special attention to their utilizations in gas sensing [7].

Taking the above into consideration, by methods of Fourier Infrared Spectroscopy was studied the features of structural changes, which observed in the nanosystems based on aqueous solution of carboxymethyl cellulose (CMC) and Al_2O_3 nanoparticles, depending on changes of concentration of components.

Experimental part

IR spectra were taken with FTIR (Fourier Transform Infrared Spectrometer) Varian 640-IRspectrometrs in frequency range 4000–400 cm^{-1} at room temperature. The absorption spectra of the samples were obtained as form of a thin layer on the KBr boards. Two KBr prisms were used to constitute the interferometer cavity.

By varying the amount of Al_2O_3 (d = 20–50 nm.) nanoparticles impacting on aqueous solution of carboxymethyl cellulose (CMC), it was developed the nanocomposites with new chemical, physico-chemical and structural-mechanical properties. For example, after nanoimpact of metal oxide nanoparticles on CMC viscosity decreased by 6–8 %.

The Al_2O_3 nanoparticles in different concentrations: 0.001; 0.005; 0.01; 0.05; 0.1; 0.5; 1.0 % were added to the aqueous solution (0.01 and 1.0 weight %) of carboxymethyl cellulose and after this take place changes in their chemical content and structure.

Discussion of the results

The IR absorption spectra of these samples, which differs strongly are given in the figure 1–2. Fig. 1 presents the infrared spectra of the initial compound (CMC) before and after nanoeffect. In this spectrum, it is possible to identify frequencies of absorption bands with several maximums. The grafted functional groups based on aqueous solution of carboxymethyl cellulose (0.01 weight %) are surfactant for Al_2O_3 nanoparticles. Being adsorbed on the nanoparticles — water interface, CMC reduces the surface tension of water on the surface of nanoparticles, which prevents them from to aggregating into larger units. Carboxymethyl cellulose is cellulose ether. In the frequency range from 925 to 1225 cm^{-1} in the spectrum an intense adsorption band appears which is typical for ethers and connected with fluctuation of the C–O polar bond (Fig. 1). As can be seen from fig.1 the spectrum 2 and 3 are distinctive. The frequency range from 925 to 1225 cm^{-1} disappeared in the spectrum 3. It explains with destruction process, which takes place under the influense of Al_2O_3 nanoparticles (0.005 %).

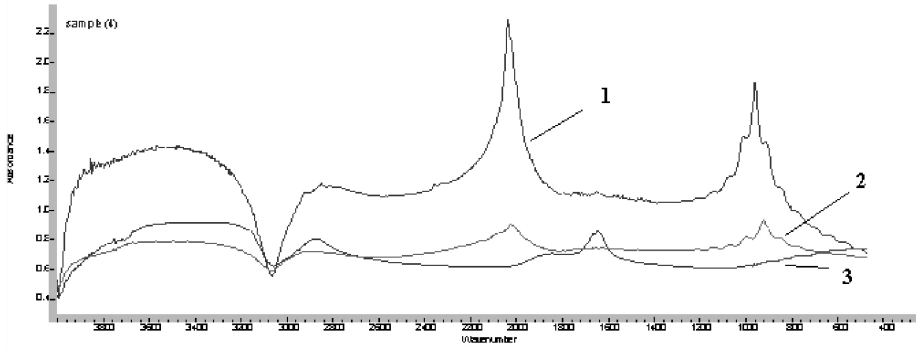

Fig.1. IR spectrum of aqueous solution of CMC and nanosystems: 1 — aqueous solution of CMC (0.01 %); 2 — 0.01 % CMC + 0.001 % Al_2O_3 nanoparticles; 3 — 0.01 % CMC + 0.005 % Al_2O_3 nanoparticles

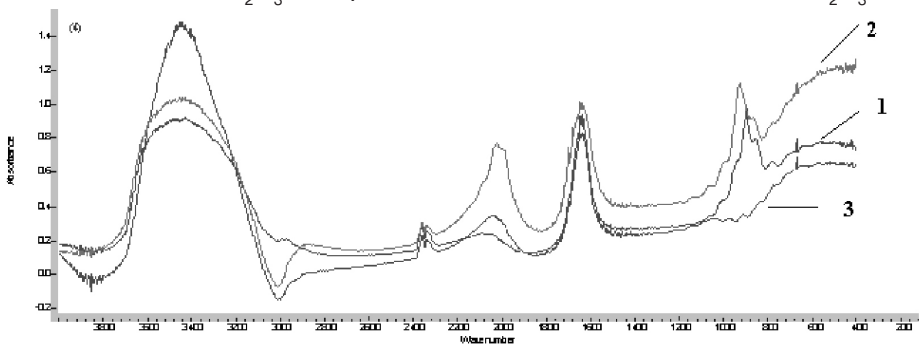

Fig.2. IR spectrum of aqueous solution of CMC and nanoheterogeneous systems: 1 — aqueous solution of CMC (1 %); 2 — 1 % CMC + 0.001 % Al_2O_3 nanoparticles; 3 — 1 % CMC + 0.005 % Al_2O_3 nanoparticles

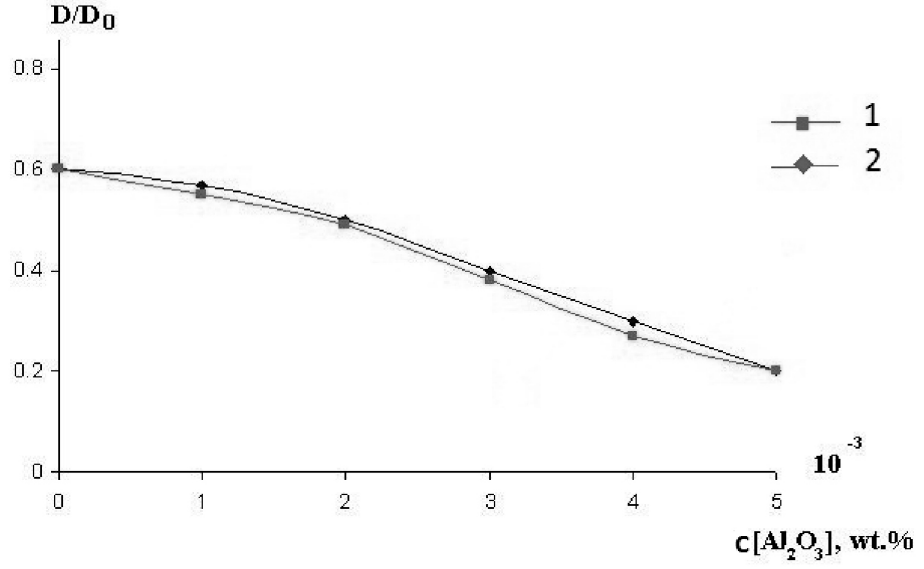

Fig.3. The correlation between concentration of Al_2O_3 nanoparticles and optical density of nanoheterogeneous systems: 1 — aqueous solution of CMC (0.01 %); 2 — aqueous solution of CMC (1 %)

Figure 2 describes the investigation of nanoeffect on aqueous solution of CMC (1 %). As shown (Fig. 2) the concentration of Al_2O_3 nanoparticles influnse to the structure of CMC. In spectrum 2 observed frequency range from 925 to 1225 cm^{-1}, which concerning to CMC, but in curve 3 these adsorption band is not founded. It explains with decomposition of nanoheterogeneous system.

Having compared Fig. 1 and Fig. 2 investigated the range of adsorption band (nIt has been obtained the nanosystems with new chemical, physico-chemical and mechanical properties by variation the amount of Al_2O_3 nanoparticles (d = 20–50 nm.) impacting over aqueous solution of carboxymethyl cellulose.

By means of IR spectroscopy method, it was determined, that the role of the Al_2O_3 (d = 20–50 nm.) nanoparticles is dual: at low concentrations of nanoparticles (0.001 wt. %) obtained nanostructuried materials, but at high concentrations of nanoparticles (0.005 wt. %) take place destruction of nanoheterogeneous systems.

The rheological parameters of modified CMC due to their nanostructure are improved: viscosity decreased by 6–8 %, the surface tention decreased by 5–7 %.

References:

1. Amanullah M. and Ashraf M. A. T. Nano-Technology in Smart fluid Development for Oil and Gas Application, Paper SPE 1261102, 2009.
2. Allsopp M., Walters A., Santmo D. Nanotechnologies and nanomaterials in electrical and electronic goods: A review of uses and health concerns//Greenpeace research laboratories. – 2007, December. – 22 p.
3. Goshtasp Cheraghian, Mahmood Hemmati, Mohsen Masihi and Saeed Bazgir, Cheraghian et al.//Journal Of Nanostructure in Chemistry. – 2013. – 3: 78.// [Electronic resource]. – Available from: http://www.jnanochem.com/content/3/1/78
4. Yadali Jamaloei B., Kharrat R. The performance evaluation of viscous-modified surfactant waterflooding in heavy oil reservoirs at varying salinity of injected polymer-contained surfactant solution. Iran. J. Chem. Chem. Eng 2012. – 31 (1), 99–111.
5. Suzdalev I. P. Nanotechnology: Physics and chemistry of nanoclusters, for nanostructures and nanomaterials. – M.: Komkniga, 2006. – 592p.
6. Hongyan W., Xulong C., Jichao Z., Zhang A. Development and application of dilute surfactant-polymer flooding system for Shengli oilfield.// J. Pet. Sci. Eng. – 2010. – 65 (1–2): 45–50.
7. Antonella Macagnano. Chapter 13 – New Applications of Nanoheterogeneous Systems.//Nanostructured Polymer Blends, 2014. – P. 449–493.
8. Mahmudov H. M., Kuliyeva U. A., Kerimov V. K., Kurbanov M. A. Water radiolysis on the surface of Al_2O_3 nano-catalyst.//European Journal of Analytical and Applied Chemistry, 2015. – P. 58–62.

Section 8. Medical science

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Female urinary incontinence in Tashkent (Uzbekistan): prevalence and risk factors

Abstract:

Purpose: To evaluate prevalence and character of urinary incontinence (UI) in women and to analyze the risk factors of the urinary incontinence in Tashkent.

Material and Methods: In this population study performed by cluster-typological method, the data from 2052 women obtained with use of questionnaire cards including Bristol Female Lower Urinary Tract Symptoms questionnaire were analyzed.

Results: The study performed showed that prevalence of UI in women at age 18 years and older accounts for 30 %. In the structure of diseases the stress UI appeared to be prevailing because uncontrolled urination occurred in physical loading in 52.3 % of women. The urgent UI was noted in 15.1 % of women, and the mixed type of UI was in 32.6 %.

The menopause has the most unfavorable effect on the development of urinary incontinence: the chance ratio (CR) was 6.1 (95 % CI 4.31–8.72). The rather high chance in the development of UI has obesity with CR 5.4 (95 % CI 3.0–9.61), constipations — CR 3.5 (95 % CI 2.43–5.04). The number of deliveries and abortions contributed significantly to the integral indicator characterizing chance for development of UI in women: CR 1.5 (95 % CI 1.23–1.73) and CR 1.3 (95 % CI 1.08–1.55).

Conclusion: UI is found almost in the third of uzbek women. Understanding of the nature and risk factors of UI will allow to allocate resources required for treatment and to provide prophylactic measurements in the future.

Keywords: urinary incontinence, prevalence, risk factors.

Urinary incontinence is one of the important problems in the urology, which results the patients in social desadaptation, worsen the quality of life of the patients, induces psychoemotional discomfort. The patients frequently have complaints on depression, irritability which consequently lead to the disturbance of psychological climate in the family and at the work [1, 356–357; 2, 410].

To the present moment the great number of epidemiological investigations have been performed, and all they have different indicators of the prevalence of UI that attributed to various approaches to the determination of urinary incontinence, various characteristics of special population and, at last, various methods of information collection (post questionnaires, personal interview and clinical assessment). The parameters of UI prevalence varies from 12 % to 53 % in the review of 48 epidemiological investigations [3; 4].

Now it is known about many risk factors of the UI development. However, there are differences with regard to ethnical attribution and cultural-everyday life conditions [4, 23–26; 5, 887–892]. Consequently, the growth of interest to the race and ethnical differences of the risk factors of UI is natural. Absence of the epidemiological data about prevalence of urinary incontinence among women of Uzbek nationality made us to perform population investigation among the women above 18 years and more in Tashkent. The purpose of this investigation was to determination of prevalence and character of urinary incontinence in women and analysis of the risk factors connected with urinary incontinence.

Material and methods

Epidemiological study has been carried out by cluster-typological method. The bases for clinical researches were

chosen on one territorial site of the central polyclinics of Shaikhantokhur and Khamza district of Tashkent. The women older than 18 years living in the territory of chosen sites were examined by the continuous method.

In total 2100 respondents underwent interview forming reliable representative sample of general set. From the returned cards of questionnaires 48 (2.3 %) were recognized as ineffective and were excluded from the subsequent analysis.

Card of questionnaire

The card of questionnaire consisted of three parts. The first part was designed for an estimation of the social status of the women, medical and obstetric histories: age, marital status, education, sort of working activity, number of labors and their character, height and weight, operative interventions on the abdominal cavity and small pelvis, chronic diseases, long receiving of medicines, presence recurrent infection of the urinary tract, presence of harmful habits, such as smoking, abusing by alcohol and coffee, presence of enuresis in the history of the nearest relatives, presence of menopause and use of estrogen replacement therapy. The second part was directed on definition of frequency, type and severity of urinary incontinence and its impact on the quality of life. The third part was developed for fixation of the results of urine examination and for ultrasonic scanning of bladder in the women having presence of urinary incontinence.

Definitions

Urinary incontinence at effort was defined as involuntary urine outflow at physical load, cough or sneezing.

Urgent urinary incontinence was determined as involuntary urine loss occurring immediately after urgent desire to urination.

When the respondents marked the symptoms of urinary incontinence at effort and urgent incontinence the UI mixed type was established [6, 167–178].

Estimation of urinary incontinence

In our research we defined urinary incontinence as more, than one episode of involuntary loss within one month. Such definition is used in the majority of previous researches of this type [4, 10–11; 5, 887–892]. To reveal the urinary incontinence among the studied contingent we applied the standard questionnaire Bristol Female Lower Urinary Tract Symptoms (BFLUTS) questionnaire, which was actively recommended (Grade A) at the fourth international meeting on urinary incontinence [7, 377–378], as the tool of an estimation of urinary incontinence in women. This questionnaire was translated previously to Uzbek and has passed validation.

At first we investigated prevalence of UI. Then from the women, included into the study according to the design of research "case — control", there were selected two similar (by parameters and symptoms) groups — group 1 presented the women suffering from urinary incontinence (case) and group 2 — the women without urinary incontinence (control).

The xi-square the test was used for comparison of prevalence of various characteristics among the both groups and for an estimation of the probable factors connected with UI. For revealing risk factors determining integrated risk of UI development in the women we used the multiple logistic regressive analysis. The factors connected with incontinence ($P < 0.01$) at simple regress were included into multivariational model. The results were presented as the ratio of chances (CR) with 95 % confidential interval. All analyses were made using a package of the statistical programs "R-project". The level P lower than 0.05 was considered as statistically significant difference.

Results

The average age of the women including in research was 39.4 ± 14.5 (min 18, max 88). The majority of the women — 1974 (96.2 %) were married, 7 (0.3 %) were single, 31 (1.5 %) were in divorce or widows. Initial education was in 406 (19.8 %) respondents, secondary — in 663 (32.3 %), secondary special — in 595 (29 %), higher education in 364 (17.7 %) of interviewed, without education 24 (1.2 %) women appeared to be. The most part of interviewed, 1225 (59.7 %), were working women, housewives were 404 (19.7 %), pensioners — 294 (14.3 %), and students — 129 (6.3 %).

The majority of the interviewed were childbearing women. Among them the great share seemed to include the women having from 3 up to 5 children — 981 (of 47.9 %), 1–2 children were in 599 (29.2 %), more than 5 children were in 337 (16.5 %) women who have been included into this study, and at last, 132 (6.4 %) women had no children at the moment of interviewing.

The study performed showed that the prevalence of urinary incontinence in women from Tashkent at the age above 18 years accounted for 30 %. The urinary incontinence at physical load formed the most part and was noted in 52.3 % of the women suffering from urinary incontinence. The urgent urinary incontinence was found in 15.1 % from the total number of the women with urinary incontinence, and in 32.6 % of the persons the mixed type urinary incontinence was revealed.

It is necessary to note, that through to 70-year-age the prevalence of UI increased. In the age category older than 70 years there was noted reduced number of the patients suffering from UI, but for this age there was characteristic more than two multiple prevalence of the mixed type UI in comparison with the rest its types. In the younger age categories the stress type of urinary incontinence was prevailed, though the tendency to growth of the mixed type UI was steady.

At the estimation of UI duration it was established, that the overwhelming majority of the women, 387 (62.8 %), have noted, that the suffered during the period from 1 till 5 years. In 20 (3.2 %) women there was noted occurrence of UI during the last year; 186 (30.2 %) women were bothered from UI from 5 till 10 years, and 23 (3.7 %) women — during 10 years and more.

The most part of the women suffering from urinary incontinence noted urine loss 1 time per one week or less often. Such periodicity of incontinence was revealed in 43.3 % of the patients, 2–3 times urine loss per one week was found in 19.6 %, 1 time per one week — in 13.3 %, some times per day — in 19.5 % and is constant — in 4.2 % of the patients.

The volume of the urine lost was characterized as insignificant in 352 (57,1 %) patients, moderate in 194 (31.5 %), and 70 (11.4 %) persons have noted urine loss in a large volume.

The analysis of the social factors of life of the women who have been included into this study (Table 1) showed that under the marital status the patients with UI differed from the women without UI. Thus, single among the women who are not suffering from UI, have appeared to be 9,4 times more, than among the women with UI (p = 0.0005).

Table 1. – Comparison of social-living factors of women with and without urinary incontinence

	Control (n =)	Case (n =)	χ^2	P value
Marital status				
Married	593 (96.3 %)	1312 (91.4 %)	14.8	0.0007
Single	4 (0.65 %)	88 (6.1 %)	28.95	0.0005
Divorced/widow	36 (2.5 %)	19 (3.1 %)	32.1	0.0005
Education				
Initial	128 (20.8 %)	302 (21 %)	0.0052	0.94
Secondary	181 (29.4 %)	482 (33.6 %)	3.26	0.07
Secondary special	177 (28.7 %)	418 (29.1 %)	0.01	0.91
High	130 (21.1 %)	234 (16.3 %)	6.5	0.01
Occupation				
Housewife	40 (6.5 %)	154 (10.7 %)	8.5	0.0044
Retired (pensioners)	153 (24.8 %)	142 (9.9 %)	77.05	0.0005
Working	415 (67.4 %)	1019 (71 %)	2.47	0.116
Student	8 (1.3 %)	121 (8.4 %)	35.97	0.0005

In group of the patients with UI the women having higher education were 1.3 times more than in group of the women without UI. With regard to the other educational levels in both groups the women were distributed equivalently.

The analysis of working activity has revealed, that the greatest difference in compared groups was noted among the pensioners, which was 2.5 times more among the women with UI, and among the students, which, on the contrary, were 6.5 times more among the women who are not suffering from UI. It was interesting that with regard to the number of the working women in the compared groups the differences were practically not.

We also have studied obstetric-gynecological histories of the interviewed women. As it may be seen from the data presented (Tab. 2), in the patients with UI the number of the women, having 3 deliveries and more accounted for 74 % that was 1.5 times more, than at the women without urinary incontinence.

Table 2. – Comparison of the characteristics of the obstetric-gynecological histories in the women with and without urinary incontinence

	Control	Case	χ^2	P value
Vaginal delivery				
No	104 (7.2 %)	22 (3.6 %)		
1–2	608 (42.3 %)	138 (22.4 %)	0.024	0.87
3 and more	724 (50.4 %)	456 (74 %)	21.11	0.0005
Abortions				
No	1209 (84.2 %)	450 (73.1 %)		
1–2	211 (14.7 %)	148 (24 %)	27.47	0.0005
3 and more	16 (1.1 %)	18 (2.9 %)	9.84	0.0026
Complicated deliveries				
No	1340 (93.3 %)	558 (90.6 %)		
Yes	96 (6.7 %)	58 (9.4 %)	4.29	0.0395
Caesarean section				
No	1410 (98.2 %)	594 (96.4 %)		
Yes	26 (1.8 %)	22 (3.6 %)	5.1	0.024
Menopause				
No	1276 (88.9 %)	288 (46.7 %)		
Yes	160 (11.1 %)	328 (53.3 %)	419.29	0.0005

The results of the analysis have shown, that among the women suffering from UI, complicated deliveries (the application of obstetric forceps, episiotomy and others) were noted 1.4 times more often, than in the women without involuntary urine loss.

The number of the previous abortions was also differed in the women of compared groups. So, among the patients with UI the women having 1–2 abortion were 1.6 times more, than among the women without UI. This difference increase up

to 2.6 times among the women having in the anamnesis 3 and more abortions.

From all interviewed women suffering from UI, 3.6 % underwent earlier operation Cesarean section, while among the women without UI such patients were 2 times less. Among persons suffering from UI the women in menopause were 4.8 times more, than among the women without UI.

Table 3. – Comparison of the frequency of extra-genital diseases in the women with and without urinary incontinence

	Control	Case	χ^2	P value
Respiratory diseases				
No	1381 (96.2 %)	573 (93 %)		
Yes	55 (3.8 %)	43 (7 %)	8.7	0.004
Diseases of the cardiovascular system				
No	1394 (97.1 %)	592 (96.1 %)		
Yes	42 (2.9 %)	24 (3.9 %)	1.0	0.3
Arterial hypertension				
No	1395 (97.1 %)	591 (95.9 %)		
Yes	41 (2.9 %)	25 (4.1 %)	1.6	0.2
Diabetes mellitus				
No	1418 (98.7 %)	591 (95.9 %)		
Yes	18 (1.3 %)	25 (4.1 %)	15.2	0.0007
Obesity				
No	1415 (98.5 %)	540 (87.7 %)		
Yes	21 (1.5 %)	76 (12.3 %)	110.8	0.0005
Diseases of the thyroid gland				
No	1428 (99.4 %)	611 (99.2 %)		
Yes	8 (0.6 %)	5 (0.8 %)	0.1	0.7
Constipations				
No	1357 (94.5 %)	511 (83 %)		
Yes	79 (5.5 %)	105 (17 %)	70	0.0005
Varicose disease				
No	1390 (96.8 %)	609 (98.9 %)		
Yes	46 (3.2 %)	7 (1.1 %)	6.5	0.01
Diseases of nervous system				
No	1413 (98.4 %)	582 (94.5 %)		
Yes	23 (1.6 %)	34 (5.5 %)	23.1	0.0005
Diseases of the urinary system				
No	1400 (97.5 %)	599 (97.1 %)		
Yes	36 (2.5 %)	17 (2.9 %)	0.03	0.9
Traumas of the spine				
No	1427 (99.4 %)	605 (98.2 %)		
Yes	9 (0.6 %)	11 (1.8 %)	4.9	0.03

As it is visible from the table 3, in which there was presented the frequency of extra-genital diseases in the women, who were included into this study, respiratory diseases, diabetes mellitus, obesity, constipations, diseases of nervous system were found more often in the patients with UI. Thus the largest difference in compared groups was with regard to the number of the women with obesity, who appeared to be among the patients with UI 8.2 times more than among the women without UI. Diseases of nervous system, chronic colitis and diabetes mellitus in the patients with UI were met more than 3 times more often, than in the women without UI.

The results of multiple logistic regressive analysis are presented in the Table 4.

The most unfavourable impact on the development of UI the menopause had: the ratio of chances (CR) — 6.1 (95 % CI 4.31–8.72). The obesity contributes rather high chance to the development of UI — CR 5.4 (95 % CI 3.0–9.61), the constipation showed CR 3.5 (95 % CI 2.43–5.04). The number of deliveries and abortion showed the significant impact in the integral indicator characterizing chance for development of UI in women: CR 1.5 (95 % CI 1.23–1.73) and CR 1.3 (95 % CI 1.08–1.55), respectively.

Table 4. – The factors associated with urinary incontinence in women

Factors	OR	Standart error	P	Confidence interval	
				min	max
Age	1.013159	0.0062998	0.036	1.000887	1.025582
Occupation	1.064536	0.0602464	0.269	0.9527686	1.189415
Vaginal delivery	1.461971	0.1295343	0.000	1.228911	1.739232
Abortions	1.299731	0.1188284	0.004	1.086506	1.554802
Diabetes mellitus	1.63531	1.0324	0.436	0.4744839	5.636102
Obesity	5.376775	1.593982	0.000	3.007304	9.613165
Constipations	3.503397	0.65194	0.000	2.432714	5.045309
Diseases of nervous system	1.076437	0.1538856	0.606	0.8133964	1.424541
Caesarean section	0.8151558	0.3143906	0.596	0.3827788	1.735935
Complicated deliveries	1.315972	0.2787864	0.195	0.8688029	1.993298
Menopause	6.136008	1.103466	0.000	4.313308	8.728937

Discussion. The urinary incontinence remains to be the important problem touching the women of all ages, various cultures and races. Chan et al. (1991) [8, 326–328] informed, that only 4.8 % from 919 elderly women in Singapore suffered from urinary incontinence; Kondo et al. (1990) [9, 330–331] showed that 27.1 % of the women living in Japan had urinary incontinence at effort. In research including Chinese women at the age above 18 years living in Hong Kong, Ma S. S. (1997) [10, 327–331] reported, that 34 % of the women noted, at least, one episode of UI and 18.5 % of the women had constant urinary incontinence. According to the data of C. Hampel et al. (1997) [3, 3–12], G. Aggazotti et al. (2000) [11, 245–249], prevalence of symptoms of UI in the USA achieved 37 %, in the continental Europe — 26 %, in England — 29 %.

As, it is visible, the data on prevalence of urinary incontinence are differed. But the common opinion of all researchers is that urinary incontinence is the widespread disease. Our study showing that almost the third of the interviewed women suffer from urinary incontinence is one more confirmation of this situation. Moreover, according to our data the incidence of urinary incontinence increases with age, that will be coordinated to the literary data. Simeonova Z. et al. (1999) [12, 546–551] showed increase of incidence of urinary incontinence from 3 % in the age of 20–29 years up to 32 % in an age category of the women more than 80 years.

From the majority of epidemiological studies of UI among the various population it is known about many risk factors of this disease at the woman. Some chronic diseases, such as diabetes mellitus, hypertension and constipation increase the risk id urinary incontinence occurrence [13, 634–641]. In our research obesity and constipations caused high chance of development of urinary incontinence in the women.

Uzbekistan is region with traditionally high birth rate. And consequently for us the special interest is given to the influence obstetric-gynecological histories on the development of urinary incontinence in the women.

According to data of Song Y. et al., (2005) [5, 887–892] more than 2 kinds are risk factors for development of urinary incontinence. Rortveit et al. (2003) [14, 900–907] informed, that in comparison with non-parous women the risk of UI was higher among the women, which had Cesarean section and more above among the women, who had vaginal delivery.

The study performed has also confirmed, that vaginal deliveries increased risk of occurrence of UI. But Cesarean section had no impact on the development of urinary incontinence. Besides, on our data, it was appeared, that the abortions raise risk for development of urinary incontinence in the women, though in the earlier studies performed we did not meet the evidences about relations between abortion and occurrence of urinary incontinence. Probably, sharp body hormonal reorganization occurring in connection with interruption of pregnancy in the further effects on the mechanisms of urinary incontinence.

The most unfavourable influence on the development of UI in our research menopause showed. These data will be coordinated to the data received by Victor W. N. (2001) [15, 52–56] and Apolikhina I. A. (2006) [4, 16–17].

At the same time the study performed research has shown, that cultural features of the studied population exclude practically the influence of harmful habits, such as smoking, abusing by alcohol and coffee, which accordingly to the data of epidemiological studies performed in the other countries were significant risk factors for development of UI [4, 15–16; 5, 887–892].

According to the data of Mary H. P. et al. (1999) [16, 67–82] development of urinary incontinence in the women is connected to age. However, multiple regressive analysis performed by us has shown that the age had no significant impact on the value of integral indicator characterizing chance for development of urinary incontinence. This is evidently indicated that the increase of incidence of UI with age is caused, mainly, by greater prevalence of menopause and other diseases in the woman, which present prognostic status.

Conclusion. Thus, the study performed has shown that UI in the women of the Uzbek nationality is the widespread disease and meets at 30 % of the women.

The results obtained can be recommended for use as prognostic factors during performance of the mass prophylactic

examinations and selection of the contingent of patients requiring differential therapeutic-prophylactic measures for strengthening health of the female population.

The understanding of a nature and risk factors of UI will allow to plan allocation of the resources required for treatment and to supply preventive measures in the future.

References:

1. Alayev Yu. G., Balan V. E., Gadjieva Z. K. The prevalence of imperative disorders of urination among the women above 40 years.//Meeting of All-Russian Society of Urologists: Abstracts of the Reports. – Tyumen, 2005. – P. 356–357.
2. Trapeznikova M. F., Dutov V. V., Bichkova N. V., Golovchenko K. V. Epidemiology of the hyperactive bladder in Moscow province. Materials of the Plenary session of the Authorities of the Russian Society of Urologists. – Tyumen, 2005. – P. 410.
3. Hempel C., Wienhold D., Benken N., Eggersmann C., Thuroff J. W. Preva-lence and natural history of female incontinence. //Eur urol. 1997. – 32: 3–12.
4. Apolikhina I. A. Clinical epidemiology, differential diagnostics and conservative treatment of urinary incontinence in the women. Abstract of Thesis. Dis. … for scient.degree Doctor of Medical Sciences: 14.00.01. – Moscow, 2006.
5. Song Y., Zhang W., Song J., Xu B. Prevalence and risk factors of urinary incontinence in Fuzhou Chinese women.//Chinese Medical Journal, 2005. – Vol. 118. – No. 11: 887–892.
6. Abrams P., Cardozo L., Fall M., Griffiths D., Rosier P., Ulmsten U., van Kerre-broeck P., Victor A., Wein A. The Standardisation of Terminology of Lower Urinary Tract Function Neurourol. – Urodyn 21:167–178. – 2002.
7. Abrams P., Cardozo L., Khoury S., Wein A. Incontinence, 4th edition, 2009. – P. 377–378.
8. Chan C. J., Lee K. S., Merriman A., et al. Urinary incontinence among the eld-erly people of Singapore. – Age Aging, 1991. – 38: 326–328.
9. Kondo A., Kato K., Saito M., et al. Prevalence of hand-washing urinary incon-tinence in females in comparison with stress and urge incontinence.//Neurourol Urodyn. – 1990. – 9: 330–331.
10. Ma S. S. The prevalence of adult female urinary incontinence in Hong Kong Chinese.//Int Urogynecol J. – 1997. – 8: 327–331.
11. Aggazzotti G., Pesce F., Grassi D. et al. Prevalence of urinary incontinence among institutionalized patients: a cross-sectional epidemiologic study in a midsized city in northern Italy.//Urology. – 2000. – Vol. 56. – No. 2. – P. 245–249.
12. Simeonova Z., Milsom I., Kullendorff A. M., et al. The prevalence of urinary incontinence and its influence on the quality of life in women from an urban Swedish population. Acta Obstet Gynecol Scand. – 1999. – 78: 546–551.
13. Kocak I., Okyay P., Dunbar M., Erol H., Beser E. Female urine incontinence in the west Turkey: prevalence, risk factors and impact on quality of life//European Urology. – 2005. – Vol. 48. – P. 634–641.
14. Rortveit G., Daltveit A. K., Hannestad Y. S., et al. Urinary incontinence after vaginal delivery or cesarean section.//N Engl J Med. – 2003. – 348: 900–907.
15. Victor W. Nitti. The Prevalence of Urinary Incontinence.//Rev Urol. – 2001. – 3 (Suppl 1): 52–56.
16. Mary H. Palmer, Sheila Fitzgerald, Susan J. Berry, Kristin Hart. Urinary Incontinence in Working Women: An Exploratory Study.//Women and Health. – July 1999. – Volume 29, Issue 3. – P. 67–82.

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Hygienic estimaton of allocation of schools and planning of district of boarding schools in Tashkent city

Abstract: Hygienic estimation of training and education of children and teenagers in a variety of specialized boarding schools.

Keywords: specialized boarding schools, children, teenagers, education and teaching condition.

The development of effective technologies of health protection of women and also children and teenagers, as a period of growth and development of the child related to important period which determining the condition of human health during the whole to subsequent life were related to the numbers of priority directions of the development of medical sciences in the Republic of Uzbekistan to the period until 2018. Hygienically adequate environment with other factors is important supposition of protection and strengthening of the health and development of children. Thereupon a condition of education and upbringing of children in organized collectives, in which during this period located a great deal of children are

extremely important. Fullness degree of the state of education are determined by the accomplishment and sanitary condition of children institutions [1, 33–36; 2, 1–14].

These factors are essentially important for physically restricted children upbringing in specialized boarding schools. Children are vulnerable to unfavorable conditions of habitat, but handicapped ones are extremely vulnerable to this. Meanwhile, the education and healthcare systems of our republic have social problem not only ensure opportunity of worthy life for people with disabilities but also accomplish rational education of disabled children with their social adaptation on the stage of their study at specialized educational institutions. Thus, the object of our research is hygienic assessment children and teenagers' state of education and upbringing at specialized boarding schools.

Materials and methods of research

Researches were carried out in 5 specialized boarding schools which are localized in Tashkent city. The features of profile and studying contingent of schools are presented in table 1.

Table 1. – Contingent of specialized boarding schools

№ of schools	Specialization	Number of children, of them abs. %		
		total	Girls	Boys
№ 106	For low hearing children with Uzbek language education	337 ± 25	191/56.6	146/43.3
№ 102	For low hearing children with Russian language education	290 ± 15	175/60.3	115/39.7
№ 101	For deaf and dumb children	221 ± 12	118/53.3	103/46.7
–	For eyeless children	368 ± 10	204/55.4	164/44.6
№ 100	For children with locomotor apparatus disorders (LAD)	288 ± 6	118/41.0	170/59.0

Selected for research of specialized boarding schools (later SBS) were taken into consideration for being day and night of children at the age from 7 until 17 for receiving the education on the courses of secondary general educational schools and professional training with consideration of character and the degree of physical and psychological narrow minded abilities of pupils. We prepared "A map of sanitary-hygienic examinations of specialized boarding-schools" including 10 blocks of educational condition and teaching (44 criterion signs). We used the grading system for the characteristics of quality of these indexes on the bases of recommendations of A. G. Sukharev and others (2000) [1], and also F. L. Azizova [4], G. I. Shaykhova (2015) [2]. Maximal assessment of each criterion sign makes up 100 grades. The score was calculated by each index on the basis of conclusion about conditions of education and teaching for a complex assessment of schools. In this case if the score made up 90–100 % maximal magnitude — the condition of education and teaching is appraised as "optimal", 86–89 % — "permissible", 72–85 % — "satisfactory", which requires partial correction, less than 60–71 % — "unsatisfactory", which requires cardinal changes.

Results and discussion

Practically all investigated schools were founded in the first half of the XX century but in the past there were not any reconstructions and even they did not change the place of localization. The main part of investigated schools were built by considering of their appointment, however at school № 100 (for children with LAD) district and the building of school are not adapted for such children. The capacity of investigated schools by comparing with secondary schools is relatively not high – from 210 until 330 pupils, but intervention of classes were estimated to 8–12 pupils. Receiveddataallowconcluding; that onlyintwoschoolsfrom 5 studied (101 and 102) there was not project holding capacity. Inotherschoolsthenumberofpupilsin 12–46 % moreprojectholdingcapacity, that it cannot be reflected to hygienic conditions of teaching of the children. The most unfavorable situation was noted in specialized boarding–school for children with LAD (locomotor apparatus disorder), that contingent of these pupils is the most difficult who needs a great care and special condition of teaching and education. Room system teaching is widely used at schools, at some schools (№ 102) the number of rooms with special equipment for weak hearing children increase the number of total classrooms. The number of school teachers also depends on the profile of school. Thus, at schools for weak hearing children and for children with LAD one teacher is assigned to 7–8 children, but deaf and dumb and eyeless 3–4 pupils are assigned to one teacher. For children of these schools have been provided by solid staff of the teachers, if there is severe condition of children one teacher must be planned to them. However the health of children, their study and social adaptation depend on described factors, and concrete hygienic conditions of teaching and education.

We carried out the complex estimation of hygienic condition of teaching and education of children on the basis of revealing the accordance between actual condition of schools and present hygienic standards. No one from studied schools have not optimal staff of allocation (in park zone). In all schools planting of greenery in (50 %) was sustained.Training — experimental zone was not provide at schools № 100 and for eyeless children, though a part of the children with locomotors apparatus disorders and also eyeless children could be find for themselves a training in this zone. Gymnastic — sport zones in all schools, but they require reequipments especially at school № 101. There is no recreation area at school № 16 for children but economic zone meets the hygienic requirements only at school № 101. As a whole no one from school by allocation and planning of district did not take higher grade –900 (9 indexes). Nearer to this index a school № 101 (680 grades) and a school № 102 (660). Special attention requires planting of greenery in districts, correct equipment of recreation area, isolation of economic zone. It is necessary reconstruction the promenade paths, sidewalks (width, rakes, fences, structure of sheeted and in accordance with San R and N 0313–14) [3].

Tashkent city is located in sub mountain oasis, in which, in accordance with hygienic requirements, compositional — planning decisions of school buildings must be directed to using favorable climatic conditions with simultaneous protection from excessive insolation and overheating. It depends on number of storey of buildings, quantity and orientation of the building, character of their building ups, number and allocation of recreations, a quality of ventilation. Estimation of these indexes in studied schools allowed establishing (Table 2), the main hygienic requirements are followed in structural –planning concepts of all schools: there is division of building into teaching — apartment and general school, number of storey of buildings are not increased 3 storeys, all study sections were divided by age and unilateral building up.

Table2. – Planning — special concept of buildings (grades)

Indexes	Estimation in grades				
	№ 100	№ 101	№ 102	№ 106	School for eyeless children
Planning — special concept	80	80	80	80	80
Portion of apartment with favorable orientation	90	100	100	80	80
One-sided building up	90	100	100	100	80
Sufficiencyof recreation	10	60	60	60	10
Height of building	90	90	90	90	90
Division of apartments into two zones	100	100	90	100	100
Total (maximal mark – 600 grades)	460	530	520	510	440

At the same time insufficiency or the absence (school № 100) recreations are able to decrease the quality of an air. Separate apartments are not always located rationally. As, at school № 100 gymnasium was located on the second floor but rhythmic and physiotherapy exercises rooms were allocated on the converted building of the ground floor. During the investigation (2012–2013 yy.) many building were in need of repair.

Conclusion

No one from investigated boarding schools is not adequate in full measure of hygienic requirements to the teaching and education conditions, qualifying by San R and N of the RUz № 0313–14 in accordance with its specializations.

All investigated boarding schools require reconstruction or major repair.

References:

1. Sukharev A. G., Kanevskaya L. Ya., Ryabova L. B., and others. Complex assessment methodology of teaching and education condition of children and teenagers.//Hygiene and sanitary. – 2000. – № 4. – P. 33–36.
2. Shaykhova G. I., Ponomareva L. A., Azizova F. L., Salikhova N. S. Complex hygienic assessments of teaching and education condition of children and teenagers. Methodical recommendation. – Tashkent, 2008. – P. 14.
3. Sanitary rules of facilities, equipment, content and teaching regime of specialized educational boarding schools for children, who has defects in physical and mental development № 03.13–14. – P. 43.
4. Azizova F. L., Shaykhova G. I. Complex hygienic estimation of specialized boarding schools. – Tashkent, 2015. – P. 44.

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Physical development of the pupils of specialized boarding school for weak hearing children

Abstract: The hygiene research based on physical development of the weak hearing children of specialized boarding school showed that average anthropometric results in most groups which were divided by age and by sex have almost the same results like the normal children's group except the one point. Weak hearing children have a tendency to a lower results than the standard.

Keywords: physical development, weak hearing children and teenagers, specialized boarding school.

Introduction

Physical development of pupils and teenagers is one of the most important health indexes of growing organism, keenly reacted to the character of the changes of those factors which affect to morphological and functional conditions of organs and system of the child body [1; 4].

The level, harmonicity and dynamics of physical development of the child is external manifestation of difficult process of development and forming the organizm and can be served by criteria of integrated assessment of an influence of unfavorable factors [2; 3; 5].

For children with limited capacity of physical development index can not be considered uniqly for healthy children as well. It should be understand, that "limited capacity" of such children may be different and accordingly, their influence to growing organism may have various importance. Study index of physical development of such children — a rare manifestation and we could not find any arrangement on this problem and also we could not find any standards of physical development for children with different defects of development. therefore, our aim was hygienic estimation of physical development of pupils of specialized boarding — school for weak hearing children in Tashkent city.

Materials and methods of research

The object of study was chosen the pupils (impaired hearing children) of specialized boarding-school № 102 in Tashkent city. Physical development of weak hearing children and teenagers were investigated by basic anthropometric indexes — height, body mass, circumference of thorax. At school № 102 with Russian language of teaching 190 weak hearing children aged from 7 to 15 (72 — girls, 118 — boys) were under observation. Children of each sex were divided into 9 age groups, who has been performed the estimation of physical development of the child individually taking into consideration 5 gradations of physical development: medium, taller than medium, tall, lower than medium and low physical development.

Results and discussion

The main revealing index of physical development of children is their growth. Table 1 presents, that the boys under 10 have significantly low height than their contemporaries without physical defects. However already at over than 10 middle indexes of growth in weak hearing children have not significant differences from normal children. Body mass of weak hearing children is significantly lower than normal children was revealed in 7 and 9 years old boys but circumference of thorax (C.Th) in all age group of boys had not significant difference from magnitude of age standards of normal children. The indexes of physical development of weak hearing boys were presented in Table 1.

Anthropometric characteristics of weak hearing girls were presented in Table 2. Results of these investigations were very interesting.

Table 1. – Comparative characteristics of anthropometric data of weak hearing boys, M ± m

Age	Height, cm.			Body mass, kg.			ST, cm.		
	actually, M ± m	standard, M ± m	P	actually, M ± m	standard, M ± m	P	actually, M ± m	standard, M ± m	P
7 years old	115.3 ± 2.6	124.4 ± 0.3	<	21.5 ± 1.0	23.3 ± 0.2	<	59.3 ± 1.6	59.5 ± 0.3	>
8 years old	122.9 ± 1.8	128.4 ± 0.4	<	24.9 ± 1.0	25.6 ± 0.3	>	61.9 ± 0.8	60.7 ± 0.3	>
9 years old	129.6 ± 1.2	134.9 ± 0.5	<	26.4 ± 1.0	29.5 ± 0.4	<	64.1 ± 0.8	63.7 ± 0.4	>
10 years old	135.5 ± 2.0	139.4 ± 0.5	>	30.0 ± 1.6	31.8 ± 0.4	>	65.8 ± 1.0	65.7 ± 0.4	>
1 years old	141.3 ± 1.8	143.1 ± 0.6	>	32.4 ± 1.3	34.7 ± 0.5	>	66.4 ± 0.7	67.2 ± 0.4	>
12 years old	145.8 ± 1.8	149.2 ± 0.7	>	35.4 ± 2.1	38.6 ± 0.5	>	69.6 ± 1.6	69.9 ± 0.4	>
13 years old	149.9 ± 2.6	154.3 ± 0.7	>	40.5 ± 1.4	42.4 ± 0.6	>	72.2 ± 0.8	71.9 ± 0.4	>
14 years old	158.9 ± 2.2	162.2 ± 0.7	>	49.1 ± 2.4	47.9 ± 0.7	>	76.1 ± 1.9	75.6 ± 0.6	>
15 years old	159.9 ± 3.8	169.4 ± 0.7	<	49.4 ± 3.2	54.5 ± 0.7	>	77.4 ± 3.2	80.9 ± 0.5	<

Table 2. – The index of physical development of weak hearing girls, M ± m

Age	Height, cm.			Body mass, kg.			CT, cm.		
	actually, M ± m	standard, M ± m	P	actually, M ± m	standard, M ± m	P	actually, M ± m	Standard, M ± m	P
7 years old	115.3 ± 4.1	124.4 ± 0.4	<	21.5 ± 1.0	23.3 ± 0.2	>	59.3 ± 1.6	59.5 ± 0.3	>
8 years old	120.3 ± 2.1	127.1 ± 0.4	<	24.9 ± 1.0	25.6 ± 0.3	>	61.9 ± 0.8	60.7 ± 0.3	<
9 years old	128.5 ± 2.5	132.6 ± 0.4	>	26.4 ± 1.0	29.5 ± 0.4	>	64.1 ± 0.8	63.7 ± 0.4	>
10 years old	134.4 ± 2.8	140.6 ± 0.6	<	30.0 ± 1.6	31.8 ± 0.4	>	65.8 ± 1.0	65.7 ± 0.4	>
11 years old	145.5 ± 1.9	143.5 ± 0.6	>	32.4 ± 1.3	34.7 ± 0.5	>	66.4 ± 0.7	67.2 ± 0.4	>
12 years old	143.1 ± 2.9	150.3 ± 0.5	<	35.4 ± 2.1	38.6 ± 0.5	>	69.6 ± 1.6	69.9 ± 0.4	>
13 years old	150.7 ± 3.3	156.1 ± 0.5	>	40.5 ± 1.4	42.4 ± 0.6	>	72.2 ± 0.8	71.9 ± 0.4	>
14 years old	154.3 ± 1.9	161.4 ± 0.4	<	49.1 ± 2.4	47.9 ± 0.7	>	76.1 ± 1.9	75.6 ± 0.6	>
15 years old	156.6 ± 1.1	163.4 ± 0.5	<	49.4 ± 3.2	54.5 ± 0.7	>	77.4 ± 3.2	80.9 ± 0.5	<

The growth of girls in all age groups was less than magnitude of standard, from 8 years old — after one year, which is at the age of 8, 10, 12, 14 and 15. The body mass of girls had not reliable difference from standards, but circumference of thorax (C.Th at the age of 8 and 15 was even bigger index of standards (tab. 2).

Considering above mentioned that the basic index — determining level of the development of a child is growth.We have also studied the distribution of the children by this index. Received data justifies, that t5he most part of children (48.7 % girls and 49.4 % boys)have medium level of development,

28–31 % lower than medium and lower level, 19–24 % — taller than medium and high level of the development (table 3). Authentic difference of these indexes between girls and boys were not determined. It has not been also some regularity in distribution of the children by level of development according to the age (table 3).

While estimation the harmonicity of physical development of the children, considering the optimality of body mass and circumference of thorax (CTh) in ratio to growth, it was detected that the least number of children with harmonious development is revealed before starting of adolescence age: in girls — at 9 (0 %), in boys — at 12 (30 % children of this age), but most of all children with harmonious development is revealed at 7 (girls — 75 %, boys — 50 %) and at 13 in girls (55.6 %) and at 13–1 — in boys (46.2 and 43.8 %) (Table 4).

Table 3. – Distribution of school children № 102 by the level of development, %

Age	level of development, %				
	low	lower than medium	medium	taller than medium	tall
	Girls				
7 years old	25 ± 21.7	25.0 ± 21.7	25.0 ± 21.7	25.0 ± 21.7	0
8 years old	14.3 ± 13.2	28.6 ± 17.1	42.9 ± 18.7	14.3 ± 13.2	0
9 years old	0	25.0 ± 21.7	75.0 ± 21.7	0	0
10 years old	0	37.5 ± 17.1	37.5 ± 17.1	0	25.0 ± 15.3
11 years old	0	0	45.5 ± 15.0	36.4 ± 14.5	18.2 ± 11.6
12 years old	0	36.4 ± 14.5	54.5 ± 15.0	0	9.1 ± 8.7
13 years old	22.2 ± 13.9	22.2 ± 13.9	33.3 ± 15.7	11.1 ± 10.5	11.1 ± 10.5
14 years old	0	25.0 ± 15.3	75.0 ± 15.3	0	0
15 years old	0	30.0 ± 14.5	50.0 ± 15.8	20.0 ± 12.6	0
All girls	6.8 ± 2.5	25.5 ± 4.4	48.7 ± 5.0	11.8 ± 3.2	7.01 ± 2.6
	Boys				
7 years old	25.0 ± 15.3	25.0 ± 15.3	37.5 ± 17.1	12.5 ± 11.7	0
8 years old	14.3 ± 9.4	35.7 ± 12.8	35.7 ± 12.8	7.1 ± 6.9	7.1 ± 6.9
9 years old	0	9.5 ± 6.4	71.4 ± 9.9	9.5 ± 6.4	9.5 ± 6.4
10 years old	12.5 ± 8.3	12.5 ± 8.3	62.5 ± 12.1	6.3 ± 6.1	6.3 ± 6.1
11 years old	8.3 ± 8.0	0	50.0 ± 14.4	25.0 ± 12.5	16.7 ± 10.8
12 years old	0	20.0 ± 12.6	40.0 ± 15.5	30.0 ± 14.5	10.0 ± 9.5
13 years old	15.4 ± 10.0	7.7 ± 7.4	53.8 ± 13.8	15.4 ± 10.0	7.7 ± 7.4
14 years old	0	18.8 ± 9.8	43.8 ± 12.4	25.0 ± 10.8	12.5 ± 8.3
15 years old	25.0 ± 15.3	25.0 ± 15.3	50.0 ± 17.7	0	0
All boys	11.2 ± 3.2	17.1 ± 3.8	49.4 ± 4.5	14.5 ± 3.5	9.6 ± 2.9
P (girls – boys)	> 0.05	> 0.05	> 0.05	> 0.05	> 0.05

Table 4. – Number of school children № 102 with harmonious development, %

Age	Girls	Boys
7	75.0	50.0
8	42.9	28.6
9	0	38.1
10	12.5	31.3
11	18.2	33.3
12	27.3	30.0
13	55.6	46.2
14	25.0	43.8
15	30.0	37.5
M ± m	31.8 ± 4.5	37.68 ± 4.8

As a whole of this contingent of children the harmonious development was detected in 31.8 ± 4.6 % girls and 37.6 ± 4.8 % boys ($p > 0.05$). Disharmonic growth of physical development was conditioned mainly (from 50.0 until 100.0 % in different age — sexual groups) (table. 4).

Thus, conducted estimation of physical development of children with restricted abilities allow to make the following conclusion: average statistical anthropometric indexes of weak hearing children in most age – sexual groups of both sex have not reliable differences from standard indexes of normal children but individual indexes of these children more often ranges on comparing with standard which is near to the lower indexes and sometimes we can see high indexes.

References:

1. Ag-ool E. M. The influence of social-hygienic, ecological factors to the state of health and physical development of pupils of the Republic of Tiva.//Hygiene and sanitation – M., 2007. – № 5. – P. 64–67.
2. Giguz T. L., Polyakov A. Ya., Bogachanov N. D. Dynamics of physical development of school children in Novosibirsk.//Hygiene and sanitation – M., 2007. – № 4. – P. 50–52.
3. Isaac S. I., Panasyuk T. V. Characteristics of physical development of school children of different regions of Russia.//Hygiene and sanitation. – M., 2005. – № 5. – P. 61–64.
4. Povargo E. A., Zigitbayev R. N., Shubina Kh. Z. and others. The main trends in physical development of junior school children.//Hygiene and sanitation. – M., 2007. – № 2. – P. 71–73.
5. Chmil I. B., Medvedev L. N. Age dynamics of anthropometric indexes of children of Krashoyarsk.//Hygiene and sanitation. – M., 2002. – № 2. – P. 49–51.

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Study of biological molecules in hair follicle in patients with alopecia Areata

Abstract: The given article is devoted to studying factor of growth of fibroblasts (bFGF) and factor of apoptosis (FasL) in patients with alopecia areata. Concentration of factor of growth of fibroblasts bFGF in blood is reliably decreased, and concentration of factor of apoptosis FasL is reliably increased in patients with alopecia areata. Indications of factors of growth and apoptosis observed correlate with grade of disease severity and indicate a fine regulation of phases of vital cycle of hair follicles of proteins of families FGF and FasL.

Keywords: alopecia, cytokins, dermatoscopy.

At present an incidence rate of a number of able-bodied patients is noted referring to physicians with problem of hair shedding. Besides, a tendency to an incidence growth of torpid elapsing forms of disease resistant to the therapy conducted. Demography investigations showed that 0.05–0.1 % population is exposing alopecia at least once during its life. The first signs of alopecia are showing up in the majority of people aged 15–30. At the same time cases of registration of alopecia areata in children of tender years became more frequent, especially that of taeniate and universal forms. All above-stated evidenced both medical and social significance of a problem discussed [1].

Alopecia areata occurred rather often in the last time and is characterized by baldness nidi on the hair-covering area of head, eyebrows, beard or trunk. It was established that development of alopecia takes place against a background of numerous causes to which belong combination of alopecia circumscripta and autoimmune diseases, genetic predisposition, weak type of nervous system, nidi of focal infection (tonsillitis, pharyngitis, helminthic invasion, inflammation of bile ducts and other chronic inflammatory processes in organism), and familial cases of morbidity. In spite of a great number of the performed studies many questions of etiology and pathogenesis of alopecia remain insufficiently explored**.** At the same time effectiveness of different therapeutic methods varies in wide limits, and results of treatment do not always satisfy both clinicians and patients. Hereupon the performing modern immunogenetic, histochemic investigations allowed to explore deeper pathogenetic mechanisms of development of various alopecia forms [2; 5].

At present an interest of many scientists is directed towards studying mechanisms and factors of intercellular interaction of different alopecia forms, main of which are adhesive cellular molecules, molecules of extracellular matrix, cytokins [4; 11]. Cytokins are high-potent hormone-like proteins that are synthesized by different cellular species. Cytokins are divided in the following classes: 1) interleukins; 2) interferons; cytotoxins; 3) hemopoietic colony-stimulating factors; 4) growth factors; 5) inhibiting factors. One of the valuable cytokins are growth factors, representing proteins molecules (molecular weight from 5 000 up to 50 000 daltons), stimulating or inhibiting division or differentiation of various cells and being main transporters of mitogen cellular signal. Growth factors are related with tyrosine kinase receptors on cellular surface that provides dimerization and activation of the latter. Phosphorylation cascade is initiating and as biologic effect of phosphorylation manifested intensification of mitogen characteristics of tissues and differentiation of cells, stimulation of transport systems and chemotaxis, activation of metabolic pathways [6; 12]. Because of the main cellular

origins of dermal papillae are fibroblasts, an interest study is study of fibroblast' growth factor (FGF), as well as a factor of apoptosis in patients with different forms of alopecia areata and effect of these molecules on growth (anagen) and rest (telogen) phases of hair follicle.

It is known that 22 factors were identified in humans. These factors belong to the family of growth factors of fibroblasts (FGF), expressing in skin, and 4 receptor' forms to them. They can differently directed effect on a state of hair follicle contributing to stimulation of growth or, on the contrary, entry of hair into stage of period of telogen, i. e. family FGF accomplishes fine regulation of replacement of periods of active growth, rest and shedding of hair. American scientists detected that expression activity of mRNA in different FGF depends upon a cycle phase. So, expression of mRNA FGF 18 and 13 achieves its maximum in period telogen, FGF 7, 10, 5 and 22 — in the second half of anagen. In a culture FGF 18 stimulates synthesis of DNA in human dermal fibroblasts, cells of dermal papillae, epidermal keratinocytes and vascular endotheliocytes. In hypodermic administration of GF 18 to mice which hair follicles are in a phase of telogen it was observed their transformation into phase of anagen with activation of hair growth [7; 8; 10]. One of the most studied and already used in Dermatology and Combustiology of FGF is FGF-2, or the basic bFGF growth factor of fibroblasts. FGF-2 is able to work intracellularly as activator of proliferation. It positively effects on a growth of all the types of dermal cells, stimulates components' production of extracellular matrix by fibroblasts, stimulates their chemotaxis and synthetic activity. Possibility of synergism between VEGF and bFGF in induction of angiogenesis detected to be in studies in *vitro*, including perifollicular area during anagen [6; 9]. It was proved in a whole number of experimental works that addition of dermal papillae cells of bFGF to cultural medium sufficiently increases their activity and gives rise to hair growth. Subcutaneous administration of gelatin hydro gel containing bFGF resulted in increasing area and length of hair in a zone of administration, whereas pure hydro gel (without growth factors) didn't have such an effect of hair growth. It was established that concentration of bFGF is especially high in areas of proliferation of the developing and mature follicles that evidenced its role of regulator of cellular mitotic activity of epithelial origin. On the contrary, FGF1 presents in differentiated cells of hair bulbs, where it may take part in formation of structural components of follicles or fibers. It was exhibited *in vitro* that bFGF postpones approaches of katagen in cellular culture of hair follicles, whereas aFGF acts as promoter of katagen [3].

Aim of study: Investigation of growth factor of fibroblasts bFGF and apoptosis factor FasLy in patients with alopecia areata aimed at improvement of therapy of the given disease.

Materials and methods of study: Ninety-eight patients suffering from various forms of alopecia areata, receiving ambulance and hospital treatment in the Republican Specialized Science Practical Medical Center of Dermatology & Venereology, Ministry of Public Health, Republic of Uzbekistan were under our observation. All the patients were aged from 19 to 42, males were 43.3 %, females — 56.7 %. Circumscribed form of alopecia areata — focal and polyfocal was noted in 58.2 % patients, distributed form — subtotal and total — in 29.6 % and universal form — in 12.2 % patients. Duration of disease in 12.4 % patients was up to 1 year, in 26.2 % — from 1 to 5 years, in 61.4 % — up to 10 years and over. The progressing stage of disease with "zone of shaking hair" on the periphery of foci of shedding hair was registered in all the patients with alopecia areata. Control group consisted of 15 individuals not suffering from alopecia areata, representative in their age and sex. Factor of growth of fibroblasts bFGF and factor of apoptosis FasL were studied in blood of patients with alopecia areata and health individuals of control group by polarization fluoroimmunoassay (ELISA) method with using of test-system of Sigma firm (Germany).

Trichodermatoscopy of skin of hair-covered part of head was conducted in all the patients. So, trichoscopy examination under lens X60 in patients with alopecia areata, polyfocal and subtotal forms of alopecia areata showed decrease in hair density both in parietal and occipital parts of head — 125–163 (norm 235) and 112–175 (norm 213) hair cm^2 (square centimeter), increase of a number of wool hairs up to 56 % in parietal area and up to 71 % — in occipital area and, accordingly, decrease of a number of the growing terminal hairs up to 44 % in parietal and up to 29 % in occipital areas. Medical examination of damage foci revealed cadaveric hairs, pathologic hairs as exclamation marks and hair-free follicles of different atrophy degrees. Subtrophic and further atrophic hair follicles were fixed in patients with total and universal forms of alopecia areata equally with single cadaveric hairs. Dystrophic and dysplastic roots of anagen hairs were observed in examination by lens X200 hair roots round foci of hair shedding and in zone of hair.

Results of investigation: How it is seen from the table 1, concentration of factor of growth of fibroblasts bFGF in blood of patients with alopecia areata is high reliably decreased as compared with analogous indications of control group, whereas such reduction correlates with severity degree of disease and the most lower indications of the given factor were observed in patients with severe universal form of disease. So, concentration of factor of growth of fibroblasts was 90.0 ± 5.38 pg/ml in patients with focal and polyfocal forms of alopecia areata, with subtotal and total forms — 65.6 ± 7.38 pg/ml, with universal form — 44.3 ± 9.64 pg/ml, whereas an analogous index of control group was 217 ± 12 pg/ml.

Thereupon factors of growth play a key role in proliferation, migration and angiogenesis of cells of hair follicle a decrease of factor of growth of fibroblasts in patients with alopecia areata shows not only inhibition of proliferative processes in dermal papilla of hair follicle and an early transition of papilla from a stage of anagen into a stage of telogen but also defined degrade changes in dermal papillae. Inhibition of proliferative processes in dermal papilla in patients with alopecia areata was proved by a certain increase of concentration of apoptosis factors of growth. So, a reliable increase of factor of apoptosis FasL observed to be in patients with alopecia areata,

and the given indicator was sharply increased with increase of severity of disease. Factor of apoptosis FasL in focal and polyfocal forms of alopecia areata was 0.9 ± 0.19 pg/ml, subtotal and total forms — 2.42 ± 0.16 pg/ml, universal form — 2.97 ± 0.32 pg/ml, whereas factor of apoptosis FasL in control group was 0.036 ± 0.01 pg/ml.

Conclusions: Thus, studies carried out permit to conclude that proteins of families FGF and FasL are responsible for a fine regulation of phases of vital cycle of hair follicles. It is possible that studies aimed at regulation of concentration of these proteins in hair follicles in alopecia areata form a basis for improvement of therapy of the given disease.

References:

1. Adaskevich V. P., Myadelets O. D., Tikhonovskaya I. V. Alopecia. – M., 2000.
2. Gajigoroyeva A. G. Hair diseases: classification. Non cicatricial alopeciae.//Dermatology, 2008. – 1.
3. Zarudiy R. F., Ahmerov R. R. Electron journal "Regenerative Surgery", UDC 616.5–085:615.38. – 2005. – № 3.
4. Mazitova L. Effect of endocrine, metabolic and chemical factors on hairs shedding and their structure in women. Les Nouvelles Esthetiques. – Russian Edition, 2002. – 1. – P. 40–42.
5. Tkachev V. P. Trichology. Lecture of the course of thematic improvement. – ФПК МР РУДН, 2008.
6. Yano K., Brown L. F., Detmar M. Control of hair growth and follicle size by VEGF-mediated angiogenesis. Clinical Investigation, 2001. – 107 (4). – P. 409–417.
7. Boo Y., et al. Shear Stress Stimulates Phosphorylation of Endothelial Nitric-oxide Synthase at Ser1179 by Akt-independent Mechanisms.//The Journal of Biological Chemistry. – 2002. – 277. – P. 3388–3396.
8. Witzel S. et al. Wnt11 controls cell contact persistence by local accumulation of Frizzled 7 at the plasma membrane.// Journal of Cell Biology. – 2006. – 175 (5). – P. 791–802.
9. Hoeben A., et al. Vascular endothelial growth factor and angiogenesis.//Pharmacology Review. – 2004. – 56. – P. 549–80.
10. Colombe L., Michelet J. F., Bernard B. A. Prostanoid receptors in anagen human hair follicles.//Experimental Dermatology. – 2008. – 17 (1). – P. 63–72.
11. Happle R. Diphencyprone for the Treatment of Alopecia Areata – More Data and New Aspects. Archives of Dermatology, 2002. – 138. – P. 112–113.
12. Verbaan F. J. Assembled micro-needle arrays enhance the transport of compounds varying over a large range of molecular weight across human dermatoid skin.//Journal of Controlled Release. – 2007. – 117 (2). – P. 238–245.

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Treatment of diaphyseal fractures of the metacarpal bones

Abstract: It was presented the experience of theapplication of stable osteosynthesisby three Kirschner wires on diaphyseal fractures of the metacarpal bones on 74 patients. Indications for osteosynthesiswere opened (6%), closed (94%), non-united, mal-unitedfracturesand false joints of metacarpal bonesdiaphysis. Patients were performed intraosseous anesthesia atdistalepimetaphysisarea of radial bone anddescribeda method of operation extramedullaryosteosynthesis using three Kirschner wires. Also, describedmethod of wedge osteotomy for full recovery of hand function. Good results were obtained in 83.1 % of patients, satisfactory at 13.6 %, and unsatisfactory results in 3.4 % of patients.

Keywords: metacarpal bones, wedge osteotomy, diaphys , fracture.

Introduction

Treatment of fractures of the metacarpal bones isstilla difficult part of Hand Surgery. At the recent time, there is no singleapproach to the choice of treatment for different diaphyseal fractures of the metacarpal bones. Conservative treatment is not always sufficient retention for consolidation of bone fragments and often leads to secondary fragmentsdisplacement after reduction.

Basically among surgeries used intra and extramedullaryostesinthesis alsoextrafocalexternal fixation and diafixationmethod. Intramedullary osteosynthesis pin allows for reliable fixation of fragments, provides extra-articular holding metal fixating contributes less traumatizationinterosseal muscles and longitudinal arch brush, can be apply for multiple fractures of metacarpal bones. The disadvantage is the inability to intramedullary nailing accurate repositioning of the high rigidity and bending pin curvature mismatch metacarpal bone and the complexity of its removal after bone fragmentsconsolidation. As extramedullary stable osteosynthesis of tubular bones of the hand has been used successfully mono-local extramedullary

plate with screws AO system and other similar structures. The disadvantage is the difficulty of the screw through the metacarpals, the need for re-operation. Wider application finds extra focalosteosynthesis external fixation. But this method is indicated only at fragmented, peri- and intra-articular fractures. Despite the simplicity and reliability of the method diafixation, its application is limited for multiple fracture of the metacarpal bone and does not eliminate the rotational displacement of bone fragments. To eliminate those disadvantages, we have developed a modified method diafixationbone fragments fracture of the metacarpal bones of the hand.

Material and Methods

We observed 74 patients between 2010 and 2014 in the department of hand surgery with injury of metacarpal bones. Of these, 68 were male, female. Age was from 18 to 53 years, which is the most able-bodied. It was identified street injury 33 %, household trauma 45 %, production and other injuries in 22 % of patients. Injury was observed in the right hand 93 %, left in 7 % of patients. The open fractures were 6 %, 94 % were closed; patients have been admitted with non-united, mal-united fractures and false joints of the metacarpal bones.

The indications for this technique were: opened, closed, non-united, mal-uniteddiaphyseal fractures and false joints of metacarpal bones. This method is not suitable for intra-articular, metadiaphyseal, fragmented and spiral fractures.

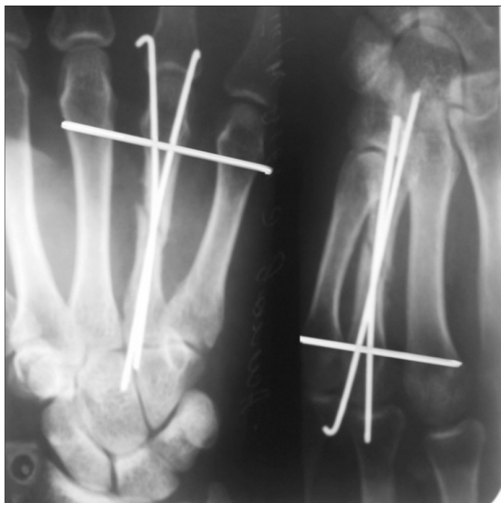

Fig. 1. X-ray after surgery

Surgical technique

The operation was performed under the intra-osseous anesthesia with 0.5 % solution of procaine (60–70 ml.) through the distal epimetaphysisofradius (anesthesia usually occurs within 5–10 minutes after the anesthetic injection and enforce surgery with duration of 1–1.5 hours). By semi ovalincision on dorsal radial surface approached the site of the fracture I, II, III metacarpal bones, and to approach to the IV and V metacarpal bone was incised on the dorsal ulnar surface in the projection damaged metacarpal bones. The length of the wound was in the ranged of 3–4 cm. Then, edges of the wound were diluted by a silk skin clamp. After that sharp and blunt withdrawn extensor tendons the fracture site was exposed, removed blood clots, tissue interposition eliminated. After that repositioned bone fragments and fixed two crossed Kirschnerwires through both fragments and one through the distal fragment is perpendicular to the axis of the metacarpal bones, which provided a solid fixation and exclude rotary displacement of fragments.

Example #1 (Fig. 1):

Patient S., 23 years, case # 1618 from 08.12.2011, was admitted to the hospital with the diagnosis: Closed oblique fracture of 4 metacarpal of the right hand.

The patient was operated 10.12.2011, under the intra-osseous anesthesia 0.5 % solution of Procaine, after treatment of the surgical field with Betadineheldsemi ovalincision along the dorsum of the hand at the level of the fracture length of 4 cm. layers exposed metacarpal bone. Hand-stage reduction, correction of angular displacement, then fragments of bones strengthen 2 crossed wires and one carried out through the distal fragment is perpendicular to the axis of the metacarpal bone, which provide a solid grip and eliminate the rotational displacement of fragments. After surgery, superimposed plaster splint for 4–5 weeks. Made control radiograph. Sutures are removed after 15 days, and after 3–4 weeks plaster splints.

When non-united wrong fused fractures and false joints of metacarpal bones of the hand were a significant deformation of the metacarpals it was clear that limitation of motion of the metacarpal- phalange joints of the fingers. Under these fractures we use the following method.

The objective of the proposed method is the elimination of the defect of the deformed segment, reducing trauma, with the exception of postoperative complications, reducing the time of treatment. To solve the problems a method of treating non-united, fused wrong, false joints and fractures of the metacarpals with angular deformity, including osteoclasis, one-step manual reposition, correction of angular displacement c followed by the imposition of plaster splints, characterized in that the front osteoclasis produce osteotomy properly fused bones under angle of 45 degrees and a length of 5–6 mm., and then strengthen the bone fragments 2 crossed spokes and one carried out through the distal fragment is perpendicular to the axis of the metacarpal bone, which provide a solid grip and eliminate the rotational displacement of fragments.

When non-united fractures and false joints metacarpal bones to fix two crossed Kirschner wires, plastic auto bone made to improve the regeneration of the damaged bone reposition axis.

This method eliminates the anatomical defect deformed segment, prevent the occurrence of contractures. After surgery 15 days remove sutures, plaster splints immobilized for 3–4 weeks after surgery. After the X-ray control after 3–4 weeks (this corresponds to the period seam) removed the plaster splints.

When isolated diaphysis fractures of fresh dates seam fragments were 1–1.2 months. When non-united fractures and wrong intergrows consolidation occurs within 1.5–2 months.

The Results

Long-term results of treatment in a period from 1 year to 4 years old were studied in 59 (79.7 %) patients. The evaluation was conducted by an 8-point scale, were taken into account the consolidation of the fracture, the range of motion in the joints, the presence of pain, return to work. Good results were ascertained in 49 (83.1 %) patients, satisfactory in 8 (13.6 %), poor in 2 (3.4 %). In the study of patients with long-term results, we used the template evaluation criteria of the treatment of patients, which is reflected in the table 1.

Table 1.

Scores of all parameters	Scores			Gross
Consolidation	0	1	2	
The volume of traffic on the CFJ	0	1	2	
Pain syndrome	0	1	2	
Return to work	0	1	2	
Gross				

Calculated on a point system with 4 parameters:

1. Consolidation:
   a. Full consolidation of 2 points;
   b. Meden coalesce 1 point;
   c. Consolidation no 0 points.
2. The range of motion:
   a. The volume of traffic on the PPS 90°-180° (range of motion 90°) 2 points;
   b. The volume of traffic on the PPS 100°-175° (range of motion 75°) 1 point;
   c. The volume of traffic on the PPS 120°-145° (range of motion of 25° or less) 0 points.
3. Pain Syndrome:
   a. No pain syndrome 2 points;
   b. Slight pain syndrome 1 point;
   c. Pain syndrome has 0 points.
4. Return to work:
   a. Return to work so 2 points;
   b. Return-to-work no 0 points.

The results evaluated in following point system:

- from 8 to 6 points is good;
- 5 do3 points satisfactory;
- of 2 points or less unsatisfactory result.

Table 2. – Results

	New fractures	Wrong accretefracture	non-unitedfractures	Nearthrosis	Total
Good	24	18	4	2	49
Satisfactory	1	3	4	1	8
Unsatisfactory	–	–	1	1	2
Total	25	21	9	4	59

Conclusions:

1. In diaphysis fractures of the metacarpal bones of the hand for stable fixation of bone fragments, in our opinion, should be used osteosynthesis with three Kirschner wires, providing the possibility of early movements of the joints of the fingers. This method allows you to start active movements in the inter-phalange joints of the hands and carpal-phalange in the first days after the operation, reducing time disability patients.

2. The advantages of these methods are small trauma surgery, accurate comparison of bone fragments, their reliability and controlled fixation with the possibility of early functional loading of the overwhelming number of patients.

3. The method we use stable osteosynthesis in fractures of the metacarpal bones of the hand allows you to get 83 % of good results in the vast majority of patients, which gives reason to recommend it for widespread use in the practice of medical institutions.

References:

1. Shihalëva N. G., C. I. Treatment of patients with closed fractures of the distal metacarpals metaepiphysis using transosseousosteosynthesis.//The genius of orthopedics. – 2009. – № 2: 40–45.
2. Beidik O. V., O. N. Topographic study trans-osseous osteosynthesis short tubular bones of the hand.//The genius of orthopedics. – 2006. – № 2: 18–21.
3. Miguleva I. J., G. S. Treatment of closed fractures of II–V metacarpal bones.//Russian Medical Journal. – 2004. – № 6: 51–54.
4. Zerdedzhi M., I. M. Application osteosynthesis spoke with open comminuted fractures of the phalanges and metacarpals.// Doctor. – 2008. – № 6: 80–82.
5. Scheker L. R., A. O. Radical debridement, free flap coverage and immediate reconstruction of the upper extremity.//Hand Clin. – 2007: 23–24.

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Correlation of locus alleles of DRB1 II class of histocompatibility complex with clinical, immunological and virological parameters in HIV infection

Abstract: Associations between the presence in HIV infected patients of different variants of HLA DRB1 locus alleles and the risk of HIV-associated diseases development while receiving HAART are determined. There is a correlation between HLA DRB1 locus alleles of histocompatibility class II and levels of β2-microglobulin, neopterin, immune cell activation and HIV load in patients receiving HAART.

Keywords: HIV infection, HIV-associated diseases, the system of HLA II class, allele locus DRB1, viral load, CD4, HAART.

It was shown that the increase in viral load (VL) may promote systemic activation of the immune system in HIV infection, which is a strong predictor of disease progression in HIV infection. It was proved that increased level of β2-microglobulin (β2-MG) is associated with changes in the immune status and HIV viral load and is connected with HIV progression and survival of patients [2; 3].

There are literary data regarding positive associations of tuberculosis with specific HLA DRB1 locus that indicate susceptibility to tuberculosis [1].

Objective

Identify association between the presence of different variants of locus alleles of DRB1 in patients with HIV infection and the risk of HIV-associated disorders and changes in immunological and virological parameters in patients receiving highly active antiretroviral therapy (HAART).

Materials and methods

The study involved 102 patients with HIV aged 24 to 58 years, the average age of patients was 38 years. The term of infection of examined subjects was in averaged 7.4 ± 0.33 years. According to the clinical course of HIV infection, all patients were divided into three groups. The 1st group included 32 patients (31.4 %) with I and II clinical stages, the 2nd group included 26 (25.5 %) patients with clinical stage III, the 3rd group included 44 (43.1 %) patients with IV clinical stage. All patients were also divided into seven groups by the presence of locus alleles DRB1 of class II histocompatibility complex. Six research groups consisted of patients with alleles of genes that occur most frequently among persons in the Dnepropetrovsk region: HLA DRB1 *01, HLA DRB1 *04, HLA DRB1 *07, HLA DRB1 *11, HLA DRB1 *13, HLA DRB1 *15. The seventh group consisted of patients with alleles locus that is rarely found (HLA DRB1 *03, HLA DRB1 *08, HLA DRB1 *10, HLA DRB1 *12, HLA DRB1 *14, HLA DRB1 *16, HLA DRB1 *17, HLA DRB1 *18). Most examined patients (87.3 %) received HAART for medical reasons, 12.7 % of patients in the study did not receive HAART for any other reason. The control group involved 15 healthy donors.

Specificities of 15 alleles of genes DRB1 were defined with amplified test systems. Determination of levels of neopterin (N) and β2-MG handled by ELISA with standard test systems (manufacturer Germany).

Statistical analysis of the obtained material used the methods of Fisher criterion and Student's test. Value of $p < 0.05$ was considered statistically significant. Statistical analysis of the results was performed using the software MathCad and Excel-2010. Considering the large range of VL data, for statistical analysis a log scale data were calculated.

Results

According to our observations the highest percentage of occurrence of various forms of HIV-associated tuberculosis (TB), including first diagnosed tuberculosis (FDTB) observed in the lungs of patients with locus alleles HLA DRB1 *13 *15 and rarely seen locus alleles. Also various forms of TB in a smaller percentage of cases developed in patients with locus alleles HLA DRB1 *04 *07 *11. TB never occurred in patients who had gene allele HLA DRB1 *01 (Table 1).

As shown in Table 1, recurrent bacterial infection of the upper respiratory tract (URT) occurred in patients with HIV locus with alleles HLA DRB1 *01, *04, *07, *11 and with rare alleles. Pneumonia developed in patients who have had locus alleles HLA DRB1 * 01, * 11, * 13. Concurrent herpetic infections in HIV-infected patients occurred in the presence of gene alleles HLA DRB1 *04 *07 *11 and rare alleles of locus. In HIV-infected examined patients of all groups regardless of the system of HLA DRB1 HIV-associated oropharyngeal candidiasis developed. Persistent generalized lymphadenopathy (PGL) was seen in HIV infected patients with locus alleles HLA DRB1 *01 *04 *11 *13 and rare alleles.

Chronic viral hepatitis C (CHCV) and chronic hepatitis (CH) unspecified (including toxic hepatitis) as concomitant disease, developed in HIV-infected patients irrespective of HLA class II. Chronic viral hepatitis B (CHBV) occurred in patients with gene alleles HLA DRB1 *01, *04, *11 and rare alleles. CH progressed into cirrhosis in patients with locus alleles HLA DRB1 *04. Anemia I, II, III degree accompanies patients with HIV infection who have locus alleles HLA DRB1 *04, *11, *13 and rare alleles. (Table 2)

Table 1. – Dynamics of HIV-associated diseases in patients with different alleles of HLA DRB1 locus in patients receiving HAART

Alleles HLA DRB1 locus	PGL, %	Oropharyngeal candidiasis, %	Recurrent bacterial infection of the URT, %	Pneumonia, %	FDTB lung	Various forms of TB, %	Herpetic infection, %
HLA DRB1 *01	31.6	67.7	31.6	31.6	–	–	–
HLA DRB1 *04	43.6	87.5	37.5	–	31.3	–	37.5
HLA DRB1 *07	–	50	37.5	–	–	26.9	34.6
HLA DRB1 *11	30.4	78.3	33.3	33.3	–	33.3	23.3
HLA DRB1 *13	37.5	79.2	–	41.7	37.5	45.8	–
HLA DRB1 *15	–	75	–	–	50	50	–
Rare alleles	20	80	30	–	35	40	30
P	< 0.004	< 0.003	< 0.004	< 0.005	< 0.003	< 0.004	< 0.005

Table 2. – Dynamics of disease development in HIV-infected patients with different locus alleles of HLA DRB1 in patients receiving HAART

Alleles HLA DRB1 locus	CHCV, %	CHBV, %	CH unspecified (including toxic hepatitis), %	Cirrhosis, %	Anemia I, II, III degree, %
HLA DRB1 *01	63	42	84	–	–
HLA DRB1 *04	68.7	43.8	81.3	31.3	56.3
HLA DRB1 *07	41.7	–	58.3	–	–
HLA DRB1 *11	60.8	34.8	78.3	–	52.2
HLA DRB1 *13	62.5	–	79.2	–	33.3
HLA DRB1 *15	50	–	66.7	–	–
Rare alleles	52.5	37.5	72.5	–	30
P	< 0.004	< 0.003	< 0.005	< 0.004	< 0.003

Table. 3. – Dynamics of biochemical and immunological parameters in HIV-infected patients with different locus alleles DRB1 II class while taking HAART

Alleles of HLA DRB1 locus	Groups of patients	N, nmol/l	β_2-MG, mcg/ml	$CD4^+$ T-helper cells	*P*
HLA DRB1 *01	I	33.444 ± 29.479	6.578 ± 1.676	426 ± 185	< 0.003
	II	53.5 ± 3.536	9.25 ± 0.355	340 ± 4.95	< 0.006
	III	56.714 ± 10.847	9.429 ± 1.117	323 ± 200	< 0.004
HLA DRB1 *04	I	65 ± 42.509	9.2 ± 45.197	428 ± 115	< 0.003
	II	68.4 ± 1.709	9.44 ± 2.389	422 ± 184	< 0.006
	III	77.125 ± 10.062	25.039 ± 1.432	127 ± 123	< 0.004
HLA DRB1 *07	I	29.125 ± 14.055	7.05 ± 1.623	552 ± 191	< 0.003
	II	53.333 ± 33.399	8.6 ± 2.245	279 ± 59	< 0.006
	III	50 ± 10.583	8.14 ± 0.876	193 ± 89	< 0.004
HLA DRB1 *11	I	24 ± 9.899	6.45 ± 0.636	468 ± 145	< 0.003
	II	56.222 ± 14.292	9.389 ± 1.013	359 ± 86	< 0.006
	III	68.1 ± 30.658	10.06 ± 1.831	130 ± 92	< 0.004
HLA DRB1 *13	I	46 ± 9.077	8.3 ± 1.011	533 ± 238	< 0.003
	II	56.333 ± 37.033	8.7 ± 2.573	387 ± 146	< 0.006
	III	61.083 ± 24.839	9.042 ± 1.215	171 ± 129	< 0.004
HLA DRB1 *15	I	31.875 ± 13.943	7.238 ± 1.48	551 ± 172	< 0.003
	II	79 ± 8.888	9.663 ± 1.212	211 ± 69	< 0.006
	III	83 ± 33.141	9.757 ± 1.427	201 ± 201	< 0.004
Rare alleles	I	31 ± 12.423	7.757 ± 1.176	447 ± 183	< 0.003
	II	50 ± 20.255	8.531 ± 1.284	344 ± 117	< 0.006
	III	74.706 ± 32.247	9.641 ± 1.855	162 ± 130	< 0.004

Tables shown in almost all patients in all examined groups there was an increase in VL, reduced levels of CD4+ T-helper cells and increased levels of N and β2-MG in the development of HIV from I till IV clinical stages in patients receiving HAART.

Table. 4. – Dynamics of changes in viral load in HIV-infected patients with different gene alleles DRB1 II class on HAART

Alleles HLA DRB1 locus	Groups of patients	VL (ln)	*P*
HLA DRB1 *01	I	4.325 ± 3.433	< 0.004
	II	3.689	< 0.007
	III	2.405 ± 5.753	< 0.005
HLA DRB1 *04	I	3.689	< 0.004
	II	4.677 ± 3.047	< 0.007
	III	7.461 ± 4.423	< 0.005
HLA DRB1 *07	I	4.359 ± 2.085	< 0.004
	II	4.144 ± 1.991	< 0.007
	III	5.583 ± 2.81	< 0.005
HLA DRB1 *11	I	3.924 ± 0.332	< 0.004
	II	5.661 ± 2.942	< 0.007
	III	7.486 ± 4.377	< 0.005
HLA DRB1 *13	I	4.619 ± 2.168	< 0.004
	II	7.767 ± 2.857	< 0.007
	III	5.292 ± 2.127	< 0.005
HLA DRB1 *15	I	6.216 ± 3.632	< 0.004
	II	8.154	< 0.007
	III	8.154 ± 4.327	< 0.005
Rare alleles	I	5.064 ± 3.074	< 0.004
	II	4.008 ± 0.625	< 0.007
	III	7.16 ± 4.139	< 0.005

In patients with the allele HLA DRB1 *01 reduction in VL 1.8-fold (between I and III groups) was observed and CD4+ T-helper cells were kept at a high level (up to 323 ± 200) even taking into account the stage of HIV infection that was not observed in other alleles of the HLA DRB1 gene. In all other patients who had the allele HLA DRB1 locus *04, *07, *11, *13, *15 and rare alleles with IV clinical stage CD4+ T-helper cells were decreased to the level of ≤ 200 in 1 mm^3 and VL was increased 1.2–2.1 times. Increased levels of N and β2-MG were observed in all patients with different alleles of the HLA DRB1 locus. However, the most significant increase in both N and β2-MG was seen in carriers of alleles of the locus HLA DRB1 *01, *11, *15. Thus, at HLA DRB1 *01 N was increased 1.7 times, β2-MG by 1.4 times; in HLA DRB1 *11 N was increased 2.8 times, β2-MG is 1.6; with HLA DRB1 *15 N was increased 2.6 times, β2-MG 1.4 times. A separate significant 1.7 times increase of N was observed in patients with alleles of the locus HLA DRB1 *07 and in rare alleles 2.4 times. A separate and significant increase of β2-MG 2.7 times was observed in patients who had the alleles of the locus HLA DRB1 *04.

Conclusions

1. There was a correlation between alleles of DRB1 locus of HLA histocompatibility class II and β2-MG, N, cellular immune activation and HIV load in patients receiving HAART.
2. In the process of receiving HAART in patients with alleles of the locus HLA DRB1 *01 there was observed the 1.8 times decrease of VL, the content of CD4+ T-helper cells at a sufficiently high level, even taking into account the stage of HIV infection that was not observed in other alleles of the HLA DRB1 gene. With the alleles of the locus HLA DRB1 *04, *07, *11, *13, *15 and rare alleles even with HAART there was a sharp decrease in CD4+ T-helper cells to the level of ≤ 200 in 1 mm^3 and an increase in VL.
3. Increased levels of N and β2-MG were observed in all patients with different alleles of the HLA DRB1 locus. However, the most significant increase in both N and β2-MG was seen in alleles of the locus HLA DRB1 *01, *11, *15.
4. The highest percentage of occurrence of HIV-associated TB of various forms, including FDTB lung was observed in patients with alleles of the locus HLA DRB1 *13, *15 and with rare alleles. Also TB of various forms in a smaller percentage of cases developed in patients with alleles of the locus HLA DRB1 *04, *07, *11. In patients who had the allele of gene HLA DRB1 *01 TB did not develop.
5. Pneumonia developed in HIV-infected patients who had alleles of the locus HLA DRB1 *01, *11, *13.
6. The development of herpetic infection in HIV-infected patients occurred in the presence of gene HLA DRB1 alleles *04, *07, *11 and rare alleles.
7. Chronic HCV and chronic hepatitis unspecified (including toxic hepatitis) as a concurrent disease developed in HIV-infected patients regardless of the HLA class II. Chronic HBV was seen in patients with HLA alleles DRB1 *01, *04, *11, and rare alleles. Chronic hepatitis progressed to cirrhosis in patients with alleles of the locus HLA DRB1 *04.

References:

1. Stavitsky N. V. The development of genetic factors in children with latent tuberculosis infection.//Fundamental research. – 2010. – № 5. – P. 53–59.
2. Leligdowicz Aleksandra, Feldmann Jérôme, Jaye Assan et al. Direct Relationship between Virus Load and Systemic Immune Activation in HIV-2 Infection.//J Infect Dis. – 2010. – 201 (1): 114–122.
3. Liu Zhiyuan, Cumberland William G., Hultin Lance E., et al. Elevated CD38 Antigen Expression on CD8+ T Cells Is a Stronger Marker for the Risk of Chronic HIV Disease Progression to AIDS and Death in the Multicenter AIDS Cohort Study Than CD4+ Cell Count, Soluble Immune Activation Markers, or Combinations of HLA-DR and CD38 Expression.// Journal of Acquired Immune Deficiency Syndromes & Human Retrovirology. – October 1, 1997. – Volume 16 – Issue 2 – P. 83–92.

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Ultrasound examination of upper lip in patients with unilateral cheilognathopalatoschisis

Abstract: Congenital cheilognathopalatoschisis is one of the most actual and urgent problems of the stomatology. 205 patients were under supervision, 122 of them were the patients with unilateral bilateral cleft of the lip and palate, 83 of them suffered from unilateral isolated cleft lip. The research showed that the echographic examination which allows a detailed image of the upper lip, alveolar process, hard and soft palate, palatal suture and tongue is highly efficient method of assessment of individual anatomical peculiarities of the building of the upper jaw in children with cheilognathopalatoschisis.

Keywords: congenital cheilognathopalatoschisis, echographic study, children, labioplasty.

The enhancement in the sphere of medical rehabilitation of children with congenital cheilognathopalatoschisis is one of the most actual and urgent problems of the present day. Complete medical, psychological, social adaptation of a child and the formation of the personality depend on the results of elimination of anatomical, functional and cosmetic defects as well as timely conduction of rehabilitation works [1; 4].

In order to provide qualified assistance to this group of difficult patients multi-stage surgery and constant supervision of surgeons, orthodontists, pediatricians, speech therapists and other specialists are required from the birth till an adult age at the specialized centers [2].

Detailed knowledge of individual anatomical peculiarities of children with congenital cheilognathopalatoschisis allows the surgeon to choose the appropriate operative method. Underestimation of the degree of anatomical defect in the patients with congenital cheilognathopalatoschisis hinders the achievement of good post operative results.

Traditionally to examine these type patients ray diagnostics such as radiography, computer tomography, magnetic resonance tomography are used in addition to physical methods. However the usage of ray diagnostics may be maximally limited in patients of an early age. Moreover, in order to examine infants and children of a preschool age, it is important to ensure immobility of them, which requires the condiction of the examination under anesthesia.

Ultrasound examination has become widely used in the practice of maxillofacial surgery in the recent years. The competency of ultrasound is spreading not only on the study of soft tissues of face and neck, which is the traditional variant of using this method, but also it allows to evaluate bone structures-the surface of the bone, its configuration, the degree of mineralization as well as relative positioning of bone fragments. Absolute advantages of this method are its non-invasiveness, safety and the opportunity of using it on patients for many times [5–7].

Ultrasound-based diagnostic imaging can be carried out at a different position of the patient (standing, sitting, lying), which is particularly important in the assessment of functional condition of soft tissues. This method may be applied to the patients of any age including newborns and it does not require special preparation and assistive means.

Informativeness of echographic study gives an opportunity to limit the use of radiological methods, to use invasive diagnostic intervention less frequently, to approach to the usage of expensive examinations as CT and MRI more rationally [3].

Study objective

To improve the quality of examination of patients with congenital cheilognathopalatoschisis on the basis of introduction of improved methods of echographic study to the diagnostic process.

Materials and methods

The study was conducted at the department of "Children's maxillofacial surgery" and the department of "Visualization and functional diagnostics" of the clinic of Tashkent Medical Academy. 205 patients were under supervision, 122 of them were the patients with unilateral bilateral cleft of the lip and palate, 83 of them suffered from unilateral isolated cleft lip. The age range of the patients was from 6 months to 3 years. In order to study the normal anatomy of orbicular muscle of mouth 50 healthy children of the same age range who formed a control group were studied.

Echographic study was conducted with the ultrasound scanner Sonoline — Sienna ("Siemens", Germany). A multifrequency linear transducer 5.0–7.5–9.0 MHz with the length of the radiating surface of 35 mm. and convex probe with a frequency of 2.6–3.5–5.0 MHz were used in the study. The sections were obtained in the frontal, horizontal and sagittal planes. The visualization was carried out on the display of the monitor of the ultrasound device in grey scale (B-mode) in real time. More informative echographic images were registered on thermopaper. Echographic imaging was performed when the patient was in horizontal position: the child was lying on the on the couch, face up with a slightly upturned head. All studies were performed through percutaneous access.

Echographic examination of orbicular muscle of mouth was carried out in horizontal plane with linear sensor with a frequency of 5.0–7.5–9.0 MHz. Diagnostic beam was focused in the near field at a depth of 0.5–1.5 cm. During the study the orbicular muscle of mouthand the tissues surrounding it were visualized at the condition of rest. Echographic study of the upper lip was carried out on 50 healthy children and on 205 patients with cleft lip and palate until the primary labioplasty and a year after it. The labioplasty was performed on the patients according to Obukhov-Tennyson, Milliard and according to Azimov-Vokhidov modification. The width of cleft lip, basal ridge and the orbicular muscle of mouth were determined in the patients who were not operated on. In patients with cheilognathopalatoschisis the width of the muscle on healthy and operated side, the width of the orbicular muscle of mouth and the degree of fibrous tissue replacement were determined; the width of postoperative scar and relative positioning of contiguous parts of the muscle (their diastasis and separation in depth) was discovered; the distance between lateral fragments of basal ridge, the height of lateral fragments of basal ridge was studied; the width of the cleft and its upper (at the level of apical basis) and lower (at the level of alveolar ridge) parts, the length of the cleft (from the edge of the pyriform aperture to the top of the alveolar process) and the width of upper jaw in the upper and lower part of the cleft were measured; the state of the subcutaneous fat cellular tissue and submucosa was assessed.

The results of the study

Echographic study of the upper lip was performed on two groups of children. The first group consisted of 205 patients and 122 of them suffered from unilateral bilateral cheilognathopalatoschisis, 83 of them had unilateral isolated cleft lip before and after primary labioplasty. Their age range was from 6 months to 3 years. The second group (control group) consisted of 50 healthy children from 6 months till the age of 3. Echographic study of the upper lip in both of the group allowed to obtain an image of dermis, the orbicular muscle of mouth, submucosa, to evaluate the thickness, symmetry echogenicity of each layer.

Normally in echogramms the upper lip had a stratified structure; the skin, the orbicular muscle of mouth, submucosa and mucosa. The dermis was well developed and its thickness was 3.4 ± 0.4 mm. In 22 children (44 %) we observed the decrease of the dermis thickness in the area of grooved philtrum to 2.78 ± 0.32mm. The thickness of the orbicular muscle of mouth in the projection of philtrum was 1.2 ± 0.07 mm. In the lateral sections of the upper lip the thickness of the muscle layer was more and it significantly varied, which is explained by the attachment of several mimic muscles to the the orbicular muscle of mouth (m. levatorangulioris, m. levatorlabiisuperioris, m. risorius, m. zygomaticusmajor, m. zygomaticus minor). The thickness of the submucosal layer was 1.85 ± 0.18 mm. The layers of the right and left halves of the upper lip were symmetrical in all children.

In patients with the cleft lip before the labioscopy the width of the cleft (the distance between the fragments of the upper lip) and the width of the orbicular muscle of mouth were measured. The width of the cleft lip was 4.48 ± 2.6 mm., the width of the orbicular muscle of mouth was 12.5 ± 4.8 mm.

In patients with unilateral bilateral cheilognathopalatoschisis the distance between processus alveolaris was studied before and after primary labioscopy. For this we divided this group into three subgroups according to the degree of the cleft.

As a result of the examination of the patients we obtained the first group of 16 patients with the first degree cleft according to Frolov. The distance between processus alveolaris was 4.85 ± 0.7 mm. The second group of 52 patients had the second degree cleft according to Frolov. The distance between processus alveolaris was10.2 ± 0.54 mm. The third group of 54 patients had the third degree cleft according to Frolov. The distance between processus alveolaris was16.2 ± 0.8 mm. Echographic examination after a year after labioplasty showed a sudden decrease in the distance between alveoli. This distance was 1.07 ± 0.6 mm. in the patients of the first group, in the second group the distance between alveoli was 4.65 ± 0.83 mm., in the third group it was 6.05 ± 0.30 mm.

The state of soft tissues of the upper lip was eavaluated after the labioscopy: the thickness of the orbicular muscle of mouth was determined on the healthy and the side operated on earlier, the degree of its substitution with fibrous tissue was studied, the width of the postoperative scar was measured, mutual positioning of bilateral sections of the muscle, their diastasis and depth were analyzed. The thickness and the state of dermis and submucosa on the operated side were also examined.

In the patients with scar deformations of the lip the thickness of all layers of the upper lip was less than in children of the control group. The fact that drew our attention in 122 patients with unilateral cleft of the lip after the primary labioscopy was the assymmetry of all layers of the upper lip and the peculiarities of the orbicular muscle of the mouth: the thickness of the orbicular muscle on operated side was 0.72 ± 0.14 mm. which was less than in norm. In 83 patients with isolated cleft of the lip after the primary labioscopy the thickness of the orbicular muscle of the mouth on the healthy side was 0.9 ± 0.2 mm., and on the operated side it was 0.7 ± 0.58 mm.

Echographic study allowed to measure the width of the scar on the skin and on the orbicular muscle as well as to evaluate its maturity. The width of the scar was from 1.3 mm. to 5.3 mm. (3.15 mm. on avarage). Echographic examination allowed to clarify the direction of the muscle fibers and muscle attachment points, as well as the mutual arrangement of adjacent sections of the orbicular muscle: their diastasis and separation in depth. In 83 (68 %) patients with unilateral cheilognathopalatoschisis the fragments of the muscle were compared, in 39 (32 %) of them they were located under one angle to each other.

Echographic study allowed getting an image and visualising the surface of the lateral fragments of processus alveolaris of the upper jaw. In 122 children the defect of processus alveolaris was observed. In patients with isolated cleft lip no deformation of processus alveolaris was found.

These findings gave an opportunity to orient in the quantity of bone chips required for eliminating the defect of the alveolar process and reduce the size of the donor wound.

Discussion of the results

In patients with scar deformation the echographic study enabled the evaluation of the condition of all layers of the upper lip after labioplasty: to determine the thickness of the orbicular muscle of the mouth, the dermis and submucosa on the healthy and earlier operated side, the degree of substitution of the muscle with the scar tissue; mutual location of the muscle fibers, to measure the thickness of the scar and to assess its maturity.

Ultrasound examination allowed visualisation of the surface of alveolar process. Echographically the cleft of the alveolar process looks like a defect of the bone tissue of various width. Echographic study gave opportunity to conduct linear measurements of the cleft parametres. Ultrasound study allowed determining the width of the cleft, the edge of the piriform aperture and in the crest of the alveolar process. These measurements can be used for determining the degree of underdevelopment of the alveolar process of the upper jaw in the area of the cleft (Pershina M. A., 2001).

The information obtained is very actual, as it is difficult to do X-ray examination at this age.In the case of thinning or osteoporosis of the outer cortical bone it is possible to visualize the beginnings of permanent teeth in the cleft area.

Conclusion:

1. Echographic examination which allows a detailed image of the upper lip, alveolar process, hard and soft palate, palatal suture and tongue is highly efficient method of assessment of individual anatomical peculiarities of the building of the upper jaw in children with cheilognathopalatoschisis.
2. Echographic examination gives an opportunity to analyze the condition of the upper lip after labioplasty, to determine the thickness of the orbicular muscle of the mouth, dermis and submucosa on the healthy and previously operated side, the degree of substitution of the muscle with the scar tissue; mutual location of the muscle fibers, to measure the thickness of the scar and to assess its maturity.
3. Echographic examination allows to evaluate morphological parameters of the cleft of the alveolar process; the width of the cleft and its upper (at the level of apical basis) and lower (at the level of alveolar ridge) parts, the length of the cleft (from the edge of the pyriform aperture to the top of the alveolar process) and the thickness of the upper jaw in the upper and lower part of the cleft.

References:

1. Ageev L. V., Savitskaya G. M., Yulova N. A. Rehabilitation program for children in the congenital cleft lip and palate at the Moscow Center of Children's Maxillofacial Surgery. Congenital and hereditary pathology of the head, face and neck in children: current issues of complex treatment. – M.: MSMSU, 2002. – P. 39–41.
2. Vadachkoria Z. O. Key aspects of medical rehabilitation of children with congenital cleft palate.: Author. dis … Dr. med. nauk. – Tbilisi, 1996. – P. 30.
3. Gromov T. N. Ultrasound examination in the assessment of the anatomical features and results heylouranoplastiki in children with cleft lip and palate. – Moscow, 2008.
4. Mamedov A. A., Ospanova G. B., Repin Z. A. A comprehensive program for patients with impaired speech.//Orthodent-info. – 1998. – № 4. – P. 23–26.
5. Dolk H., Goyens S., Lechat M. F. EUROCAT registry description 1979–1990. – Brussels, 1991. – 317. – P. 245.
6. Oberg K. C. Surgical advances in cleft lip and cleft palate. Nov.//FetalSurgery. – 1995. – 11.14. – P. 51–53.
7. Jost-Brinkmann P. G., Wandner H., BrauerM., Schmidt G. 3D sonography for evaluation of secondary alveolar cleft bone grafts.//2n World cleft congress of the international cleft lip and palate foundation. – Munich, Germany. – 2002. – P. 221.

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Epidemiology of neurosyphilis

Abstract: The problem of neurosyphilis remains one of the most important in health care. Central nervous system syphilis is often irreversible, involves disability and harm not only to the families of the patients, but also to society as a whole.

Keywords: neurosyphilis, epidemiology, diagnosis.

Neurosyphilis — the defeat of the nervous system in syphilis infection, which can occur at any stage of the infection depends on the causative agent of syphilis hit in the brain tissue. The disease involves complex symptoms of the nervous system that with the growth of the disease vary, forming various manifestations of neurosyphilis. Despite the control measures, the incidence of syphilis remains high [5; 6].

The increase in the incidence of the neurosyphilis according to the long-term supervision lags behind the overall indicators relating to syphilis for 5–10 years. About 15 years ago O. K. Loseva and colleagues in the journal "Doctor" published an article entitled "Neurosyphilis returns" [4]. Today, we must acknowledge that neurosyphilis "back."

Currently, the National Assembly has been steadily increasing incidence and prevalence of the disease to various forecasts for 2020 may exceed 25 100 000 population, and the incidence of the manifest of the National Assembly in 2020 may exceed 25 100 000 population.

In neurosyphilis epidemiology in modern conditions may also affect late-seeking patients treated in unlicensed commercial centers, the widespread use of durant penicillin not provide sufficient antibiotic concentration against treponem in the CSF. One reason for the increase in incidence of neurosyphilis may be his untimely and low-quality diagnosis (lack of consultation neurologist, internist, ophthalmologist, otolaryngologist and liquorologic Research), which entails the appointment of inadequate treatment, which naturally leads to an increase in the number of patients with neurological and psychiatric disorders [1; 2; 3].

The purpose of the study

To study the epidemiology of neurosyphilis in the Stavropol region.

Materials and methods

The incidence of neurosyphilis was analyzed on the basis of the archives of the library and the hospital data the Internet data.

Results and discussion

There have been studies of cognitive impairment in patients with an established diagnosis — neurosyphilis (neuropsychological testing). The data revealed the most significant cognitive changes in this group of patients, which may be due to more pronounced specific degenerative process in the brain tissues.

Considering that at the present stage for the National Assembly is erased, asymptomatic nature of the use of neuropsychological testing in conjunction with neurophysiological research methods may be a more objective way to detect cognitive impairment than an attempt at the clinical stage, focus on the characteristic symptoms of the late manifestations neyrosifilitic encephalopathy where the clinical picture can simulate any neuropsychiatric symptoms, which often leads to misdiagnosis and incorrect treatment. All this will help at an earlier date to diagnose neurosyphilis and will reduce the number of patients.

Conclusion

In recent years, the number of patients with neurosyphilis increased significantly. Often this is due to his untimely diagnosing. In order to prevent the development of neurosyphilis is necessary to monitor the state of the nervous system in patients with latent forms of syphilis during the period of clinical and serological monitoring.

For early diagnosis of neurosyphilis is necessary to introduce in hospitals carrying out neurophysiological and sonographic studies.

References:

1. Васильева О. А., Карпов С. М., Казиев А. Х. Когнитивные нарушения при позднем нейросифилисе.//Неврологический вестник. – 2012. – Т. XLIV, вып. 1 – С. 10–13.
2. Васильева О. А., Кубрин Е. А., Карпов С. М., Шевченко П. П. Поздний нейросифилис как фактор когнитивных нарушений.//Фундаментальные исследования. – 2012. – № 4–2. – С. 256–259.
3. Казиев А., Карпов С. М., Кубрин Е. М. Показатели когнитивных функций мозга при нейросифилисе.//Практическая неврология и нейрореабилитация. – 2010. – № 2. – С. 43.

4. Лосева О. К. Современный нейросифилис: клиника, диагностика, лечение./О. К. Лосева, Э. Ш. Тактамышева//РМЖ. – 1998. – Т. 6. – № 15. – С. 21–23.
5. Попов А. К., Одинак О. М. Нейросифилис.//Дифференциальная диагностика нервных болезней/Под ред. Г. А. Акимова и М. М. Одинака. – СПб, 2000. – С. 349–354.
6. Яковлев Н. А. Нейросифилис (клиника, диагностика и лечение): уч. пос./под ред. В. В. Дубенского. – Тверь, 2004. – 175 с.

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Physical activity and bone mass density in β-thalasemia subjects (A Review)

Abstract: Beta thalassemia is a blood disorder that reduces the production of hemoglobin. Patients with thalassemia show a variety of bone disorders that include bone deformities, osteopenia and osteoporosis, growth failure, and spinal deformities Karimi [6].

Main objective of this paper was to review the recent literature regarding physical activity influence on bone mass density in β-thalassemic subjects.

The search was made mainly focusing in PubMed, ResearchGate, Hinari, for studies focusing on PA intervention in β-thalassemia subjects. Only 6 papers fulfilled the inclusion criterias.

There is a lack of studies focusing in PA influence on bone mass density in these patients category. Further research is needed to identify risk factors, means of prevention and also to establish specific PA engagment guidelines and recomandations for this social category.

Keywords: Thalassemia, Bone mass density, Physical Activity.

Haemoglobin Disorders

Beta thalassemia is a blood disorder that reduces the production of hemoglobin. Patients with thalassemia show a variety of bone disorders that include bone deformities, osteopenia and osteoporosis, growth failure, and spinal deformities [6]. Beta (β-) thalassemia syndromes of which β-thalassemia major, also known as Mediterranean anemia or Cooley's Anemia, is the clinically most severe one.

The major beta (β-) thalassaemia syndromes are:

- β- thalassemia;
- β-thalassemia intermedia;
- HbE/β-thalassemia;
- Other rare thalassemia's.

Approximately 7 % of the global population is a carrier for Hemoglobin disorders. A carrier of a pathological Hb gene encounters no health problems. Between 300,000–500,000 children are born annually with a severe hemoglobin disorder. About 80 % of affected children are born in middle and low income countries. About 70 % are born with sickle cell and the rest with thalassemia disorders. 50–80 % of children with sickle cell anemia and 50,000–100,000 children with β-thalassemia major die each year in low and middle income countries *World Bank 2006* [9], *(report of a joint WHO-March of Dimes meeting 2006)*. Patients with β-thalassemia major, the most severe form of thalassemia, cannot make adult hemoglobin, and as a consequence cannot produce normal red blood cells. In these individuals, each red blood cell contains much less hemoglobin, and there are far fewer red cells than the normal range. This causes anemia, which is severe in these patients. A child with β-thalassemia major does not, however, develop severe anemia until 3 months to one year of age. If left untreated, affected children have a very poor quality of life and most will die at a very young age. The basic components of management in these patients are blood transfusion and iron chelation.

Objectives

Main objective of this paper was to review the recent literature regarding physical activity influence on bone mass density in thalassemic subjects *(β-thalassemic specifically)*.

Methods

The search was made mainly focusing in: PubMed, ResearchGate, Hinari, for studies focusing on PA intervention in β-thalassemia subjects.

Results

Only 6 papers fulfilled the inclusion criterias:

1. Vincent L. [4];
2. Fung E. B. [2]., 2010;
3. Fung E. B. [1]., 2012;
4. Hamidieh A. A. [5]., 2013;
5. Valizadeh N. [3]., 2014;
6. Schündeln M. M. [7]., 2014.

Author's Name	Year of publication	Type of study	Number of subjects	Type of intervention
Vincent L. et al.	2010	Not specified	5 subjects with α-t (α-t), 6 SCT carriers (SCT) and 9 SCT carriers with α-t (SCT/α-t).	Skeletal muscle histomorphological and energetic characteristics. Subjects underwent a muscle biopsy and also performed an incremental maximal exercise and a time to exhaustion test.
Fung E. B. et al.	2010	Cross-sectional, multicenter study	386 257 transfused thalassemia patients compared with 113 non-transfused patients.	Fat, lean, and bone mineral density (BMD) were assessed by DXA. Medical history, food frequency and physical activity questionnaires.
Fung E. B. et al.	2012	A longitudinal cross-over pilot trial	18	Subjects were asked to stand on a vibrating platform (30 Hz, 0.3 g) for 20 min/day for 6 months.
Hamidieh A. A. et al.	2013	Not specified	20	Bone mineral density (BMD) of 20 patients from three thalassemia classes whose mean (SD) age was 7.4 (3.8) years were tested with a Norland XR-46 device at baseline (before transplantation), 6 and 12 months after transplantation.
Valizadeh N. et al.	2014	Cross sectional descriptive study	10 (younger than 18 years old)	scanned for Bone Mineral Density (BMD).
Schündeln M. M. et al.	2014	cross-sectional study	45	Biochemical, radiographic and anamnestic parameters of bone health were assessed.

Results and Discussion

In Vincent L. et al., 2010 study, the focus were the measurements of skeletal muscle histomorphological and energetic characteristics. 10 control HbAA subjects (C), 5 subjects with α-t (α-t), 6 SCT carriers (SCT) and 9 SCT carriers with α-t (SCT/α-t) were enrolled and became part of study. Subjects have underwent a muscle biopsy and also performed an incremental maximal exercise and a time to exhaustion test. In Fung E. B. [1], 2010 study, the subjects were assessed by DXA for: Fat, lean, and bone mineral density (BMD). Also; medical history, food frequency and physical activity questionnaires were conducted. The main objective of Fung E. B. [2], 2012 study was to evaluate the effectiveness of low magnitude whole body vibration (WBV) therapy on bone. Subjects were asked to stand on a vibrating platform (30 Hz, 0.3 g.) for 20 min/day for 6 months. Areal bone mineral density (a BMD) by DXA and volumetric BMD by peripheral quantitative computed tomography (pQCT) was assessed at baseline, 6 and 12 months.

Hamidieh A. A. [5], 2013 study assesses the adverse effects of transplantation on growing bones of pediatric thalassemic patients. Bone mineral density (BMD) of 20 patients from three thalassemia classes were tested at baseline (before transplantation), 6 and 12 months after transplantation. Transfusion duration and chelation therapy had shown positive significant relationships to BMD *(g/cm²)*, but no significant relation with the BMD Z-score. The aim of Valizadeh N. [3], 2014 study was to assess the frequency of bone loss in patients with thalassemia major and intermedia in Urmia City of West Azerbaijan, Iran 10 patients *(younger than 18 years old)* with transfusion dependent thalassemia attending to Motahari and Emam Khomeini hospitals in Urmia city of Iran were enrolled and scanned for Bone Mineral Density (BMD). Among them, 8 patients had low BMD and 2 of them had normal BMD in lumbar spine. 6. The Schündeln M. M. [7], 2014 study focus was to assess bone health in pediatric patients with chronic hemolytic anemia. A cross-sectional study was conducted involving 45 patients with different forms of hemolytic anemia *(i. e., 17 homozygous sickle cell disease and 14 hereditary spherocytosis patients)*. Biochemical, radiographic and anamnestic parameters of bone health were assessed. Patients with homozygous sickle cell anemia were more frequently and more severely affected by impaired bone health than patients with hereditary spherocytosis.

Conclusions & Recommendation's

Based on the reviewed studies we can conclude that:

There is a lack of studies focusing in PA influence on bone mass density in these patients category. According

to Fung E. B. [1], 2010, the majority of adult patients with thalassemia had healthy body composition with rare obesity, young, non-transfused patients appear at risk for being underweight. Findings of Fung E. B. [2], 2012 study suggest that vibration therapy may be an effective non-pharmacologic intervention in Thal. According to Valizadeh N. [3], 2014 patients with all type thalassemia and hemoglobin H disease in age of higher than 8 year old should: Perform annual BMD and Treat low BMD with different medications (administration of bisphosphonate, calcium and vitamin D supplements). Medical consultation with a rheumatologist and/or an endocrinologist should be performed in these patients. Adequate calcium containing foods, avoiding heavy activities, stop smoking, iron chelation therapy in adequate dosage, early diagnosis and treatment of endocrine insufficiency and regular blood transfusions can help to achieve an optimal bone density in these patients. Changing lifestyle with mild daily exercise,

Further research is needed to identify: Risk factors, means of prevention and also to establish specific PA engagment guidelines and recomandations for this social category.

References:

1. Fung Ellen B., Xu Yan, Kwiatkowski Janet, Vogiatzi Maria G., Neufeld Ellis, Olivieri Nancy, Vichinsky Elliott P., Giardina Patricia J. , and Thalassemia Clinical Research Network.//J Pediatr. – 2010, October. – 157 (4): 641–647. – e2. doi:10.1016/j.jpeds.2010.04.064.
2. Fung Ellen B. , Gariepy Catherine A. , Sawyer Aenor J. , Higa Annie, and Vichinsky Elliott P. The effect of whole body vibration therapy on bone density in patients with thalassemia: A pilot study.//American Journal of Hematology. – Published online 28 June 2012 in Wiley Online Library//[Electronic resource]. – Available from: htpp://wileyonlinelibrary.com. – DOI: 10.1002/ajh.23305
3. Valizadeh N. M., Farrokhi F., Alinejad V., Said Mardani S. M., Valizadeh N., Hejazi S., Noroozi M. Bone density in transfusion dependent thalassemia patients in Urmia, Iran.//Iranian Journal of Pediatric Hematology Oncology. – Vol 4. – No 2. – 2014.
4. Vincent L., Féasson L., Oyono-Enguéllé S., Banimbek V., Monchanin G., Dohbobga M., Wouassi D., Martin C., Gozal D., Geyssant A., Thiriet P., Denis C., Messonnier L. Skeletal muscle structural and energetic characteristics in subjects with sickle cell trait, -thalassemia, or dual hemoglobinopathy.//J Appl Physiol. – 2010. – 109: 728–734.
5. Hamidieh A. A., Hamidi Z., Nedaeifard L., Heshmat R., Alimoghaddam K., Larijani B., Ghavamzadeh A., Mohajeri-Tehrani M. R. Changes of Bone Density in Pediatric Patients with β-thalassemia Major after Allogenic Hematopoietic Stem Cell Transplantation.//Arch Iran Med. – 2013. – 16 (2): 88–92.
6. Karimi M., Fotouhi Ghiam A., Hashemi A., Alinejad S., Soweid M., Kashef S. Bone mineral density in betathalassemia major and intermedia.//Indian Pediatr. – 2007. – 44 (1): 29–32.
7. Schundeln M. M., Goretzki S. C., Hauffa P. K., Wieland R., Bauer J., et al. Impairment of Bone Health in Pediatric Patients with Hemolytic Anemia. – 2014. – PLoS ONE 9 (10): e108400. doi:10.1371/journal. pone. 0108400.
8. Trikas A., Tentolouris K., Katsimaklis G., Antoniou J., Stefanadis C., Toutouzas P. Exercise capacity in patients with Bthalassemia major: relation to left ventricular and atrial size and function.//Am Heart J. – 1998. – 136: 988–990.
9. World Bank 2006, report of a joint WHO-March of Dimes meeting. – 2006.

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Reproductive health and hormonal status of women with polycystic ovary syndrome

Abstract: In this work there have studied reproductive health, also features of reproductive and hormonal disturbances at polycystosys ovarian syndrome (POS) among of women at the active reproductive age, which belongs to the uzbek population.

Keywords: ovarian polycystosys, reproductive health, hyperandrogenia.

Actuality. Nowadays problem of population's reproductive health protection takes one of the first places in the laws and politics of modern progressive society and is one of the priority directions in the Republic of Uzbekistan. One of the most frequent causes of reproductive function violations of women of fertile age is polycystic ovary syndrome (POS) [1; 5; 6; 7]. Therefore, this pathology is under close attention of doctors in various countries and in our Republic as well. Along with that clinical practice dictates the need to assist the patients suffering from POS and help them

in solving problems, the main of which, undoubtedly, is the infertility [2; 3; 4]. Moreover, menstrual disorders increased hair growth, acne, and overweight are symptoms that can be present in various combinations in all patients with POS and require treatment. Unfortunately, the quality of life and health status of women with POS has not been adequately studied.

Aim. Aim of this work is studying of regional features, structure and clinical course of POS and its effect on the reproductive health of women of childbearing age.

Materials and methods. The objects of the study were 104 women of reproductive age with POS of ovarian and extraovarian origin. A comprehensive study of the anthropometric data included measurement of growth, weight, calculation of body mass index, measurement of the waist size, hip size, and body type determination. During the investigation we use specially developed protocols for patients with POS and scales recommended for use in clinical practice (modified Ferriman-Gallwey's scale). Ultrasound examination of small pelvis has been carried out on the "Interscan-250" device. The MRI of the brain and adrenal glands has been carried out for cause. Also determining of the level of gonadotropic hormones (FSH, LH, PRL) estradiol, testosterone, DHEA, 17-pregnenoldione, cortisol, TSH, T3, T4 on the 3rd and 6th days of the menstrual cycle in the serum with the help of EIA using the Multiscan PLUS device have been carried out. The blood sampling has been conducted in the morning on an empty stomach from the cubital vein. The functional probes with dexamethasone (low dexametasona test): 4 mg/day for 4 days has been carried out for cause.

Study results. Analysis of the POS clinical features of women of active fertile age has been carried out in two clinical groups: patients with ovarian hyperandrogenism (HAGS POS) and patients with extraovarian forms of hyperandrogenism (HAGS SPOS). The reproductive health anamnestic data analysis revealed that women with various forms of POS have almost identical age of menarche. Meanwhile gynecological morbidity in patients with HAGS regardless of the form of the disease is almost three times higher in comparison with the control group.

Patients with HAGS several times more likely suffer from primary and secondary infertility of hormonal etiology recurrent miscarriages, and dysfunctional uterine bleeding.

Table 1. – Features of gynecological history of women of fertile age with POS in a comparative aspect

Parameters	**HAGS, SPOS n = 44**	**HAGS, POS n = 60**	**Control group n = 40**
Menarche age (years)	13.4 ± 0.1	13.6 ± 0.39	13.0 ± 0.37
Gynecological history burdeness (%)			
Is not burdened	18.18 ± 1.1*	21.43 ± 1.6*	60 ± 4.1
Secondary sterility	18.2 ± 1.1*	14.5 ± 1.2*	5 ± 0.4
Primary sterility	11.4 ± 1.0*	35.71 ± 2.6*	2.5 ± 0.2
Not developing pregnancy	9.1 ± 1.2*	14.29 ± 1.2*	2.5 ± 0.2
Spontaneous abortion	18.6 ± 1.6*	7.14 ± 3.5	12.5 ± 0.8

Note: * — reliability of data in comparison with the control group (* — $P < 0.05$)

Anthropometric differences have been observed among women with ovarian hyperandrogenism: there are significantly important differences in weight, BMI, circumferences of waist and hips. Women with POS in 42 % of cases were overweight or obese with predominant adipopexia in the abdominal area.

Generalized anthropometric parameters of women with extraovarian HAGS forms were similar to those of women from the control group. Noteworthy is the fact that more than half of overweight women associate their overweight with COC (that have been taken for treatment) or with pregnancy.

As demonstrated data in table 2 parameters of weight and growth have differences both with the control group and with compared with clinical group, in patients with POS. Femoral obesity type has been observed in 14.29 % of cases, and abdominal type — in 14.29 % of cases. Striae were more likely have been expressed in patients with extraovarian hyperandrogenism forms, that can be explained by increased adrenal glands activity. Every fifth patient with POS had dark spots. This symptom is a clinical manifestation of insulin resistance, in patients with extraovarian hyperandrogenism forms this symptom has not been observed. Acne vulgaris with equal frequency have been observed of women from both clinical groups average in 3.5 times more often compared with the control group.

Performed hormonal studies revealed the hyperandrogenic states structure in young women. It has been revealed that of women of active fertile age ovarian hyperandrogenism predominate (65.9 % of cases). Adrenal and/or mixed hyperandrogenism have been revealed in 5.6 % of cases.

Hyperandrogenemia caused by total testosterone level increasing has been revealed in 72.5 % of surveyed women. Herewith analysis of generalized parameters revealed statistically significant increase of these parameters in patients from both clinical groups (table 3).

The DHEA serum concentration in patients with extraovarian hyperandrogenism forms was significantly higher relative to the control group whereas in patients with POS this parameter does not differ from the control group. Women had the estradiol concentration almost identical to the control group, and hyperandrogen ovarian failure was typical for SPOS.

Averaged prolactin level of women with SPOS was two times higher than in control group which is probably can be associated with higher hyperprolactinemia prevalence in active fertile age.

Table 2. – Parameters of body type and menstrual cycle type among women of reproductive ages in a comparative aspect

Parameters		Control group n = 40	HAGS, POS n = 60	HAGS, SPOS n = 44
Body type	N	90 ± 4.9	57.14 ± 4.7	90.91 ± 4.9
	Obesity	0	21.43 ± 5.4	0
	Overweight	10 ± 4.9	21.43 ± 5.4	9.09 ± 4.9
Obesity type	No	90 ± 1.9	57.14 ± 3.2	81.82
	«Apple»	0	14.29 ± 1.3	0
	«Pear»	0	14.29 ± 1.3	0
	Mixed	0	0	9.09 ± 4.9
Menses Type	Regular	90	42.86 ± 4.9*	54.55 ± 6.2*
	Irregular	10 ± 4.9	57.14 ± 5.2*	45.45 ± 6.1*
Striae	Present	10 ± 4.9	14.29 ± 4.3	45.45 ± 6.1*
	Absent	90	85.71 ± 5.3	54.55 ± 6.2
Black spots	Absent	90 ± 4.9	78.57 ± 5.2	81.82 ± 5.7
	Present	10 ± 4.9	21.43 ± 2.4	0
Acne vulgaris	Absent	90 ± 4.9	64.29	54.55 ± 6.2
	Present	10 ± 4.9	35.71 ± 5.6**	36.36 ± 3.7**

Note: * — reliability of data in comparison with the control group and ^ — reliability of data between HAGS groups (* — P < 0.05; ** — P < 0.01; ^ — P < 0.05)

Table 3. – The hormonal status in surveyed women of fertile age with POS in a comparative aspect (n = 144)

Parameters	HAGS, SPOS n = 44	HAGS, POS n = 60	Control group n = 40
LH	9.93 ± 0.76**	11.77 ± 2.52**	4.69 ± 0.84
FSH	7.4 ± 5.46	8.71 ± 1.32	7.51 ± 0.68
E2	26.66 ± 5.46*	71.44 ± 10.69^	75.81 ± 4.50
PRL	35.83 ± 2.66*	17.24 ± 3.53^	12.98 ± 2.16
T	1.27 ± 0.27*	1.26 ± 0.17*	0.50 ± 0.02
DHEA-S	2.92 ± 0.59**	1.88 ± 0.29	1.29 ± 0.18
K	533.9 ± 123.95*	203.65 ± 76.64^	172.2 ± 20.54
TSH	1.73 ± 0.19**	2.15 ± 0.53*^	3.11 ± 0.36
insulin	8.35 ± 0.02**	5.72 ± 0.85**,^^	13.51 ± 0.52

Note: * — reliability of data in comparison with the control group and ^ — reliability of data between HAGS groups (* — P < 0.05; ** — P < 0.01; ^ — P < 0.05; ^^ — P < 0.01)

The low concentrations of insulin in patients with POS compared both with the control group and with the clinical group is noteworthy.

Conclusion. Thus, POS is the most common cause of reproductive health disorders of women of active fertile age, which caused increasing of frequency of primary and secondary infertility of hormonal etiology, miscarriage, dysfunctional uterine bleeding, which are based on the menstrual cycle disorders, and such hormonal disorders as hyperandrogenism. Therefore, hormonal disorders in young women mainly can be characterized by hyperandrogenism, ovarian hyperandrogenism predominates hyperandrogenic states structure (in 65.9 % of cases). It has been identified that hyperandrogenism frequency caused by total testosterone level increasing reach 72.5 %.

References:

1. Dedova I. I., Melnichenko G. A. Polycystic ovary syndrome: Guidelines for practitioners/Edited. – M.: «Medical information agency» Ltd, 2007. – P. 386.
2. Dedov I. I., Melnichenko G. A., Fadeev V. V. Endocrinology: Textbook. – Moscow: Medicine, 2000. – P. 632.
3. Manuchin I. B., Gevorkian M. A. Polycystic ovary syndrome. – M., 2004.
4. Shilin D. E. Polycystic ovary syndrome. International diagnostic consensus (2003) and ideology of modern therapy.//Consilium–medicum. – Volume 06. – No. 9. – 2004.
5. The Rotterdam ESHRE/ASRM-Sponsored PCOS consensus workshop group.//Hum Reproduct, 2004. – 19: 41 –7, – FertilSteril 2004. – 81: 19–25.
6. The Thessaloniki ESHRE/ASRM-Sponsored PCOS Consensus Workshop Group* March 2–3, 2007, Thessaloniki, Greece.

7. Polycystic ovary syndrome and pregnancy./Sir-Petermann T., Ladr n de Guevara A., Villarroel A. C., Preisler J., Echibur B., Recabarren S. – 2012.
8. Polycystic ovary syndrome: physiopathology review./Fux Otta C., Fiol de Cuneo M., Szafryk de Mereshian P./Rev Fac Cien Med Univ Nac Cordoba. – 2013. – 70 (1):27–30.

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Analysis of maternal intracardiac hemodynamics and fetoplacental blood flow in women with myocarditis

Abstract: In purpose of to estimate of the central hemodynamics and feto-placentary complex condition at pregnant with myocarditis 128 pregnant with myocarditis aged about 17–40 years were studied. Received results are shown, that at 68.5 % women with myocarditis the strike fraction (SF) was increased (> 70 %). At women with high SF (SF >70 %) in 64 % cases there are revealed failure of blood groove in uterine arteries, in 18 % cases — failure in placental blood groove and in 12 % cases failure of maternal-placentary blood groove.

Keywords: myocarditis, pregnant, hemodynamics, systolic myocardial dysfunction.

Introduction

Diseases of the cardiovascular system in pregnant women predominate among extragenital pathology [1; 2; 4]. They account for more than 60 % of all internal organs diseases. They are one of the leading causes of maternal and perinatal mortality, cause serious complications and lead to women invalidization [1; 2; 6; 7]. Percentage of cardiac diseases in the maternal mortality structure is from 5 to 32 %, and in the perinatal mortality structure is 4.3 to 25 % [3; 6; 7]. Statistical data of results of the maternal mortality in the United States analysis showed that gestational cardiomyopathy takes a leading position in the cardiovascular pathology structure [3; 5], and more than half of the cases occur in myocarditis.

American literature indicates that cardiomyopathy leads to the risk of maternal mortality development in 15–60 % of cases [1; 3; 6]. The analysis of maternal mortality for the last 5 years in the Republic of Uzbekistan confirmed the data of the leading scientists of the world that requires paying close attention in pregnant women.

Experts from around the world share a common opinion that the true percentage of myocarditis is not determined due to a number of reasons:

- Misconception in myocarditis diagnostics;
- Absence of pathognomonic complaints and typical objective data;
- Features of the latent period, and also that fact that histological and instrumental methods of examination, which can verify inflammatory lesion of the myocardium, are unavailable for broad audience of practicing physicians [6; 7]. Moreover, difficulties in the myocarditis diagnostics in pregnant women are associated with physiological changes in the cardiovascular system, which occur during gestation.

Aforesaid indicates the relevance of myocarditis in pregnant women.

Assessment of central maternal hemodynamics in case of myocarditis and state of placentofetal blood flow in this disease could disclose new aspects of the pathogenesis of obstetric and perinatal complications in women with this pathology.

Aim

Assessment of central maternal hemodynamics and state of placentofetal blood flow in pregnant women with postinfluenzal myocarditis.

Materials and methods

We studied 128 pregnant women with myocarditis which have turned to the consultative polyclinics of the Republican specialized scientific-practical medical center of obstetrics and gynecology (RSSPMCOG Tashkent, Uzbekistan). The age of pregnant women ranged from 17 to 40 years.

The inclusion criterion was the presence of the postinfluenzal myocarditis in pregnant women. Exclusion criteria were presence of rheumatic myocarditis, organic diseases of the heart and blood vessels and symptomatic hypertensions.

The study was carried out in 2 stages: 1st stage consisted of the hemodynamic changes features on the background of myocarditis in different age periods analysis; 2nd stage of our research consisted in a comparative study of the influence of the degree of contractile function of the left ventricle violation on the placentofetal blood flow. In this connection we choose the ejection fraction evaluated with the help of echocardiography as the main parameter, which would characterize the contractile function of the myocardium. Therefore, at this stage, the patients were divided taking into account values of ejection fraction. The values of ejection fraction from 55 to 70 % have been considered as normal parameters.

During collective examination with cardiologists, together with clinical and anamnestic data analysis, electrocardiography (ECG) and echocardiography, conducted in the Department of functional diagnostics of the Republican cardiological center in Tashkent, have been carried out. To assess the state of the placentofetal complex and fetal the doppler study (ALOKA, Japan) has been carried out the by the Department of functional diagnostics of RSSPMCOG. Qualitative blood flow parameters that characterize the peripheral vascular resistance (PVR): peak systolic to end diastolic ratio (PSEDR), resistance index (IR), and pulsation index (PI) have been used.

Results and discussion

At the moment of turning into the hospital more than half of pregnant women (53 %) were in the second trimester, every 4th pregnant women (25 %) was in the first gestation trimester. Amount of primigravidas and primiparas was 34 and 38.2 %, respectively. The study has been conducted in two stages.

We were interested in the features of intracardiac and central maternal hemodynamics changes on the background of myocarditis in different age aspects. In our study, more than half of pregnant women (87) were 20–29 years, there were 23 women (20 %) from 30 to 34 years, and only 13 women (10 %) were from 35 to 40 years. Only 4 % (5 women) from the general population were women under 20 years. Henderson et al. (USA, 2011) has identified age-related risk group of gestational cardiomyopathy development in case of myocarditis presence. The author specified that greatest risk of the cardiomyopathy development have women over 35 years. The authors have also identified that the most favorable age for pregnancy is 20 to 24 years. A cohort of pregnant women over 35 years with myocarditis in our study was 64 % of the total number of women.

72 % of women have some complaints, in 28 % of cases myocarditis has been diagnosed for the first time during cardiologist consultation. The most common complaints of pregnant women were shortness of breath (61 %), palpitation (55 %), in rare cases — fatigue (6 %), weakness (5 %) and dizziness (5 %). 27 % of pregnant women have single complaints, the rest of women have combination of several complaints.

Sinus tachycardia (heart rate (HR) more than 90 beats per minute) according to the ECG has been noted in 65 % of cases, heart rhythm disorders by ventricular arrhythmia type has been registered in 19 % of women, heart rhythm disorders by supraventricular arrhythmia type has been registered in 5 % of cases. The repolarisation abnormality in standard (III) and reinforced (AVF) leads has been observed in 16 % of cases, in precordial leads in 19 % of cases, partial bundle branch block has been observed in 13 % of pregnant women with myocarditis.

During assessment of the intracardiac hemodynamics the following data have been obtained: the most common symptom of intracardiac hemodynamics disorders was mitral regurgitation, which in most cases was detected in 62 and 54 % of pregnant women in the age 20–29 and 35–40 years, respectively.

Tricuspid regurgitation was typical for women from the age groups of 15–19 and 35–40 years, marked at every 5th and 6th pregnant, respectively.

The analysis of the data that have been obtained in the study of the central and intracardiac maternal hemodynamics in patients with myocarditis confirmed our hypothesis about the influence of pregnancy on cardiac function of pregnant women with myocarditis. Herewith we noted violations of the systolic-diastolic heart function on the background complicated by postinfluenzal myocarditis. The contractile function violation has been judged on the background of fraction ejection (FE) parameter. Echocardiography data have shown an increased FE together with increased myocardial index in 68 % of pregnant women.

Comparative assessment of the left ventricular (LF) contractile function showed that the greatest number of women with increased fractional ejection of the left ventricle was at the age of 15–19 and 35–40 years (80 and 77 %, respectively) (figure). We have notice that the older the woman the higher the risk of FE increasing. These our data correspond with the results of foreign authors [4].

There were 40 patients with normal FE values (with decreased systolic LF function), while there were 87 patients with FE greater than 70 % (with increased myocardium systolic function). The purpose of the second stage was to answer the question do the violations of the myocardium contractile function affect the state of the fetoplacental system, and if the answer is "yes", then how changes are expressed in the system mother-placenta-fetus on the background of FE changes.

Interesting data have been obtained during comparative investigation of the results of the utero-fetoplacental blood flow and state of the maternal systolic LF function doppler study (table 1).

So, 64 % of women with increased FE (FE > 70 %) have impaired blood flow in uterine arteries, 18 % of women have placental blood flow violation, and 12 % of them have uteroplacental blood flow violation. The antenatal hypoxia developed in 88 % of cases.

Table 1. – Results of the utero-fetoplacental blood flow doppler study

	FPI and its degrees			FGRS	Antenatal hypoxia
	FPI Ia	FPI Ib	FPI II		
FE>70 (n = 87)	55 (64 %)	16 (18 %)	10 (12 %)	7 (8 %)	76 (88 %)
FE 55–70 (n = 40)	5 (14%)	4 (10%)	2 (5%)	2 (5%)	17 (47%)

However, the fetoplacental complex hemodynamics violations also have been noted in pregnant women with myocarditis on the background of normal FE values. Violation of blood flow in uterine arteries (FPI Ia) has been noted in 14 % of women, and violations of placental blood flow (FPI Ib) — in 10 % of cases. Violation of uteroplacental blood flow (FPI II) has been noted in 5 % of cases. In 67 % of cases the pregnancy proceeded on the background of antenatal hypoxia.

The obtained data once again confirm that the maternal hemodynamics violation, caused by myocarditis, plays a major role in the placental insufficiency development. However, the results obtained after 2nd stage of the study carrying out show that pregnant women with myocarditis can develop fetoplacental blood flow violation even on the background of normal ejection fraction value. This information once again emphasizes that there are unknown causes and pathogenetic mechanisms of violations in the system mother-placenta-fetus in case of myocarditis, which further study let scientists more deeply understand the pathogenesis of obstetric complications on the background of this circulatory system disease in pregnant women.

Conclusions

Thus, the myocarditis that develops during pregnancy is a condition that threatens the mother and fetus life, and requires further study for pregnancy and childbirth management tactic development.

Central maternal hemodynamics in case of myocarditis development can be characterized by impaired LV contractile function, which underlies number of obstetric and perinatal complications development.

Consequently, the maternal hemodynamics dysfunction adversely affecting the fetoplacental complex, result in uterine arteries blood flow disorders development, which in turn leads to the placental vessels resistance index increasing.

However, role of immunological-inflammatory and autoimmune processes in the development of some obstetric and perinatal complications that require further study cannot be excluded.

References:

1. Koliushko G. I. Myocarditis among pregnant women. – Kharkov (Ukraine), 2011. – № 2. – (148). – P. 35–38.
2. Struk R. I. Cardiac arrhythmias in pregnancy. Guidelines for physicians. – M.: Geotar-Media, 2007. – P. 128.
3. Centers for diseases control and prevention. National center for chronic disease prevention and health promotion, pregnancy mortality surveillance system. – US, 2012. – P. 114.
4. Gunderson E. P. et al. Gestation cardiomyophaty.//Obset Gynecol. – New York, 2011. – Vol. 118. – P. 583.
5. Stephan Hetmans. Myocarditis and heart failure: need for better diagnostic, predictive, and therapeutic tools.//Eur. Heart J. – 2007. – Vol. 28, № 11. – P. 1279–1280.

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The effect of *CYP2C9* gene polymorphism at the level of Valproic acid in serum in women of reproductive age with epilepsy

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Abstract: The purpose of research — the study of the influence of single nucleotide polymorphisms (SNPs) of gene *CYP2C9* on the concentration of valproic acid (VPA) in the blood. Higher levels of VPA was observed in patients with genotype *CYP2C9*2/*3* (100 mkg/ml) and genotype *CYP2C9*1/*2* (86 mkg/ml), compared with the genotype *CYP2C9*1/*3* (72.5 mkg/ml) and genotype *CYP2C9*1/*1* (66 mkg/ml).

Keywords: Epilepsy, Pharmacogenetics, Valproic acid, Therapeutic drug monitoring, *CYP2C9.*

Introduction. Epilepsy is a chronic brain disease characterized by recurrent seizures that result from excessive electrical activity of neurons in the brain, accompanied by a variety of clinical and paraclinical manifestations, and requires long-term, and in some cases — receiving life antiepileptic drugs (AEDs). The purpose of AED-therapy, on the one hand, preventing

epileptic seizure, and on the other hand, the absence of adverse drug events. The pharmacokinetic characteristics to a greater or lesser extent dependent on the genetic characteristics of a person (genetically determined reduction in the activity of an enzyme involved in the metabolism of the drug) [1; 2].

The purpose of research — the study of the influence of SNPs of gene *CYP2C9* on the concentration of VPA in serum of childbearing age women with epilepsy.

Materials and methods. The study included 148 Russian childbearing age women with epilepsy, living in the Krasnoyarsk region (RF). Age of the patients ranged from 15 to 58 years, mean age — 28.4 ± 8.2 years.

Methods: retrospective analysis of complaints and anamnesis (for outpatients); analysis of the daily doses of AEDs; laboratory methods, including therapeutic drug monitoring (TDM) and molecular genetic testing of SNPs of the gene *CYP2C9*.

TDM was conducted at a single point (2 hours after receiving valproate). Reference level of VPA in serum: 50–100 mcg/ml. Subtoxic levels of VPA is defined by 90 to 100 mcg/ml, toxic levels over 100 mcg/ml.

Molecular genetic study was conducted by PCR Real Time, using a fluorophore-labeled oligonucleotide samples agents (technology TaqMan, "Rotor-Gene 6000", Corbet Life Science, Australia). A study of polymorphic allelic variants of the gene *CYP2C9* (on chromosome 10q24.1–24.3) P450:

- allelic variant "wild" type *CYP2C9*1* does not have a mutation in a single nucleotide substitution;
- polymorphic allelic variant *CYP2C9*2* (R144C, c.430 C > T — single nucleotide substitution of cytosine to thymine at position 430);
- polymorphic allelic variant *CYP2C9*3* (I359L, c.1075 A > C — single nucleotide substitution of adenine to cytosine at position 1075).

Descriptive statistics for the quality of accounting signs presented as absolute values, percentages and fractions errors. Data for variational series with non-parametric distribution described as medians and percentiles 25 and 75 — Me [P25; P75]. Total inter-group differences were assessed using H Kruskal-Wallis test. In case of differences of several samples was performed multiple comparisons using the nonparametric criteria options: Dunnett test (comparison of all samples with the control sample — without mutation) and Newman-Keuls test (for pair wise comparison of samples). To test the hypothesis of equality of shares used χ^2 test with Marasciulo procedure. To assess the risk of cumulation of VPA used the coefficient of relative risk. For all criteria critical level of significance was taken $p \leq 0.05$. Statistical analysis was performed using software packages STATISTICA v. 7.0, SPSS Statistics 20.0, Excel.

Results and discussion. The daily dose of VPA ranged from 300 to 2000 mg/day, with a median of 1000 [600:1000] mg/day.

As a result of statistical processing of the data, we have shown that the prevalence of genotype *CYP2C9*1/*1* was diagnosed in 100/148 (67.6%) patients, genotype *CYP2C9*1/*2* — in 18/148 (12.2%) women, genotype *CYP2C9*1/*3* — in 28/148 (18.9%), compound heterozygote (genotype *CYP2C9*2/*3*) — at 2/148 (1.4%) women.

The frequency of *CYP2C9*2* genotype correlates with the data obtained in Europe and the European part of Russia — 12.2%. The frequency of the genotype *CYP2C9*3*–18.9% higher than the incidence in Europe (10.8%), but comparable to the frequency of occurrence in Turkey (17.23%) [2] and Italy (14.5%) [3] and exceed the frequency of occurrence in the European part of Russia. The incidence of compound heterozygotes *CYP2C9*2/*3*–1.4% comparable with the frequency of occurrence in Turkey (1.1%) [3] and Italy (2.0%) [3].

The high frequency of genotype *CYP2C9*3* in the studied sample can be explained by the influence of genetic drift smaller European population and the influence of genetic drift large Asian population in the central part of the population of Siberia. Asians genotype *CYP2C9*3* is more common than genotype *CYP2C9*2* [4; 5; 6].

The level of VPA was 66 [53:86] mkg/ml in carriers of the genotype *CYP2C9*1/*1*, in carriers of the genotype *CYP2C9*1/*2*–86 [44:104] mkg/ml, *CYP2C9*1/*3*–72,5 [57.5:96] mkg/ml and in carriers of the genotype *CYP2C9*2/*3*–100 [100:100] mkg/ml. The daily dose of VPA in the groups had no significant differences.

Toxic, sub-toxic concentration of VPA in the blood at a greater frequency of cases found in carriers of genotype *CYP2C9*1/*2* (38.5%) and in the compound heterozygotes (100%) and at least genotype *CYP2C9*1/*3* (33.3%) [8]. Which also significantly higher than the genotype *CYP2C9*1/*1* (12.5%).

The tendency to accumulation of VPA remained for heterozygous carriers of the mutant allele of a polymorphic variant *CYP2C9*1/*2* even after dosing reduction on average of 16.7% from baseline [7]. Two patients bearer compound heterozygous *CYP2C9*2/*3* after correction dose of VPA (dose reduction the average of 15.5% of the original) on the re-examination did not come. These findings are consistent with the data [8; 9; 10] of the higher risk of accumulation of VPA and other xenobiotics are metabolized in the liver in carriers of polymorphic allelic variants of the gene *CYP2C9*1/*2*.

According to the analysis of risk assessment, the risk of accumulation was 1.82, 2.1 and 5.46 times higher in genotype *CYP2C9*1/*3, CYP2C9*1/*2* and *CYP2C9*2/*3*, respectively, than in genotype *CYP2C9*1/*1*.

Conclusions. According to our research, the accumulation of VPA in the blood at a greater frequency of cases detected in heterozygous carriers of the mutant allele of a polymorphic variant *CYP2C9*1/*2* (38.5%) and compound heterozygotes (100%) and to a lesser extent in heterozygous carriers of the mutant polymorphic allelic variant *CYP2C9*1/*3* (33.3%) compared to homozygous carriers of advanced ("wild") genotype *CYP2C9*1/*1* (12.5%). The obtained data are correlated with results of other authors, the higher the concentration of VPA in blood carriers allelic variants of polymorphic *CYP2C9*2* and *CYP2C9*3* in comparison with common carriers polymorphic allelic variant *CYP2C9*1* [8; 10; 11; 12].

However, accumulation of VPA in carriers of *CYP2C9*3* polymorphism can be traced not all authors [12]. On the other hand, a higher concentration of VPA in the blood is shown in carriers of polymorphic allelic variants *CYP2C9*3* compared with carriers of "wild" polymorphic allelic variant is shown in a study conducted in Japan [9].

References:

1. Anderson G. D. Pharmacokinetic, pharmacodynamic, and pharmacogenetic targeted therapy of antiepileptic drugs./ G. D. Aderson//Ther. Drug Monit. – 2008. – Vol. 30. – P. 173–180.
2. Frequency of cytochrome P450 CYP2C9 variants in a Turkish population and functional relevance for phenytoin./A. S. Aynacioglu, J. Brockmoller, S. Bauer [et al.]//Br. J. Clin. Pharmacol. – 1999. – Vol. 483. – P. 409–415.
3. Genetic polymorphism of cytochrome P450 2C9 in a Caucasian and a black African population./M. G. Scordo, E. Aklillu, U. Yasar [et al.]//Br. J. Clin. Pharmacol. – 2001. – Vol. 52, № 4. – P. 447–450.
4. Takahashi H., Echizen H. Pharmacogenetics of warfarin elimination and its clinical implications.//Clin Pharmacokinet. – 2001. – 40: 587–603.
5. Allele and genotype frequencies of CYP2C9 in a Korean population./J.-W. Bae, H.-K. Kim, J.-H. Kim [et al.]//Br. J. Clin. Pharmacol. – 2005. – Vol. 60. – P. 418–422.
6. Frequency of cytochrome P450 2C9 (CYP2C9) alleles in three ethnic groups in Malaysia./K. C. Seng, G. G. Gin, J. V. Sangkar [et al.]//Asia Pacific J. Mol. Biol. Biotech. – 2003. – Vol. 1. – P. 83–91.
7. Pharmacogenetics of valproic acid as unmodified risk factor of adverse drug reactions./N. Shnayder, M. Pilugina, D. Dmitrenko, [et al.]//Medical and Health Science Journal. – 2011. – Vol. 7. – P. 26–38.
8. Rosemary J. The pharmacogenetics of CYP2C9 and CYP2C19: ethnic variation and clinical significance./J. Rosemary, C. Adithan//Curr. Clin. Pharmacol. – 2007. – Vol. 2, № 1. – P. 93–109.
9. The influence of cytochrome oxidase CYP2A6, CYP2B6, and CYP2C9 polymorphisms on the plasma concentrations of valproic acid in epileptic patients./L. Tan, J. T. Yu, Y. P. Sun [et al.]//Clin. Neurol. Neurosurg. – 2010. – Vol. 112, № 4. – P. 320–323.
10. Interindividual variability in ibuprofen pharmacokinetics is related to interaction of cytochrome P450 2C8 and 2C9 amino acid polymorphisms./E. Garcia-Martin, C. Martinez, B. Tabares [et al.]//Clin. Pharmacol. Ther. – 2004. – Vol. 76. – P. 119–127.
11. Pharmacogenomic association study on the role of drug metabolizing, drug transporters and drug target gene polymorphisms in drug-resistant epilepsy in a north Indian population./R. Kumari, R. Lakhan, R. K. Garg [et al.]//Indian J. Human. Gen. – 2011. – Vol. 17, № 4. – P. 32–40.
12. Impact of CYP2C9 genetic polymorphisms on valproate dosage, plasma concentrations of valproate and clinical response to valproate./E. Brusturean-Bota, A. P. Trifa, C. A. Coadă [et al.]//Hum. Veterinary Med. Int. J. Bioflux Soc. – 2013. – Vol. 5, № 3. – P. 94–98.

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Late complications and quality of life of women after using mesh implants for the pelvic organ prolapsed

Abstract: Great experience clinical use mesh implants for pelvic organ prolapse treatment was the basis for achieving a low incidence of postoperative complications and high quality of life after surgery.

Keywords: pelvic organ prolapse, complications, quality of life.

Introduction

The frequency of pelvic organ prolapse (POP) in the female population according to various sources is between 3 % and 94 %, depending on the approaches to the formation of a population sample and diagnosis of the disease [1, 15–107]. Currently, synthetic mesh implants occupy

a leading position in the treatment of POP, which became possible due to their properties such as strength and durability, pathogenesis based concept of establishment, minimal invasiveness and morbidity [2, 168–174]. However, most studies aimed at evaluating the results of the use of mesh implants for the treatment of POP have a short period of follow-up (12 months) [3, 22–30; 4, 117–126]. This fact determines the relevance of research on the long-term results of the use of synthetic materials for the treatment of POP in women.

Materials and methods

Surgical treatment using mesh implants performed in 376 women aged 43–76 years (median — 64 years) with the POP stage II–IV according to the classification POP-Q in the *City Clinical* Botkin *Hospital* (Moscow) in the period from 2004 to 2014. System Prolift™ (Gynecare, USA) was used in 286 (76.1 %) women, the system Prolift+M™ (Gynecare, USA) — 90 (23.9 %). Total reconstruction of the pelvic floor was performed in 220 (58.5 %) patients (Prolift™ and Prolift+M™ — in 167 and 53 patients, respectively), the reconstruction of the anterior region of the pelvic floor — in 69 (18.4 %) patients (Prolift™ and Prolift+M™ — in 51 and 18 patients, respectively), the reconstruction of the posterior region of the pelvic floor — in 87 (23.1 %) patients (Prolift™ and Prolift+M™ — in 68 and 19 patients, respectively). The following surgical procedures are performed because of concomitant diseases: vaginal hysterectomy for benign diseases of the uterus (uterine fibroids, adenomyosis, endometrial hyperplasia) — in 64 (17.0 %) patients; abdominal hysterectomy — in 4 (1.1 %) patients; hysterotrachelectomy because its elongation — 24 (6.4 %) patients; kolpoperineolevatoroplastiku — 32 (8.5 %) patients; front colporrhaphy — in 2 (0.5 %) patients; setting synthetic suburethral tape (TVT or TVT-O) for incontinence — in 149 (39.6 %) patients.

We use two specific questionnaires to assess quality of life of patients: Pelvic Floor Distress Inventory-20 (PFDI-20) and Pelvic Floor Impact Questionnaire-7 (PFIQ-7). Quality of life was assessed before surgery and at 1, 6, 12 months after surgery, and in the future — 1 once a year. Terms of follow-up of patients ranged from 6 to 110 months (median — 52 months).

Statistical analysis performed using the program Statistica v. 17.0 (StatSoft, USA). Comparing groups of patients on various parameters are made using the criterion χ^2, the dynamics of quality of life was assessed using the Wilcoxon method. The difference between the compared parameters were considered significant at the level of statistical significance ($P < 0.05$).

Results and discussion

During this period of follow-up recurrence of prolapse was observed in 14 (3.7 %) patients, out of which 12 patients re-set mesh prosthesis and two patients with POP stage II with minimal clinical signs of disease conducted conservative treatment. After re-establishment of the implant in any case there was no recurrence. This result of POP treatment can be considered relatively good. For example, according to a systematic review B. Feiner et al. [5, 15–24], based on the analysis of treatment outcomes in 2653 women in 30 different studies, the objective success of the treatment of POP using mesh implants range from 87 % to 95 %.

Late complications after surgery occurred in 32 (8.5 %) patients. When using Prolift™ rate of complications was 8.7 % (25/286), Prolift+M™ — 7.8 % (7/90). These types of mesh prosthesis did not differ significantly in frequency of late complications ($P = 0.071$). The following types of late postoperative complications occurred among all patients: vaginal erosion — in 9 (2.4 %) patients, dyspareunia — in 8 (2.1 %), overactive bladder *de novo* — in 5 (1.3 %), prosthesis displacement t — in 4 (1.1 %), urge urinary incontinence *de novo* — in 3 (0.8 %), stress urinary incontinence *de novo* — in 2 (0.5 %), recurrent stress urinary incontinence — in 1 (0.3 %).

Vaginal erosion is one of the most frequent specific complications associated with prosthetic mesh. Six of the nine patients erosion occurred on the front wall of the vagina, four — on the back. The implant is removed only in one patient when vaginal erosion combined with the displacement of the implant. Our results can be considered good enough, since the frequency of vaginal erosion of more than 5 % in most studies in recent years [6, 293–303; 7, 511–517]. The low incidence of vaginal erosion achieved due to the fact that we have eliminated the major risk factors of erosion: a T-shaped incision of the vagina, excessive excision vaginal tissue, lack screened vaginal tissue, the location of the prosthesis on vesico-vaginal and recto-vaginal fascia, the use of coalescent [8, 315–320].

Dyspareunia occurs on average 14 % according to a systematic review [9, 170–180]. The relatively low percentage of complications in our study was the result of perfect precision surgical technique and adequate postoperative rehabilitation of patients.

The displacement of the prosthesis occurs up to 35 % of cases reported in the literature [6, 293–303; 10, 242–250; 11, 529–534]. Low frequency of the prosthesis displacement we have achieved by providing a weak lateral tension when installing the implant, early treatment of the prosthesis erosions, and adequate action to reduce the risk of infection of the prosthesis (strict aseptic conditions, preoperative antibiotic and antibacterial treatment of complications). All four cases of prosthesis displacement occurred when the total reconstruction of the pelvic floor: two cases of complications occurred during the first month after treatment, the two — six months. It should be added that all patients in whom there was a displacement of the prosthesis does not comply with the recommendation to limit physical activity. The prosthesis is removed in only one case, when the displacement of the prosthesis combined with vaginal erosion (this case is described above), laparoscopic sacro-vaginal fixation of the prosthesis in combination with subtotal hysterectomy is performed in the other three cases.

The following treatment was performed for other complications. Sling surgery (TVT-O) was performed in 1 patient

with recurrent stress urinary incontinence and 2 patients with stress urinary incontinence de novo, 3-month treatment with M-anticholinergics performed in all patients with urge urinary incontinence de novo and overactive bladder de novo.

The following features are found in the evaluation of the quality of life of patients using questionnaires PFDI-20 after surgery. The median quality of life decreased from preoperative 210 points to 124 points in 1 month after surgery (P = 0.001). This parameter has decreased significantly from 124 to 76 points 6 months after surgery (P = 0.002). The median quality of life was 72 points within 12 months after surgery, and this value is not different from the previous value (P = 0.592). The median quality of life later than 12 months after surgery was 75 points, and this value is not significantly different from the values achieved at 12 months (P = 0.614).

Similar trends in the quality of life and established by using a questionnaire PFIQ-7. The median quality of life before surgery was 257 points, 1 month after surgery — 96 points (P < 0.001), at 6 months after surgery — 58 points (P = 0.002), 12 months after surgery — 55 points (P = 0.585), and in terms of more than 12 months after surgery — 60 points (P = 0.549).

Thus, the quality of life of patients significantly improved after use of mesh prosthesis for the treatment of POP during the first 6 months after surgery, in the future, it remains stable at the level reached in 6 months.

Conclusion

Great experience of use of the mesh prosthesis for the treatment of women POP enhance the effectiveness of the correction of this disease and reduce the incidence of postoperative complications. These results led naturally to improve the quality of life of patients after surgery compared to its preoperative condition.

Conflict of interest

The authors have no conflicts of interest.

References:

1. Milsom I., Altman D., Cartwright R. et al. Epidemiology of urinary incontinence and other lower urinary tract symptoms, pelvic organ prolapse and anal incontinence. In: Abrams P., Cardozo L., Khoury S., Wein A., editors. Incontinence. 5th International Consultation on Incontinence. – Paris: Health Publication Ltd., 2013.– P. 15–107.
2. Walter J. E. Transvaginal mesh procedures for pelvic organ prolapsed.//J Obstet Gynaecol Can. – 2011. – 33 (2):168–74.
3. Abdel-Fattah M., Ramsay I. Retrospective multicentre study of the new minimally invasive mesh repair devices for pelvic organ prolapsed.//BJOG. – 2008. – 115 (1): 22–30.
4. Elmer C., Altman D., Engh M. E. et al. Trocar-guided transvaginal mesh repair of pelvic organ prolapsed.//Obstet Gynecol. – 2009. – 113 (1): 117–26.
5. Feiner B., Jelovsek J. E., Maher C. Efficacy and safety of transvaginal mesh kits in the treatment of prolapse of the vaginal apex: a systematic review.//BJOG. – 2009. – 116 (1): 15–24.
6. Iglesia C. B., Sokol A. I., Sokol E. R. et al. Vaginal mesh for prolapse: a randomized controlled trial.//Obstet Gynecol. – 2010. – 116 (2 Pt 1): 293–303.
7. Fan H. L., Chan S. S., Cheung R. Y., Chung T. K. Tension-free vaginal mesh for the treatment of pelvic organ prolapse in Chinese women.//Hong Kong Med J. – 2013. – 19 (6): 511–7.
8. Collinet P., Belot F., Debodinance P. et al. Transvaginal mesh technique for pelvic organ prolapse repair: mesh exposure management and risk factors.//Int. Urogynecol J Pelvic Floor Dysfunct. – 2006. – 17 (4): 315–20.
9. Deffieux X., Letouzey V., Savary D. et al. Prevention of complications related to the use of prosthetic meshes in prolapse surgery: guidelines for clinical practice.//Eur J Obstet Gynecol Reprod Biol. – 2012. – 165 (2): 170–80.
10. Withagen M. I., Milani A. L., den Boon J. et al. Trocar-guided mesh compared with conventional vaginal repair in recurrent prolapse: a randomized controlled trial.//Obstet Gynecol. – 2011. – 117 (2 Pt 1): 242–50.
11. Hviid U., Hviid T. V., Rudnicki M. Porcine skin collagen implants for anterior vaginal wall prolapse: a randomised prospective controlled study.//Int Urogynecol J Pelvic Floor Dysfunct. – 2010. – 21 (5): 529–34.

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Effects of long-term treatment with Bisoprolol and Carvedilol on quality of life of patients with chronic heart failure

Abstract: The purpose of the present research was to study the assess the impact of bisoprolol and carvedilol on quality of life of patients with chronic heart failure (CHF). Long-term treatment with beta-blockers has a positive effect on the parameters of the quality of life in patients with CHF.

Keywords: chronic heart failure, quality of life, beta-blockers, long-term treatment.

Chronic heart failure (CHF) is not only a medical but also a social challenge due to significant prevalence, high mortality rates [1; 2]. Myocardial infarction (MI) is one of the main causes of HF. Despite the large number of studies on prognosis after myocardial infarction, heart failure in the literature still debated question of the prognostic significance of a number of indicators: postinfarction remodeling with the assessment of systolic and diastolic left ventricular function, myocardial viability, heart rhythm disorders, vascular remodeling, neurohumoral factors, which largely determine the severity of the clinical course, prognosis and the quality of life of patients [3; 4; 5]. This pathology sharply worsens the quality of life of patients and increases the risk of death in 4 times: it can vary from 15 to 50 % during a year. The risk of sudden death in patients with CHF is 5 times higher than in those without heart failure [6; 7]. About 50 % of patients with CHF, despite the use of combination therapy, die within 5 years after the onset of clinical symptoms [8; 9]. Use of beta-blockers opened a new era in treatment of CHF patients. Many studies, including long-term multicenter studies, determined that this drug group has a positive impact on the clinical course, the quality of life, and the prognosis of post-MI patients and patients with heart failure [10; 11].

The aim of the research: to study the comparative effectiveness of prolonged use of beta-blockers: cardioselective — bisoprolol and non-selective carvedilol with α1-, β1- and β2-blocking properties on clinical course and the quality of life in patients with chronic heart failure during long-term follow-up.

Materials and Methods. The study included 172 male patients post-MI patients with CHF between the ages of 40 to 55 (mean age 47.7 ± 6.1 yrs), who were treated at the cardiology department of Tashkent Medical Academy. Patients were randomized into groups with CHF functional class (FC) by the New York Heart Association (NYHA) classification according to 6-minute walk distance (6 MWD) and the Russian scale of evaluation of the clinical condition of the patients (Mareev V. Yu., 2000). All patients were divided into three groups by functional class (FC) CHF: 35 patients with CHF I FC, 70 patients with CHF II FC and 75 patients with CHF III FC.

We reviewed the quality of life (QoL) in patients with chronic heart failure by the Minnesota Living with Heart Failure questionnaire (MLHFQ), suggested by T. Rector and J. Cohn (1985). The symptoms were assessed by 0–4 score, where 0 — no symptoms, 4 — its maximal occurrence. Functional status of the patient was assessed by DASI (The Duke Activity Status Index,1989), the total of indicators of which was named by authors as an index of activity. Questionnaires screened originally after 6 months of treatment. There considered the total of scores on each questionnaire within the clinical course.

To assess the dynamics of the studied parameters during long-term therapy with beta-blockers, patients were divided into 2 groups: in 1st group — 83 patients who received beta-blocker — bisoprolol in the complex treatment, in 2nd group — 89 patients who received carvedilol, nonselective beta-blocker with α1-, β1-and β2-blocking properties. The mean daily dose of bisoprolol given to Group 1 patients was 10 mg.; the mean daily dose of carvedilol in Group 2 patients ranged from 25 to 50 mg. The standard therapy includes spironolactone, ACE inhibitors, antiplatelet agents. Exclusion criteria were diabetes, atrial fibrillation, COPD, asthma, and acute stroke.

Results were statistically processed using the software package Statistica 6.1 for Windows and the Excel package of Microsoft Excel 2007. The mean (M) and Standard Deviation (SD) were deduced. For data with normal distribution, inter-group comparisons were performed using Student's t-test and F-test. The mean (M) and standard error of the mean (m) were calculated. Pearson's Correlation Coefficient (r) was used to determine the strength of the relationship between the two continuous variables. Spearman's rank correlation coefficient was also used. A probability value of $P < 0.05$ was considered statistically significant.

Results and Discussion. Evaluation of clinical status and quality of life (QoL) of patients after myocardial infarction. Indicators of exercise tolerance in patients examined in patients with CHF FC I made based on the results of 6MWD were 417.4 ± 17.89 meters. Patients with CHF FC II and III showed a decrease in exercise tolerance by 18 % and 44 % as compared with the patients with CHF 6MWD FC I, representing 346.1 ± 19.25 and 237.9 ± 20.55 meters, respectively.

Baseline values of SCC in the patients with CHF FC I made 4.4 ± 1.33 scores, respectively. In patients with heart failure class II worsened clinical status of patients with increased performance SCC by 25 % compared with patients with CHF of I FC SCC (P < 0.001), accounting for 5.5 ± 0.70 scores, respectively. In patients with CHF FC III, this indicator was — 8.4 ± 0.83 scores or 90 % higher compared to SCC in patients with CHF FC I.

Baseline values QoL by the Minnesota questionnaire showed that the total index in patients with CHF FC I amounted — 26.5 ± 2.21 scores, in patients with class II CHF — 39.1 ± 3.23 and III CHF FC — 45.6 ± 2.75 scores, while it was significantly inversely correlated with the results obtained during 6MWD (r = –0.92). Baseline values of the total QoL index increases with CHF FC.

Analysis of ejection fraction (EF), 6 MWD and QoL parameters showed authentic direct dependence distance of 6 MWD from EF (r = 0.953), high inverse correlation between EF and QoL index by Minnesota questionnaire (r = –0.934).

Quality of life and prognosis of patients with CHF complicated by heart failure during long-term follow-up. The results of parameter estimation for the Minnesota QoL questionnaire in the surveyed patients showed that in patients treated with bisoprolol showed statistically significant reduction in the total index of QoL in patients with CHF FC I 31 % (P < 0.01) and CHF FC II — 34.9 % (P < 0.001) after 6 months of treatment, respectively, compared with baseline. Long-term therapy with bisoprolol in patients with FC III CHF accompanied by a decrease QoL index by 29.7 % (P < 0.05) at 6 months compared with baseline.

The results of parameter estimation for the Minnesota QoL questionnaire in the surveyed patients showed that in patients treated with carvedilol showed statistically significant reduction in the total index of QoL in patients with CHF FC I 33 % (P < 0.001) and CHF FC II — 36.8 % (P < 0.001) after 6 months of treatment, respectively, compared with baseline. Long-term therapy with carvedilol in patients with FC III CHF accompanied by a decrease QoL index by 40.1 % (P < 0.001) at 6 months compared with baseline.

The course of bisoprolol allowed significantly increase the activity index in patients with CHF FC I after 6 months of 25.3 % (P < 0.001) compared with baseline. In patients with heart failure class II after 6 months of treatment indicators of functional activity increased 2.4 times, accounting for 123 % of baseline (P < 0.001). An index of activity in patients with FC III heart failure increased by 131 % (P < 0.001) after 6 months of treatment, respectively, compared with baseline.

In the carvedilol group also noted the positive dynamics in the activity index in patients with CHF FC I by 31 % (P < 0.001) after 6 months of treatment, respectively, from the original. After six months therapy with carvedililol in patients with class II CHF indicators of functional activity increased 2.8 times, amounting to 26.9 % (P < 0.05) from baseline. In dynamics of observation after 6 months in patients with FC III CHF refractive functional activity by DASI questionnaire increased — by 39.1 % (P < 0.001), respectively, from baseline.

We evaluated the forecast in the studied groups of patients. The analysis showed that in 3 years of follow-noted development reinfarction in 38 (22.1 %) cases, including 12 fatal and nonfatal 26, and 11 cases of sudden death.

Conclusion. Long-term treatment with beta-blockers has a positive effect on the parameters of the quality of life in patients with CHF.

References:

1. Gheorghiade M., Vaduganathan M., Fonarow G. C., Bonow R. O. Rehospitalization for heart failure: problems and perspectives.//J Am Coll Cardiol. – 2013. – 61 (4): 391–403.
2. Ahmed A., Allman R. M., Fonarow G. C. Incident heart failure hospitalization and subsequent mortality in chronic heart failure: a propensity-matched study.//J. Card. Fail. – 2008. – № 14. – P. 211–218.
3. Dunlay S. M., Weston S. A., Killian J. M. et al. Thirty-day rehospitalizations after acute myocardial infarction: a cohort study.//Ann Intern Med. – 2012. – № 1. –P. 11–18.
4. Engelfriet P. M., Hoogenveen R. T., Boshuizen H. C., Baal van P. H. To die with of from heart failure: a difference that counts: is heart failure underrepresented in national mortality statistics?//Eur J Heart Fail. – 2011. – (13): 377–38.
5. Habal M. V., Liu P. P., Austin P. C. et al. Association of heart rate at hospital discharge with mortality and hospitalizations in patients with heart failure.//Circ Heart Fail. – 2014. – № 7. – P. 12–20.
6. Iqbal J., Francis L., Reid J. et al. Quality of life in patients with chronic heart failure and their carers: a 3-year follow-up study assessing hospitalization and mortality.//J Heart Fail. – 2010, Sep. –12 (9): 1002–8.
7. Kato N., Kinugawa K., Seki S. et al. Quality of life as an independent predictor for cardiac events and death in patients with heart failure.//Circ J. – 2011. – 75 (7): 1661–9.
8. Yamokoski L. M., Hasselblad V., Moser D. K. et al. Prediction of rehospitalization and death in severe heart failure by physicians and nurses of the ESCAPE trial//J Card Fail. – 2007. – № 13. – P. 8.
9. Maggioni A. P., Anker S. D., Dahlström U. et al. Are hospitalized or ambulatory patients with heart failure treated in accordance with European Society of Cardiology guidelines? Evidence from 12,440 patients of the ESC Heart Failure Long-Term Registry.//J Heart Fail. – 2013. – Vol. 15. – P. 1173–1184.
10. Van der Leeuw J. Personalized cardiovascular disease prevention by applying individualized prediction of treatment effects.//Eur Heart J. – 2014. – № 13. – P. 837–843.

11. Wikstrand J., Wedel H., Castagno D., McMur-ray J. J. The large-scale placebo-controlled beta-blocker studies in systolic heart failure revisited: results from CIBIS-II, COPERNICUS and SENIORS-SHF compared with stratified subsets from MERIT-HF.//J Intern Med. – 2014. – Vol. 275, № 2. – P. 134–143.

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Comparative efficacy emergency endoscopic sclerotherapy in the treatment of bleeding from the varices of esophagus and stomach. The urgency of the problem

Abstract:

Purpose: Evaluating the effectiveness of endoscopic sclerotherapy of the varicose veins in patients with portal origin bleeding from esophagus and stomach in different periods.

Results of treatment: In 108 patients with complicated liver cirrhosis with portal hypertension (PH) and bleeding from varicose veins (VV) in esophagus and stomach that were hospitalized into the 2nd clinic of the Tashkent Medical Academy in 2008–2011.

For a comparative analysis all the patients were divided into 2 groups. Control group consisted of 57 (52.7 %) patients with esophageal and gastric bleeding from VV, who delayed endoscopic sclerotherapy 2–3 days after admission, controlled bleeding with Blackmore probe obturator and performed intensive conservative therapy. The study group included 51 (47.3 %) patients with esophageal and gastric bleeding from VV, who performed emergency endoscopic sclerotherapy after admission at an altitude of bleeding or even stopped the bleeding in the event of a subsequent installation of Blackmore probe.

Recurrence of bleeding contained in 8 (15.7 %) patients. It should be noted that rebleeding observed only in patients with grade III varices with the transition into the stomach, while the control group of patients with recurrent bleeding heterogeneous in degree of varicose veins.

6 patients underwent re-sclerotherapy with the installation of the probe-obturator. In 2 patients performed operation by Sugiura due to profuse bleeding.

The mortality rate was 11.8 % (6 patients). In 1 patient the cause of death was the hemorrhagic shock in 4 — progressive liver failure. After surgery, the patient 1 Sugiura died as a result of hepatorenal syndrome and multiple organ failure.

During the 1-year because of recurrent bleeding re-hospitalized patients 2, both made emergency sclerotherapy, thereby achieved hemostasis.

The effectiveness of endoscopic sclerotherapy in the main group reached 84.3 %.

Keywords: portal hypertension, varicose veins of esophagus, endoscopic sclerotherapy, liver failure.

Despite the increasing quality of life, continuous improvement of methods of diagnosis and treatment, the incidence of cirrhosis of the liver has no downward trend. Portal hypertension (PH) syndrome in cirrhosis leads to the development of serious, sometimes fatal complications, such as bleeding from varicose veins of the esophagus and stomach, liver failure (LF), ascitic syndrome and hepatic encephalopathy [1, 9]. Bleeding from varicose veins (VV) — one of the most difficult, dangerous and difficult to forecast complications, which often leads to death. Patients die of acute and chronic posthemorrhagic anemia, progression of LF [8].

The introduction of new and improvement of existing minimally invasive endoscopic hemostasis opened a new page in dealing with esophageal-gastric bleeding portal genesis [6; 10]. According to various sources, the rate of achieving hemostasis at active bleeding greater than 90 % and the mortality rate is reduced to 15 % [7]. In addition, the proven efficacy of endoscopic methods in the prevention

of recurrence of bleeding from VV of the esophagus and stomach [8].

The survival rate of patients with acute esophageal-gastric bleeding of portal origin being treated using minimally invasive endoscopic techniques are significantly higher at all stages of observation comparable to patients receiving treatment as conservative therapy in conjunction with the installation of the probe of Blackmore [4]. However, despite the large number of studies on this issue, there is no precise definition of the terms of application of endoscopic methods of hemostasis.

In this regard, we decided to determine the timing of endoscopic sclerotherapy for bleeding from VV of the esophagus and stomach.

Purpose of the research. To evaluate the effectiveness of endoscopic sclerotherapy of the VV of esophagus and stomach in patients with bleeding of portal hypertension in different periods.

Materials and methods. Results of treatment of 108 patients with liver cirrhosis complicated by PH and bleeding from VV esophagus and stomach that were hospitalized at the 2nd clinic of the Tashkent Medical Academy between 2008–2011 years. The average age was 45.7 ± 18.8 years. Among them 71 patients were male. We had a history of bleeding in 37 % of patients. The duration of the bleeding continued about 12.8 ± 5.2 hours. Ascites was observed in 67 % of patients, some of them had ascites of resistant character. To assess the severity of liver failure used the classification of Child-Turcotte-Pugh. Expression and dissemination of VV of esophagus and stomach was evaluated by classification of N. Soehendra, K. Binmoeller.

For a comparative analysis all the patients were divided into 2 groups. Control group consisted of 57 (52.7 %) patients with bleeding from esophageal and gastric VV, who underwent delayed endoscopic sclerotherapy 2–3rd day after admission, stopped bleeding with Blackmore probe obturator and intensive conservative therapy. The study group included 51 (47.3 %) patients with bleeding from esophageal and gastric VV, who underwent emergency endoscopic sclerotherapy after admission at an altitude of bleeding or even stopped bleeding in the event of a subsequent installation of Blackmore probe.

The status of all patients was assessed as heavy, due to which they were admitted to the surgical intensive care department. In order to monitor all patients underwent a comprehensive study, including general clinical, laboratory and special instrumental methods (Table 1).

Table 1. – Clinical characteristic of the patients, n = 108

Clinical criteria	Control group	Main group
Number of patients	57	51
Gender (m/f)	38/20	33/17
Age	45.7 ± 18.3	40.2 ± 19.5
Laboratory analyses		
Hb, g/l	61.6 ± 23.2	69.5 ± 18.5
Ht, %	16.9 ± 7.6	18.4 ± 5.8
Protrombine time, %	73.2 ± 21.9	72.9 ± 20.4
Common bilirubin, μmol/l	35.4 ± 7.4	34.9 ± 9.2
Liver failure by Child –Turcotte- Pugh (A/B/C)	6/32/19	3/27/21
Degree of VV of esophagus and stomach (%)		
II	15 (26.3)	10 (19.6)
III	23 (40.3)	24 (47.0)
III with passing to the stomach	19 (33.4)	17 (33.4)

The technique of sclerotherapy — the procedure was performed in the endoscopic room using a fiber-optic endoscopy, endoscopic instruments firm Olympus, endoscopic injector. Emergency endoscopic sclerotherapy was carried out after a gastric lavage, delayed — after stopping the bleeding with Blackmore probe. We used intravasal and paravasal sclerotherapy with a solution of 1 % polydacanol. During one session of endoscopic sclerotherapy administered 15–18 ml. of 1 % sclerosant into two or three varicose veins. The drug is injected below the bleeding. Reintroducing sclerosants to other varicose veins of the esophagus was performed at intervals of 3–4 days. Endoscopic treatments were carried out in parallel with intensive conservative therapy.

Results of the research

To evaluate the results of treatment, we studied the frequency of recurrent bleeding, rate of complications and mortality in the early postoperative period.

In the control group treatment policy is to temporarily stop the bleeding by placing the Blackmore probe. Intensive therapy was carried out for 24–72 hours. At 2–3 day the Blackmore probe and performed endoscopic sclerotherapy.

Prolonged staying of Blackmore probe in the esophagus in patients of the control group resulted in the development of bronchopulmonary complications, inflammation of the sinuses and the oropharynx. In 10.5 % of patients had a pronounced swelling of the epiglottis, which greatly complicated the conduct of endoscopic intervention. Prolonged staying of Blackmore probe caused pressure sores and ulcers of cardioesophageal zone in 5 % of patients, marked inflammation in 27 (47.4 %), which not only complicate the conduct of sclerotherapy, but also caused a marked bleeding at the puncture site in 16 patients. This required a long pressure of the distal end of the instrument on the puncture site or re-install the Blackmore probe 8.8 % of patients, as well as

the introduction of additional volume of sclerosant at 7 %, which also negatively affected the results of sclerotherapy. This caused a pronounced inflammation of the entire esophageal wall and led to the development of pleurisy in 10 (17.5 %) patients. The development of bronchopulmonary complications in the long-term presence of the Blackmore probe also exacerbates the PN, which contributed to the progressive development of hepatorenal syndrome with severe encephalopathy in 0.7 % of patients.

All patients after sclerotherapy felt slight pain in the epigastric region, which was associated with the development of the inflammatory process in the entered sclerosant.

In 1 patient during sclerotherapy of esophageal perforation occurred in connection with what has been undertaken emergency surgery.

Recurrence of bleeding in the hospital came in 13 (12.8 %) patients. 11 of them made repeated sclerotherapy with the installation of the probe Blackmore, 2 because of the inefficiency of endoscopic hemostasis and install Blackmore probe azigoportal separation operation is performed on the type of Sugiura.

The average number of hospital days was equal to 10.1 ± 2,4.

The mortality rate was 19.3 % (11 patients). In one case, death occurred as a result of purulent mediastinitis developed after surgery undertaken on the perforation of the esophagus. As a result, three died of hemorrhagic shock patient. After surgery of Sugiura 1 patient developed postoperative wound eventration, suture failure. The patient is taken to a second operation, but postoperative death occurred as a result of multiple organ failure. Another patient developed postoperative Sugiura myocardial infarction complicated by cardiogenic shock. The other 5 patients died from progressive LF.

Within 1 year after discharge repeatedly for recurrent bleeding hospitalized in 9 patients. Management of patients was identical to that described. 1 patient due to the inefficiency of the operation performed endoscopic hemostasis Sugiura. 1 patient died due to multiple organ failure.

Thus, the effectiveness of sclerotherapy in the control group was 77.2 %.

Critical analysis of the unsatisfactory results of treatment of patients in the control group showed that, firstly, a temporary stop bleeding Blackmore probe created unfavorable conditions (mucosal edema, pressure sores, ulceration, inflammatory infiltration of the walls of the esophagus, etc.) for later execution sclerotherapy. Second, using a Blackmore probe reached a temporary stop bleeding. However, during this time there was an increase of portal pressure with an increase in esophageal varices, which also created unfavorable conditions for the technical implementation of sclerotherapy (active bleeding at the puncture site, an increase of sclerosant, etc.).

With this in mind, we decided to perform endoscopic sclerotherapy esophageal varices urgently, at the time of admission of patients to the hospital, as VV reducing during a recent or ongoing bleeding creates favorable conditions for the technical implementation of sclerotherapy. After the installation of the Blackmore probe sclerotherapy limited time 6–12 hours obturationof the veins of esophagus and stomach, or installing a nasogastric tube to control.

Patients of the main group were in the hospital an average of 7.1 ± 2.5 bed-days.

Considering that the patient was placed Blackmore probe for a short period, complications such as inflammation of the lining of the esophagus, swelling of the epiglottis and deep ulcers and pressure ulcers of the esophagus were observed. This allowed us to successfully carry out the rest of repeated sclerotherapyof the esophageal varices, which was carried out on 3–4 th day.

During the endoscopy at 72.5 % of the patients showed an active, ongoing bleeding. This situation required the introduction of additional sclerosant around the bleeding veins. Despite this, the active bleeding from the injection point was observed only in 7.8 % of patients. Given that these patients had esophageal VV III degree with the transition into the stomach after sclerotherapyBlackmore probe was set for up to 12 hours. In 2 patients developed pleural effusion in 7.8 % observed transient dysphagia.

Recurrence of bleeding originated in 8 (15.7 %) patients. It should be noted that rebleeding observed only in patients with grade III varices with the transition into the stomach, while the control group of patients with recurrent bleeding heterogeneous in degree of varicose veins.

6 patients underwent repeat sclerotherapy with the installation of the probe-obturator. In 2 patients due to profuse bleeding operation is performed Sugiura.

The mortality rate was 11.8 % (6 patients). In 1 patient the cause of death was the hemorrhagic shock in 4 — progressive liver failure. After surgery, the patient 1 Sugiura died as a result of hepatorenal syndrome and multiple organ failure.

During the 1-year because of recurrent bleeding re-hospitalized patients 2, both made emergency sclerotherapy, thereby achieved hemostasis.

The effectiveness of endoscopic sclerotherapy in the main group reached 84.3 %.

Discussion

Bleeding from VV esophagus and stomach — life-threatening complication of portal hypertension, in which 6 weeks after admission killed more than one-third of patients [8, 10]. Active bleeding from the esophagus and stomach VV is the urgent problems of modern endoscopic surgery [2; 4].

The main issue that remains controversial is the deadline for the sclerotherapy: some authors hold emergency sclerotherapy, while others prefer to conduct sclerotherapy after installation of the Blackmore probe and stabilize the patient's condition [1; 2; 3; 8]. According to some reports, conducting emergency sclerotherapy is difficult due to low bleeding vessel visualization during active bleeding, although the frequency of postoperative complications and recurrence of bleeding is significantly reduced, and the patient's general condition improves. Efficacy emergency sclerotherapy varies from 75 to 90 % [1; 3].

Our results showed that the holding emergency sclerotherapy in the treatment of patients with gastroesophageal VV complicated by bleeding, is significantly more effective than sclerotherapy Blackmore probe after installation.

When analyzing the complications seen that the number of complications resulting from sclerotherapy higher in the group where it was held in a delayed manner. This is due to long-term presence of the probe-obturator (Table 2).

Table 2. – Complications in the groups, %

Complication	Control group, n = 57	Main group, n = 51
Edema of epiglotis	5.3	–
Deep ulcers	8.8	–
Pleuritis	12.3	3.9
Perforation of the esophagus	1.9	–
Active bleeding from the place of injections	28.1	7.8
Dysphagia (transitor)	19.3	7.8
Recurrence of bleeding	22.8	15.7

One of the main problems in the treatment of patients with esophageal and gastric VV is the occurrence of relapses [3; 8]. According to our data, relapse after emergency sclerotherapy occurred in 15.7 % of patients, and delayed after sclerotherapy — at 22.8 %. This is due to the fact that during the delayed sclerotherapy patients underwent intensive infusion therapy, which leads to increased blood volume, resulting in portal pressure also rises, the walls of VV esophagus and stomach tighten and become thinner. This clearly complicates the sclerotherapy, especially with III degree of varicose veins. Although above the injection creates a cushion ethanol, but the high rate of blood flow in the varicose vein does not allow the sclerosant to focus at the desired location, and part of it stems from the puncture site, and the rest of the mass leaves the bloodstream.

The amount of sclerosing agent introduced during emergency sclerotherapy was significantly less than when delayed, so that the pressure due to a decrease in portal vein system at active bleeding [9; 11].

According to international data, the use of emergency sclerotherapy reduces the duration of hospital stay doubled [7]. In our study, these data are confirmed: the number of bed-days decreased from 10.1 ± 2.2 to 7.1 ± 2.5 (Table 3).

Table 3. – Results of treatment of the patients with the bleeding from the VV of esophagus and stomach

Clinical criteria	Control group, n = 57	Main group, n = 51
Number of days	10.1 ± 2.2	7.1 ± 2.5
Number of sessions during the stationary treatment	2.3 ± 0.7	2.1 ± 0.4
Mortality, %	19.3	14.0
Effectiveness of the bleeding stopping, %	77.2	84.3

According to some authors, a clear correlation between the number of deaths and timing of sclerotherapy is not [4; 10]. When considering the structure of deaths shows that the number of deaths from progression of Mo in the two groups was the same, but deaths due to hemorrhagic shock in the study group was 1.9 % and 5.2 % in the control.

Survival analysis according to functional class showed that functional status at the start of the treatment plays an important role in the prognosis of survival and life expectancy of patients with liver cirrhosis after various interventions. Treatment of patients with bleeding portal genesis the more effective the more preserved functional capacity of the liver and the earlier it is started [12]. However, a high percentage of post-operative recurrence of bleeding in the immediate and long-term period, and the progression of edematous-ascitic syndrome forces the use of different endovascular interventions portal system in patients with portal hypertension after endoscopic.

Thus, the bleeding from the VV esophagus and stomach is one of the main problems of surgical hepatology. Although previous studies have indicated a significant difference in the results and delayed emergency sclerotherapy, our findings suggest the benefits of emergency intervention. Based on the available data and the results of our study emergency sclerotherapy can be recommended as the first line of action in the treatment of patients with esophageal and gastric VV.

Conclusions

1. To conduct delayed sclerotherapy of VV of esophagus and stomach is difficult due to the long-term presence of the probe Blackmore, which leads to the development of inflammation of the mucous of cardioesophageal zone, pressure sores, ulcers, increased bleeding from the puncture site.
2. The urgent endoscopic sclerotherapy in patients with VV of esophagus and stomach compared with delayed sclerotherapy delayed reduced the number of relapses, from 22.8 to 15.6 % and increased the effectiveness of treatment from 77.2 to 84.3 %, and reduced duration of hospital stay from 10.1 ± 2.2 to 7.1 ± 2.5 bed-days.
3. Conduction of an emergency endoscopic sclerotherapy has reduced the mortality rate from 19.3 to 11.8 %.
4. The most important prognostic factor for survival in patients who have had bleeding of portal genesis is that they

belong to functional class Child-Turcotte- Pugh and the development of recurrent bleeding.

5. Endoscopic intervention is a treatment to stop the bleeding, but for the prevention of recurrent bleeding and liver failure requires the use of decompressive endovascular interventions in patients with bleeding of the esophagus and stomach VV.

References:

1. Albillos A., Tejedor M. Secondary prophylaxis for esophageal variceal bleeding.//Clin Liver Dis. – 2014, May. – 18 (2): 359–70. PubMed PMID: 24679500.
2. Biecker E. Portal hypertension and gastrointestinal bleeding: diagnosis, prevention and management.//World J Gastroenterol. – 2013, Aug 21. – 19 (31): 5035–50. PubMedCentral PMCID: PMC3746375.
3. Cárdenas A., Fernández-Simon A., Escorcell A. Endoscopic band ligation and esophageal stents for acute variceal bleeding.//Clin Liver Dis. – 2014, Nov. – 18 (4): 793–808. PubMed PMID: 25438284.
4. Coelho F. F., Perini M. V., Kruger J. A., Fonseca G. M., Araújo R. L., Makdissi F. F., Lupinacci R. M., Herman P. Management of variceal hemorrhage: current concepts.//Arq Bras Cir Dig. – 2014 Apr-Jun. – 27 (2): 138–44. PubMed PMID: 25004293.
5. Garcia-Pagán J. C., Barrufet M., Cardenas A., Escorsell A. Management of gastric varices.//Clin Gastroenterol Hepatol. – 2014, Jun. – 12 (6): 919–28. PubMed PMID: 23899955.
6. Garcia-Tsao G., Bosch J. Management of varices and variceal hemorrhage in cirrhosis.//New Engl. J. Med. – 2010. – Vol. 362. – P. 823–832.
7. Gonzalez R., Zamora J., Gomez-Camarero J. et al. Metaanalysis: combination endoscopic and drug therapy to prevent varicealrebleeding in cirrhosis.//Ann. Intern. Med. – 2012. – Vol. 149. – P. 109–122.
8. Herrera J. L. Management of acute variceal bleeding.//Clin Liver Dis. – 2014, May. – 18 (2): 347–57. PubMed PMID: 24679499.
9. North Italian Endoscopic Club for the Study and Treatment of Esophageal Varices. Prediction of the first variceal hemorrhage in patients with cirrhosis of the liver and esophageal varices. A prospective multicenter study.//New Engl. J. Med. – 2011. – Vol. 319. – P. 983–989.
10. Orloff M. J., Hye R. J., Wheeler H. O., Isenberg J. I., Haynes K. S., Vaida F., Girard B., Orloff K. J. Randomized trials of endoscopic therapy and transjugular intrahepatic portosystemic shunt versus portacaval shunt for emergency and elective treatment of bleeding gastric varices in cirrhosis.//Surgery. – 2015, Jun. – 157 (6): 1028–45. PubMed PMID: 25957003.
11. Triantos C., Goulis J., Burroughs A. K. Portal hypertensive bleeding//J. W. D. McDonald et al; eds. Evidence-Based Gastroenterology and Hepatology. – 3rd ed. Hoboken. – N. Y.: Wiley-Blackwell, 2010. – P. 562–602.
12. Triantos C., Kalafateli M. Endoscopic treatment of esophageal varices in patients with liver cirrhosis.//World J Gastroenterol. – 2014, Sep 28. – 20 (36).

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Clinical and diagnostic features of the infectious lesions of the central nerve system in hiv-infected patients

Abstract: Among the observed patients the dominant route of transmission of human immunodeficiency virus (HIV) infection was injecting. The most wide-spread reason of the infection central nervous system (CNS) in HIV-positive patients was Epstein-Barr virus, Toxoplasmosis and Mycobacterium tuberculosis. The disease developed mostly in young patients, regardless of gender. Infectious lesions CNS in HIV-positive patients progressed gradually as well as advanced against the background of clinically sthenic immunodeficiency.

Keywords: HIV-positive patients, immunodeficiency virus, Epstein-Barr.

HIV infection — a viral disease characterized by aggravating steadily, leading to destruction of the immune, nervous and other systems of the body with the development of acquired immunodeficiency syndrome (AIDS) [1; 2; 4].

The affection of the nervous system occurs at any stage of HIV infection: in the subclinical phase — 20.0 %, in the advanced stage of the disease — 40–50 %, in the final stages — at 30–90 % [4; 5; 6]. Immunodeficiency virus circulates in the organism clinically unsuspected over a long period. In seroconversion phase virus penetrates to the blood-brain barrier and involves various brain structures. In the most cases virus affects the white matter, oligodendroglial cells and astrocytes [3]. Lesion of nervous system in HIV infection and AIDS are diverse and can be found in 50–80 % patients, especially 10–45 % of patients present neurological symptoms in onset of a disease.

Material and methods. Total 82 HIV-infected patients have been examined. The etiologic agent was determined by examining of cerebrospinal fluid by polymerase chain reaction (PCR) for the occurrence of DNA fragments of the herpes virus types 1, 2, 3, and 6; cytomegalovirus; Epstein-Barr virus (EBV), and Toxoplasmosis. To confirm the etiology of CNS tuberculosis was applied microscopic and microbiological laboratory methods.

The results and discussion. The amount of HIV-infected patients with CNS was 80, average age was 35.7 ± 1.3 years, among whom men were 45 (54.9 %) and women were 37 (45.1 %). HIV-infectious as etiological factors of CNS was established in 48 (58.5 %) patients. The etiology of the disease was not detected in 34 (41.4 %) patients.

The investigation of medical history assigned that in all patients disease began gradually. After the manifestation of the disease, the average time of hospitalization was 42 days.

Majority patients were admitted to hospital in a medium condition — 48 (60.0 %), in severe condition — 28 (35.0 %). Impairment of consciousness was observed in 24 (30.0 %) patients. The severity of the disease depended on the degree of intoxication and immunodeficiency, the severity of neurological symptoms as well as the development of complications such as edema, swelling of the brain, which was the direct cause of the death. The mortality rate was high — 15 (18.6 %).

73 (91.3 %) patients complained of general weakness; headache — 70 (87.5 %), which was often diffuse and augmented in the evening. Intensive headache accompanied by nausea — in 31.3 % of cases, vomiting — up to 52.5 % of cases. Dizziness was noticed in 85.0 % of patients.

Intensity of intoxication syndrome manifested by variegated fever. In details, 42.5 % of patients had febrile and sub febrile temperature.

The examination established disturbances in the orientation of the place, time and person, from 28.8 to 35.0 % of patients. Only 21.3 % of patients had disorders of supreme integrative functions such memory loss. Psychiatric dysfunctions occurred in 17.5 % of patients.

Meningeal syndrome transpired as nuccal rigidity in 88.8 % of patients; Kernig's sign — at 56.3 % and Brudzinski's sign — at 7.5 % of patients.

Movement disorders namely hemiparesis, paraparesis and tetraparesis were observed in all groups of patients (27.5 %). Epileptiform syndrome was considered in 2 (2.5 %) patients. Moreover, 27.5 % of the patients had pyramidal pathway symptoms indicating the severity of brain damage which was connected with nerve-point changes in brain tissue.

Cranial nerves *(II–VII, IX, XII)* dysfunction was diagnosed, as a consequence of implicating of the brain stem. For instance, 10 % of patients suffer from decreasing acuity of vision; 17.5 % patients had bulbar syndrome. Vestibular-ataxic syndrome was common and manifested in the form of dizziness in 82.5 %, unsteadiness walk — 60.0 %, imbalanced in Romberg's test –51.3 % of patients.

Primary neuro-AIDS determined by the influence of HIV occurred in various clinical HIV forms: AIDS dementia (HIV encephalopathy), meningitis or meningoencephalitis, vascular neuro-AIDS, vacuolar myelopathy by type ascending or transverse myelitis, symmetrical distal sensory polyneuropathy chronic inflammatory demyelinating polyneuropathy, acute inflammatory demyelinating polyneuropathy (AIDP) by type of Guillain-Barre syndrome, encephalomyelopolyneuropathy ALS-like syndrome (ALS, amyotrophic lateral sclerosis)

X-ray examination in the third group of patients revealed specific inflammation of the lungs in 75 % cases, which leaded to the assumption of CNS tuberculosis.

Disquisition of immune status: in all groups of patients the level of CD4+ cells was less than 100 in 1 ml. Thereby, the average amount of CD4+ cells in the first group was 49 in 1 mkl., the 2nd — 55 in 1 mkl., 3 rd — 91 in 1 mkl.

Conclusions

The clinical presentation of the infectious lesions of CNS in HIV-positive patients has the specific features depending on the etiologic factor. The comprehensive examination of the neurological status of the patient as well as consideration of all discrete symptoms will assist to doctors to prognosticate particular etiology of CNS and administer early causal treatment. Furthermore, findings from the clinical examination and PCR tests of the spinal fluid can be estimated as a significant diagnostic approach on the validation the etiology of CNS.

References:

1. Евтушенко С. К., Деревянко И. Н. Диагностика и лечение поражений нервной системы у ВИЧ-инфицированных лиц при первичном и вторичном нейроСПИДе: метод. рекомендации. – Донецк, 2001. – С. 36.
2. Ермак Т. Н., Перегудова А. Б., Груздев Б. М.//Тер. архив. – 2006. – № 1. – С. 80– 81.
3. Леви Д. Э. ВИЧ и патогенез СПИДа. – 2010. – С. 736.
4. Gongora-Rivera F., Santos-Zambrano J., Moreno-Andrade T. The clinical spectrum of neurological manifestations in AIDS patients in Mexico.//Arch Med Res. – 2000. – Vol. 31. – P. 393–8.

5. Bartt R. E. The Neurology of AIDS.//JAMA. – 2006. – Vol. 295. – 331 p.
6. Sacktor N., Lyles R. H., Skolasky R. HIV-associated neurologic disease incidence changes: Multicenter AIDS Cohort Study, 1990–1998//Neurology. – 2001. – Vol. 56. – P. 257–60.

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Estimation of haemocoagulation state in dynamics and risk factors of thrombotic complications at women with uterine myoma exposed to the surgical treatment

Abstract: In purpose on to estimate of influence of the operative treatment to the haemocoagulation and to the risk of developing of thrombosis at women with uterine myoma we have carried out retrospective research of case histories of woman operated concerning a uterine myoma. The received results shown, that the surgical trauma directly influences increases of coagulation and thrombogen potential of blood aggravating a condition of hemostasis at women on the post operative period. Postoperative period complicated with deep vein thrombosis at 2 women from group II on the 27th day after discharging from hospital, and at 3 there is occurred secondary adhesion of postoperative wound. Women are elderly after 40 years are believe in thrombotic dangerous, carrying out of the expanded operative interventions allows to note them high group of the risk of development of thrombotic complications, demanding corresponding specific thromboprophylaxis. Thus, preventive maintenance with UFH at the present contingent patients does not allow to the result of coagulation potential in initial level, which at them were before operation.

Keywords: uterine myoma, hemostasis, thromboembolia.

Introduction. Treatment of myoma at all stages of development of medicine caused multiple discussions. The basic method of treatment of uterine myoma is the combination of conservative and surgical interventions. However, despite productive enough conservative methods, frequency of radical operations remains is high and makes 80 % [4]. Also it is more increases frequency of postoperative thrombotic complications among patients with uterine myoma. As a testifying this, dates received by Ozolini L. A. after retrospective research of case histories of patients with uterine myoma show, that thrombotic complication after vaginal hysterectomy originated in 7 % and after abdominal hysterectomy in 13 % cases [3; 4]. At the present, there are no doubts that fact, that at performing operative intervention there is a role of influence of complex stress factors including not only traumatic component, but also humoral reactions. It has established that operative intervention increases of the risk of thrombogenesis on 10 times [4; 5; 9], especially if it lasts more than 45 mines, expanded, and it is accompanied with massive hemorrhages. The urgency of the present position takes place is that in the majority cases (80 %) postoperative deep veins thromboses proceeds unsymptomatically, and moreover it will appearance clinically on the 27th day after discharging from hospital [3; 6; 8].

Purpouse. To estimate of hemocoagulation state, to study of influence of operative intervention to the impairing of coagulation system and developing of postoperative thrombotic complications at woman with uterine myoma exposed to the surgical treatment.

Materials and methods. We have carried out a retrospective research of 116 case histories of women with the diagnosis of uterine myoma, which have performed uterine extirpation with its appendages or without them at the Department of operative gynecology of the Republican specialized scientific-practice medical centre of obstetrics and gynecology (RSSPMC O&G) during 2005–2008 years. Average age of patients was 45 ± 8 years old. In the general number of investigated patients 76 of them were women aged after 40 (group I), 40 were below 40 years old (group II) which have not being treated with hormonal therapy before due to myoma. All patients have admitted to the RSSPMC O&G for the operative treatment with the diagnosis of symptomatic uterine myoma, which further confirmed by histologically. In majority cases they have been spent spinal anesthesia, in those cases, at revealing of the contra-indications, that patients have been spent the general anesthesia. Besides antithrombotic nonspecific methods (elastic bandaging of lower limbs, early mobilization, abundant drink), all patient received pharmacological prophylaxis with unfractionated heparin (UFH) in dosage of 2500 ID subcutaneously each 8 hours prior to and of the postoperative period.

For comparison of haemostasiological pattern there is also studied haemostasis system of 20 rather somatically healthy women at the reproductive age without gynecologic diseases (control group).

Estimation of the hemostasis condition is carried out in dynamics prior to and on 1st, 3rd, 7th days of the postoperative period at the hemostasiological laboratory of RSSPMC O&G with usage of reactants firms Barnaul (Russia) which included in itself definition: activated partial thromboplastin time (APTT), prothrombin time (PT), prothrombin ratio (PR), the international normalised ratio (INR), concentration soluble fibrin-monomer complexes (SFMC) and fibrinogen, amount of platelets. Definition of PR and INR were realized by using following formulas:

PR = PT of patient/PT of control serum. (1)

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

INR = PR^ISI. (2)

ISI — the international sensitivity index for different thromboplastin it is intended differently. In laboratory RSSPMC O&G there is used thromboplastin named Tehplastin (Technology-standard, Russia), received of a brain of the person, and it's ISI equal to 1.1–1.2.

Results. The average size of a uterus together with myomatous node was 12 ± 4 weeks (min. 7 weeks; max. 24 weeks). In the structure of somatic pathologies cardiovascular disease (40 %), obesity (20 %), anemia (30 %), varicose veins of lower limbs (14.8 %), gastrointestinal tract diseases (14.8 %) were predominant. At the majority of patients there are revealed some accompanying diseases: the combination obesity, arterial hypertension, anemia and varicose veins of lower limbs.

Table 1. – Volume, duration of operative performance and anesthesia, amount of intra operative hemorrhage and infusion

Parameters	Group I (n = 76)	Group II (n = 40)
Operative performance:		
Uterine extirpation (total hysterectomy)	58 (76.2 %)	9 (22.5 %)
Uterine amputation (hysterectomy)	13 (17.2 %)	3 (7.5 %)
Conservative myomectomy (Laparotomy)	1 (1.3 %)	14 (35 %)
Conservative myomectomy (Laparoscopy)	4 (5.3 %)	14 (35 %)
Duration of operative performance:		
Up to 45 min.	13 (17 %)	12 (30 %)
From 45 up to 60 min.	22 (29 %)	13 (32.5 %)
More than 60 min.	41 (54 %)	15 (37.5 %)
Interoperation blood loss volume:		
Up to 100 ml.	12 (15.8 %)	21 (52.5 %)
Up to 200 ml.	33 (43.2 %)	14 (35 %)
Up to 300 ml.	21 (27.6 %)	3 (7.5 %)
Up to 400 ml.	5 (6.6 %)	2 (5 %)
Up to 500 ml.	5 (6.6 %)	0
Anesthesia:		
SBA	62 (82 %)	21 (52.5 %)
OKA	7 (9 %)	15 (37.5 %)
Endotracheal anesthesia	7 (9 %)	4 (10 %)
Interoperation infusion volume:		
Up to 1600 ml.	64 (84.2 %)	27 (67.5 %)
More than 1600 ml.	12 (15.8 %)	3 (7.5 %)
Frozen plasma	6 (7.9 %)	1 (2.5 %)

Duration of operation almost were analogical (averaged 60 min.) in both group, however average volume of intraoperative hemorrhage in difference from I, in patients of group II did not exceed above 200 ml. (table 1).

According to the received dates of coagulogram, conducted in dynamics, pre- and postoperative parameters of screening tests of haemostasis at women from group I essentially differed from parameters of group II (table 2). At the postoperative period, we have noted the tendency to the increasing of hypercoagulation, despite on spent thromboprophylaxis with UFH. About this testified statistically significant ($p < 0.05$) changes of parameters of the haemostasis. At the group I average initial meanings of SFMC (4.1 mg. %) on admitting to the hospital in comparison with control (2.8 ± 1.3 mg. %) was on 42.8 % more ($p < 0.05$). Dynamics analysis coagulogram at women from retrospective research (group II) on the 7th day of the postoperative period has shown, that at women with uterus myoma aged after 40 years, on performing uterine extirpation with its appendages or without of them against spent thromboprophylaxis with UFH improvements haemostasiological parameters did not occur or they had negative dynamics. It was accompanied by increasing of fibrinogen concentration on 53.5 % (4.3 ± 0.7 g/l), SFMC on 82.5 % (7.5 ± 0.6 mg %), with simultaneous shortening of ATTP on 15.6 % (31.8 ± 6.3 sec.) in comparison with initial level which was before operation (2.8 ± 0.6 g/l, 4.1 ± 1.1 mg. %, 37.7 ± 5.2 sec. accordingly).

In difference from group I, at group II patients, initial meaning of SFMC on admitting was increased insignificantly in comparison with control group. The highest meaning of SFMC were observed on the 3rd day (5.7 mg. %), which have decreased by 7th day (4.7 mg. %) at the postoperative period and in comparison with its initial level (3.8 mg. %) was on 50 % and in comparison with control it was on 2.03 times more. As, in this group patients postoperative increasing of fibrinogen concentration not observed, although on 7th days of the postoperative period it's noted shortening of APPT (31.8 ± 6.3) on 19.3 % less in comparison with its initial level (38.7 ± 3.1 sec.). Other indicators of a haemostasis were within norm.

Table 2. – Haemostasis state indices at women with uterine myoma in dynamics before and after hysterectomy against administering of UFH (M ± m)

Parameters	Prior to	1st day	3rd day	7th day
1st group (n = 76)				
Fibrinogen (g/l)	2.8 ± 0.6	3.0 ± 0.6	3.7 ± 0.7	4.3 ± 0.7
APTT (sec.)	37.7 ± 5.2	37.4 ± 5.2	35.3 ± 4.4	31.8 ± 6.3
PT (sec.)	15.6 ± 1.2	15.9 ± 1.2	15.9 ± 0.9	15.9 ± 1.0
PR (IU)	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
2nd group (n = 40)				
Fibrinogen (g/l)	2.7 ± 0.6	3.0 ± 0.6	3.5 ± 0.6	3.9 ± 0.7**
APTT (sec.)	37.9 ± 3.9	37.8 ± 6.0	36.0 ± 5.2	31.2 ± 3.4**
PT (sec.)	15.7 ± 0.9	15.9 ± 1.4	15.8 ± 1.0	16.1 ± 1.5
PR (IU)	1.1 ± 0.1	1.1 ± 0.1	1.1 ± 0.2	1.1 ± 0.2
INR	1.1 ± 0.1	1.1 ± 0.1	1.1 ± 0.2	1.1 ± 0.2
SFMC (mg. %)	3.1 ± 1.8	5.0 ± 1.1**	4.5 ± 0.9**	4.7 ± 1.3**
T (10^9/l)	218.4 ± 41.5	202.0 ± 29.3	196.3 ± 31.5	171.0
Control group (n = 20)				
Parameters	**Meanings**	**Parameters**		**Meanings**
Fibrinogen (2–4 g/l)	2.3 ± 0.5	PR		1.02 ± 0.3
APTT (32–42 sec.)	37.7 ± 3.1	INR		1.2
PT (14–17 sec.)	15.3 ± 0.7	SFMC (up to 3.5mg %)		2.8 ± 1.3

Note: ** — significant in comparision with initial dates (p > 0.05)

Postoperative period complicated with deep vein thrombosis at 2 women from group II on the 27th day after discharging from hospital, and at 3 there is occurred secondary adhesion of postoperative wound.

Discussion. The problem a genesis of haemostasis system changes at performance of surgical interventions, it is necessary to allocate two basic moments. First — importance of operative intervention as combination of the general (nonspecific) and local (specific, depending on a zone of operation and its character) pathophysiologic answer to programmed extreme influence of special type, which is the surgical stress [2; 8]. After operative interventions, performing on pelvic as response to trauma of tissues and vessels there are significant amount of thromboplastin substances will thrown in bloodstream, than at operations which performed in abdominal cavity. As organs in pelvic and the lower part of peritoneum are the most powerful sources of the thromboplastin after brain, lungs and kidney. The uterus and its appendages except thromboplastin substances contain in significant amount of anti-heparin factor, and also stimulators and inhibitors of fibrinolysis. Any operative intervention, or trauma, inflammatory processes lead to activation and ejection in blood of these substances in consequence occur infringement in curtailing system up to deep changes towards hypercoagulation [1;7; 9]. As more expanded and dilated operative intervention in gynecologic patients, as more deeply it influences to the coagulation state.

The second moment this initial condition of systems and organs, integrated criterion, which character of system nonspecific mechanisms of adaptation is. This criterion in many respects defines predisposition and limited changes of haemostasis system during operation and at the early postoperative period [2; 11]. It is possible to suggest, that features adaptable and desadaptable changes in haemostasis system as response to developed haemodynamic and coagulation changes, caused with the existing disease, cause the initial parameters revealed by us at women aged after 40 years in coagulation part of haemostasis in the presence of myoma. Dominating point of view at the present according to which in an organism of women in presence of myoma, it has created defined conditions to curling strengthening. At development in a uterine myoma thromboplastic activity of its tissue increases, at the time there is decrease fibrinolytic activity of myomatous tissue at the expense of low concentration of the plazminogen activator. At the same time decrease of fibrinolytic activity in myomatous tissue to the amount of low concentration of the activator plazminogen established, that may be connected with low vascularization

of tumor tissue [3; 4; 8]. However it is necessary to notice, that not always at women with a uterus myoma the thromboses, fortunately available in an organism a number of compensator mechanisms will develop. This results from the fact that on any pathological changes initially the organism answers with compensator the reactions, directed on protection of an organism from thrombogenesis. In process of progressing of pathological processes or against joining of concomitant factors (for example, age after 40 years, operative intervention, extragenital disease and i. e.) compensator mechanisms pass to decompensate mechanisms which are shown with chronic form disseminated intravascular coagulation (DIC). As show our dates, the preoperative haemostasis system is characterized with expressed changes of chronic form of DIC, which have noted at patients aged after 40 years. Despite on spent thromboprophylaxis with UFH, operative intervention at women from group I aggravated available complex infringements of haemostasis, which at them it has been revealed on admitting, increasing of danger of development thrombotic complications in the postoperative period. Although, size of uterine myoma, volume, duration of operative performance were similar in both groups

Conclusion. Thus, as show our dates, the preoperative haemostasis system is characterizing with chronic form of DIC. Especially, these changes more significantly noted at patients aged after 40 years. Followingly, women elderly after 40 years are believe in thrombotic dangerous, carrying out of the expanded operative interventions allows to note them high group of the risk of development of thrombotic complications, demanding corresponding specific thromboprophylaxis. Thus, preventive maintenance with UFH at the present contingent patients does not allow to the result of coagulation potential in initial level, which at them were before operation. Hence, it is necessary to apply other methods of pharmacological preventive maintenance, for example low-molecular heparin.

References:

1. Amin A. N., Lin J., Thompson S., et al. Inpatient and outpatient occurrence of deep vein thrombosis and pulmonary embolism and thromboprophylaxis following selected at-risk surgeries.//Ann Pharmacother. – 2011. – V. 45 (9) – P. 1045–52.
2. Jeffrey I. Weitz Unanswered questions in venous thromboembolism.//Thrombosis Research. – 2009. – S. 123., V. 4. – P. S2–S10.
3. Lee A. D., Stephen E., Agarwal S., Premkuma P. Venous Thrombo-embolism in Indiar.//Eur J Vasc Endovasc Surg. – 2009. – V. 37. – P. 482–485.
4. Falcone Marco, Serra Pietro. Massive pulmonary embolism in a woman with leiomyomatous uterus causing pelvic deep venous thrombosis.//Ann Ital Med Int. – 2013. – V. 20. – P. 104–107.
5. Nao S., Norihito Y., Tatsuru O., Noriyuki Y. Risk factors for perioperative venous thromboembolism: A retrospective study in Japanese women with gynecologic diseases.//Thrombosis Journal. – 2012. – V. 43. – P. 8–17.
6. Nao S., Fumio K., Atsushi H., Takeshi H., Sachiko E. Intermittent pneumatic compression for prevention of pulmonary thromboembolism after gynecologic surgery.//Thrombosis Journal. – 2013. – V. 45. – P. 3:18.
7. Samama M. M., William H. Risk factors for perioperative venous thromboembolism: A retrospective study in Japanese women with gynecologic diseases.//Thrombosis Journal. – 2012. – V. 8. – P. 48–54.

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Identification of risk factors for obesity in children and adolescents living in Tashkent city

Abstract: This article analyzes the identification of risk factors for obesity in children and adolescents living in Tashkent city in order to form the following prophylactic measures to prevent obesity in children and adolescents at an early age.

Keywords: children and adolescents, body mass index, obesity, risk factors, relative risk.

Obesity is a major public health problem in the twenty-first century. The use of integral approach to solving this problem will allow to take into account all its aspects — malnutrition, physical activity, as well as socio-economic and socio-political factors in this area [1, 12–44; 2, 32–36]. Considering them in terms of epidemic spread of obesity as a problem that goes beyond time and national borders, in particular, an alarming increase in the frequency of obesity among children and adolescents, we can assume that the problem is a threat to the health and well-being of future generations [7, 29–33; 8, 277–284].

An important specificity of the last decade is the increase in the number and change in the balance of risk factors affecting the health of children and adolescents, the effective

identification of which will target the prevention of obesity. Risk factors are those that determine the health affecting it negatively. They favor the occurrence and development of diseases. Risk factor is a sign that somehow related with the occurrence of the disease in the future.

For the development of the disease the combination of risk factors and immediate causes of the disease is necessary. It is often difficult to isolate the causes of the disease, since they may be related by several reasons. There are major, so-called high risk factors, which are common to a wide variety of diseases: smoking, physical inactivity, overweight, unbalanced diet, hypertension, psycho-emotional stress, and so on. They distinguished are primary and secondary risk factors as well [9, 361–364; 11, 456–460]. The primary factors are the factors which are affecting the health: unhealthy lifestyle, environmental pollution, family history, poor performance of health services and so on. The secondary risk factors include the diseases that burden for other diseases: diabetes, atherosclerosis, hypertension and so on [12, 644; 13,17–26; 14, 3–19].

Aim: to identify the risk factors for obesity in children and adolescents living in Tashkent city.

Materials and Methods: There observed 32 girls and 26 boys aged between 11 to 15 years, diagnosed with exogenous constitutional obesity degree I–II within three-four years living in Tashkent city. The children were examined in the clinic of the Republican Specialized Scientific and Practical Medical Center of Endocrinology (RSSPMCE) Ministry of Health of Republic of Uzbekistan. Patients with obesity are at the outpatient monitoring. The diagnosis based on medical history, anthropometric data and inspection of hygienists, pediatricians and endocrinologists. Nutritional status and well-being, activity and mood of patients were evaluated during outpatient examination. Anthropometric studies included bioimpedance monitoring body composition with the determination of its mass, body mass index (BMI), waist circumference, and the value of the hips (WC/VH); the amount of fat mass. The measurements were carried out using Martin anthropometry, caliper and standard medical scales.

In order to assess the importance of risk factors for obesity in children, we carried out mathematical analysis of the prevalence of major risk factors to the calculation of the relevant indices.

With the help of a questionnaire we studied the diet, physical activity, leisure, bad habits, and data on the family financial situation, education and occupation of parents. Questionnaires were made, according to the requirements applicable to sociological research.

Sociological research in families with obese children (the case), and the families with healthy children (control) by the "case-control" method and pairs of copies to study the social and hygiene, biological and other factors that influence on the formation of obesity in children was conducted.

The information was collected by questionnaire and the copy data of the medical records of children with obesity. Control group comprised the data of 50 children with normal weight (healthy). The study group included 58 children with excess body weight (obesity). Further, we identified the prevalence of these factors in the study and control groups using mathematical and statistical techniques. The relative risk ratios were calculated in their comparison. Moreover, by analyzing the ratio of the highest level of relative risk to the most minimum level in each gradation factors we calculated weights, i. e. ranking places that each factor took leading to the development of obesity in children [3, 223; 4, 16].

To determine the risk of obesity in children they used one of the modern methods of evidence-based medicine and clinical epidemiology: the case-control and indicator of the relative risk [4, 16]. The method of "case-control" considers the frequency of exposure of risk factors. The principal study design "case-control" is that the first sample population based on the selected two comparable (in materials and characteristics) groups of patients but one (cases) with the disease and the other one (control) — without the disease under study. Then in both groups retrospectively the frequency of exposure of the factor under study was determined.

Obtained data allow calculating the odds ratio of having a risk factor for the development of the disease, which is equivalent to relative risk.

Research made by case-control with the right design has several advantages: a well-suited for the study of diseases with long latency periods, as well as rare diseases, effective in time and cost, makes possible to evaluate large numbers of potential etiological factors.

To identify a reasonable relationship between the risk factor and the disease, it is necessary that the control group was comparable to that in the whole group of cases, except for the presence of disease. Cases and controls should be collected in the same or similar environment. The option of cases and controls are selected from the population of individuals with disabilities among a certain part of the population or a random sample of the entire population is carried out. This avoids the biases.

The selection of an appropriate control group is critical. This group should include individuals who might be selected as cases if they had developed the disease, but not all of the population who have no the disease under study. That is, the control group should be as similar to individuals from the group of cases, apart from the presence of the studied condition. It is also important to think about the number: it is recommended to comply with the ratio of 1: 1, the maximum statistical power is created at this ratio.

If the relative risk (RR) of 1.0, which means that there is no difference in risks (incidence is the same in each group).

RR = 2.0 means that the risk of to be ill in this group of individuals exposed to the factor action is twice higher than in those in the group which is non- exposed to the factor.

RR = 1.6 means that the risk of be ill in people in the group exposed to the factor action is 1.6 times higher than in those in group not exposed to the factor action (or risk up to 60 % percent higher in the group exposed to the action of factors).

RR > 1 indicates preventive effect risk factor when the risk factor has protective effect rather than harmful.

Results: Our data revealed an excess of body weight in 32 girls and 26 boys from 11 to 15 years. On examination the body mass in girls was 61.8 ± 6.9 boys 70.5 ± 7.1. The predominance of obesity in girls at school-age children and adolescents clearly revealed, where the sex ratio reaches 2:1. In this case, a predisposing factor is the expression of large subcutaneous fat in girls in neonatal and puberty period.

It is known that obesity is increasingly dominated in the urban population. According to A. I. Kliorin, in the early 70s obesity was recorded in 28 % of citizens and 22.3 % of the villagers. We followed 32 girls and 26 boys living in Tashkent. These statistics related mainly to the child population, and probably reflected the hypodynamic lifestyles of an urban child and his easier access to high-calorie refined products.

If we talk about the epidemiology of different types (forms) of obesity, the most common is exogenous-constitutional (or simple) form of obesity, the weight of which is 75–97 % of cases [6, 315–316]. Our patients (28 girls and 23 boys aged 11 to 15 years), diagnosed with exogenous constitutional obesity degree I–II in children from three to four years, in three boys and four girls — obesity of III degree.

It has been established genetic predisposition to obesity, which is confirmed by epidemiological studies. Mechanisms for genetic effects may be related to differences in somatic type, cellular composition of adipose tissue, hyperphagia, taste sensitivity, hyperglycemia, hyperinsulinism, hypometabolism and differences in enzymatic lipolysis and lipogenesis [6, 315–316]. The risk of developing obesity in the child reaches 80 %, if it is available to both parents. The risk is about 50 % if only the mother is obese, 40 % with obesity in the father, and about 7–9 % in the absence of obesity in parents. 42 % of mothers of adolescents who were under our observation, were identified obesity II degree, 18 % both of parents were revealed obesity II degree, 20 % were observed exogenous constitutional obesity degree I–II, 20 % of parents were found no obese.

Special questionnaire of teenage girls (6 adolescents) and their parents revealed the presence of particularities in the organization of their feeding, nutrition and feeding behavior.

We surveyed emotion-genic feeding disorders in 13 boys and 16 girls (aged 14–15 years). With this type of eating disorders the stimulus to food intake becomes not a hunger but an emotional discomfort: people eat not because they are hungry, but because they are restless, anxious, angry, are in a bad mood, depressed, bored, lonely, and so on [5, 128–132; 7, 29–33; 8, 277–284]. Talking with the girls it was revealed that they were often anxious associated with being overweight, feeling aversion to themselves, the appearance of secondary sexual characteristics, and they were often alone. In boys, the emotion of eating disorders was associated with the preparation for the exam, an exam failure, bad relations with friends, especially the girls. Of the surveyed 12 boys and 21 girls were found disorders of daily meal taking they observed the night eating syndrome. First, this form was described by A. Stoonkard in 1959 and quite often run in clinical practice [10, 366–371]. According to obese patients, it was determined that they could not fall asleep without an excessive amount of food eaten. Their sleep was shallow, anxious, and restless, they woke up at night several times and took again some food (cookies, candy, cake, etc.).

In a survey of children and their parents it was revealed that at the time of the survey the daily diet dominated potatoes (roasted) in 70.2 %, sweets and pastries in 61.3 %, pasta and dumplings in 48.5 %. Many children call these products as favorite ones. 36.6 % of children ate at night before sleeping. It was also found that from early infancy, they often ate before going to bed, after full satiety they had a normal sleep. According to the authors [8, 277–284; 9, 361–364], night eating syndrome at obesity can be attributed to an embodiment of the ontogenetic psycho-physiological immaturity. It was also determined that physical inactivity characterizes most obese children. Only 10.89 % of them visit sports clubs, whereas those in the control group 50 % of the children ($p = 0.000$). And, unfortunately, 96.03 % of children play on computer or watch TV more than 3 hours every day. There is no doubt that food as a form of providing building material and energy for the whole growth process and the development of a child is very important for his future health.

It is well known, the existence of familial forms of obesity in which the inheritance factor is reached 25 %, which indicates a relatively high contribution of genetic factors to the development of this syndrome. 4 % of the surveyed had the family form as "constitutional-exogenous obesity".

The quality of food of the surveyed was certainly different. According to the questionnaire, the diet of obese children was characterized by a predominance of bread, flour, cereals and confectionery, the high content of saturated fats, salt and sugar in the diet with low norms of nutritional standards for fresh fruits and vegetables (deficiency of dietary fibers in the diet was 80 %). In study group the content of meat and meat products (sausages, etc.) in the diets were significantly higher than normal. Within a week teenagers with obesity consumed fast food (hamburgers, hot dog, French fries, etc.) without any limitations.

One of the factors that determine the development of obesity is physical activity that plays a significant role in the formation and functioning of healthy body. 55 % of boys and 38 % girls preferred watch TV shows and movies to regularly physical exercises, 23 % did not engage in physical activity at all and 34 % spent their time on computer for hours.

The socio-economic status of the family affected on formation of obesity in children as well. According to the research studies carried out in the northeastern regions of Brazil it was confirmed the hypothesis about the relationship of malnutrition in childhood and obesity in adults with very low incomes. The similar results were obtained in the UK. Children from families with high material incomes had no excess body weight [13, 17–26]. However, our results had other direction.

The estimation of the economic status of surveyed children and adolescents with obesity showed that 85 % lived without any material difficulties. Middle-income households were reported in 12 %. The educational level of parents is also one of the leading factors in the development of children and adolescents. Most mothers (78.0 %) of obese children had secondary education. One in five respondents of the surveyed women had no profession. A significant part of the fathers surveyed had secondary education (82.0 %).

Therefore, according to our research, the risk factors associated with the development of obesity should include genetic predisposition, parental obesity, nutrition and eating behavior, the level of physical development, family economic status, educational level of parents and others.

According to obtained data, we estimated the significance of risk factors for obesity in children.

Table 1. presents socio biological factors identified by questionnaire.

Table 1. – Socio-biological factors

Factor	Grading factor	Case R1	Control R2	AR R1\R2	Relative risk RR
The social situation of parents	worker (employed in manual labor)	37.7	40.8	0.92	1
	The employee (engaged in mental work)	19.6	16.1	1.22	1.32
	Housewife	42.7	43.1	0.99	1.07
Pregnancy of the mother proceeded	toxemia, with the threat of miscarriage	24.6	10.0	2.5	2.9
	Normal	75.4	90.0	0.84	1
Labors	Artificial (cesarean section)	23.3	10.1	2.3	2.73
	Natural	76.4	89.9	0.84	1
The child was born	For term	79.4	82.2	0.96	1.05
	Premature	13.3	13.1	1.0	1 1
	Prolonged	7.3	4.7	1.5	1.56
Feeding of the child	Artificial	12.4	6.5	1.9	2.23
	Natural	72.2	84.3	0.85	1
	Mixed	9.2	1.65	1.94	15.4
The health status of a child under 3 years of age	often ill	2.8	1.9	1.47	1.77
	Rarely sick	85.9	84.6	1.01	1.21
	Not sick	11.3	13.5	0.83	1
Comorbidity diseases in parents including: obesity III — degree	Yes	5.4	1.4	3.85	4.05
	No	94.6	98.6	0.95	1
II — degree	Yes	4.9	2.33	2.1	2.4
	No	95.1	97.9	0.97	1
I — degree	Yes	8.4	4.2	2.0	2.08
	No	92.6	95.8	0.96	1

According to Table 1, the study of social status of parents identified the relative risk (RR) 1.32, that was — the employees. In the study of pregnancy toxemia with the threat of miscarriage — RR was 2.9. In mothers who had artificial labors RR — 2.73. At artificial feeding RR was higher — 2.23. RR in children who were often ill — 1.77. Identification of comorbidity diseases in parents, including obesity degree III RR was 4.05, obesity degree I — 2.08, obesity degree II — 2.4.

Table 2 shows lifestyle factors, i. e., nutrition and physical activity of children and adolescents with obesity.

As indicated in Table. 2, the child's diet at one time exposed to the factor of two times higher versus to control, the relative risk (RR) is 2.31; when consumed sweets and cakes the RR is 2.16; going to school by transport — 3.08; no walking in the fresh air — 4.06; watching TV –2.3; activity with computer for 3 hours or more — 4,5; no help round the house — 2.67; satisfactory studying of the child — 3.4.

Based on the definition of socio-biological RR and lifestyle factors we distributed 10 leading factors contributing to the development of obesity in children and adolescents (Figure 1).

Table 2. – Child lifestyle factors: nutrition and physical activity

Factor	Grading factor	Case R1	Control R2	R1\R2	Relative risk
Child nutrition at one time	Yes	14.3	27.7	0.51	1
	No	85.7	72.2	1.18	2.31
Eating sweets	Rarely	11.7	12.0	0.97	1
	1–2 times per week	31.3	30.1	1.03	1.06
	After a day	23.5	15.0	1.56	1.6
	Every day	19.6	9.7	2.1	2.16
Eating bread/flat cake	1 slice (1\4th of bread/flat cake)	11.7	12.0	0.97	1
	2 pieces (1\3rd of bread/flat cake)	31.3	30.1	1.03	1.06
	3 pieces (1\2nd of bread/flat cake)	23.5	15.0	1.56	1.6
	More than 3 pieces of bread/flat cake	19.6	9.7	2.1	2.16
Morning exercises	Yes	91.7	95.8	0.95	1
	No	8.3	4.2	1.9	2
Engagement in activities	Yes	87.5	75.4	1.16	1
	No	12.5	24.6	0.50	2.32
Going to school	By transport	12.1	4.3	2.81	3.08
	On walk	87.8	95.7	0.91	1.71
Staying outdoors	Up to 1 hour	28.3	28.5	0.99	1.86
	1–2 hours	9.8	15.8	0.62	1.16
	3 hours or more	11.4	21.2	1	0.53
	No	50.5	23.5	2.14	4.03
Watching TV	Up to 1 hour	42.9	56.7	0.75	1
	1–2 hours	19.5	15.1	1.29	1.72
	3 hours or more	35.6	20.3	1.75	2.3
	None	0.95	2.0	2.1	1.2
Computer exercises	Up to 1 hour	26.2	441.	0.58	16.9
	1–2 hours	30.5	20.5	1.48	2.96
	3 hours or more	42.1	18.6	2.26	4.5
	No	16.0	8.0	0.5	1
Activity round the house	No help	85.9	69.5	1.23	2.67
	Helps	14.1	30.5	0.46	1
Studying at school	Excellent	32.4	38.6	0.83	1
	Good	48.2	54.7	0.88	06
	Satisfactory	19.4	6.7	2.89	3.4

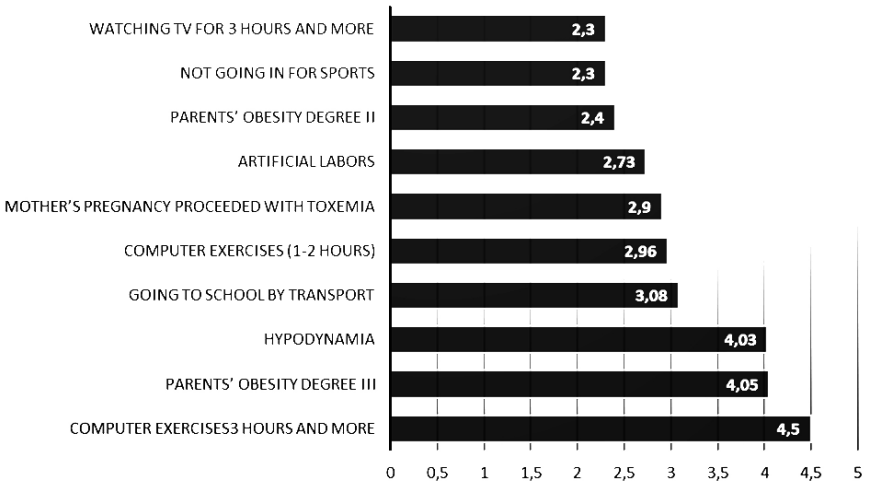

Fig. 1. Arranges the leading factors contributing to the development of obesity in children

When determined the major factors contributing to the development of obesity in children and adolescents, on the basis of the relative risk it was revealed that the activity with the computer for 3 hours or more, parental obesity and inactivity instead of walking outdoors occupied the leading position.

Thus, summarizing the results of the research should be stated that children and adolescents with obesity are characterized by hypodynamic lifestyle, going to school by transport, not going in for sports, spending much time with computer, taking meals at one and the same time, eating sweets every day as well as parental obesity and feeding the baby with formula.

Consequently, the greater activity with the computer, and parental obesity are the leading risk factors for childhood obesity.

Thus, the prevalence of obesity in the human population, a large number of complications directly related to overweight (cardiovascular, metabolic and endocrine), the heterogeneity of its forms define the search of the criteria for early diagnosis and revealing the groups at risk of developing obesity and its early metabolic complications and the implementation of preventive measures to prevent them, and therefore, to improve the quality and duration of life.

Conclusions:

1. Preventive measures for the prevention of obesity in children and adolescents should be carried out at an early age.

2. Healthy lifestyle, balanced diet, physical activity should be included in the medical care of children.

References:

1. Global Strategy on Diet, Physical Activity and Health. Report of a WHO Expert Committee. – 2012. – P. 12:4.
2. Lobykina E. N., Khvostov O. I, Koltun V. Z. et al. Science and organizational approaches to the promotion of knowledge about balanced diet.//Health of the Russian Federation. – 2007. – No. 7. – P. 32–36.
3. Mamatkulov B., La Mort, Rakhmanova N. A. Clinical epidemiology. Evidence-based medicine.//manual. – Tashkent, 2011. – P. 223.
4. Mamatkulov B., Avezova G. S., Kasimova D. A. The health of children and the use of evidence-based medicine methods in the study of risk factors: Scientific-methodical manual. – Tashkent, 2011. – P. 16.
5. Pavlov N. N., Kleschina Yu. V., Eliseev Yu. Yu. Assessment of dietary intake and nutritional status of today's children and adolescents.//Man and his health. – 2011. – No. 1. – P. 128–132.
6. Peterkova V. A., Remizov O. V. Obesity.//Under edit. Dedova I. I., Melnichenko G. A. – Moskow: MIA, 2004. – No. 1 – P. 315–316.
7. Sorvacheva T. N., Peterkova V. A., Titova L. N. et al. The effectiveness of a low-carb diet in the treatment of obesity in children and adolescents.//Nutrition – 2007. – Vol. 76, No. 3. – P. 29–33.
8. Florencio T. M., Ferrerira H. S., de Franca A. P. et al.//Br. J. Nutr. – 2001. – Vol. 86, No. 2. – P. 277–284.
9. Gokbel H., Atlas S.//J. Sport. Med. – 1999. – Vol. 39, No. 4 – P. 361–364.
10. Holtz C., Smith T. M., Winters F. D.//J.Am. Osteopath. Assoc. – 1999. – Vol. 99, No. 7. – P. 366–371.
11. Kinra S., Nelder R. P., Lewendon G. J.//J. Epidemiol. Commun.Hlth. – 2000. – Vol. 54, No. 6. – P. 456–460.
12. Alpes D. H., Stenson W. F., Bier D. M. Manual of nutritional therapeutics. 4th edn. – Philadelphia: Lippincott Williams and Wilkins, 2001. – P. 644.
13. Burrows A. R., Leiva B. L., Burgue A. M., et al. Insulin sensitivity in children aged to 16 years: Association with nutritional status and pubertal development.//Rev Med. Chil. – 2006. – P. 17–26.
14. Weker H. Simple obesity in children. A study on the role of nutritional factors.//Med. Wieku Roz-woj. – 2006. – P. 3–19.

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The study of the adsorption rate of carbohydrates in the dietary intake of children and adolescents with obesity

Abstract: This article aims to study the rate of adsorption of carbohydrates in the dietary intake of children and adolescents who are obese in order to develop the follow-up measures for goal-directed correction of identified eating disorders, physical activity and prevention of obesity.

Keywords: children and adolescents, body mass index, obesity, dietary intake, glycemic index.

Today obesity is one of the common chronic relapsing diseases. In 1998, it was registered 250 million obese patients in the world, and in 2025, according to estimates by WHO experts, their number will exceed up to 300 million. According to epidemiological studies, in world developed countries 25 % of teenagers are overweight, and 15 %

are obese [1, 12–44]. From all types of obesity 75 % of this disease is alimentary (exogenous-constitutional, simple) obesity [2, 128–132]. As a base of treatment of any form of obesity the rational diet therapy constitutes reducing calorie intake, the degree of which depends on the severity of obesity, age, level of physical activity and patient's occupation [3, 3–10]. The main part in the dietary management of obesity is assigned for fats, therefore, many authors usually recommend to reduce first the amount of fat-containing products in order to decrease the caloric dietary intake of patients who are overweight [4, 388–391; 5, 971–981]. However, in addition to fat, the cause and progression of obesity is excessive dietary intake of carbohydrates. The diet therapy of obesity considers the quantitative characteristic of dietary carbohydrates and encourages to increase their intake by foods containing slowly adsorbed carbohydrates, i. e., by fruits and vegetables. Studies carried out in the 80s showed that the assimilation rate of carbohydrates depends on many factors and one of them is the chemical composition of carbohydrate-containing foods [6, 35–37]. For example, carbohydrates of baked or roasted potatoes (polysaccharides, starch) by digestion rate and the glycemic reaction are almost equal to glucose (monosaccharide). Carrot carbohydrates digest and cause post-alimentary glycemia at the same degree as the carbohydrates of most baked goods. Pasta increase blood glucose level with the same rate as the sugar. At the same time, lactose (milk sugar) is a dietary substance that contributes little to glucose.

In 1984, the group of Canadian researchers introduced the notion of "glycemic index" (GI), which reflects the adsorption rate of carbohydrates and represents the ratio of the area under the glycemia curve after consumption of 50 g. of carbohydrate in the composition of certain product to the area under the glycemia curve obtained after intake of 50 g. glucose (percentage). On the basis of these studies they asked to adjust the diet for the patients with diabetes, taking into account the data on GI carbohydrate foods [4, 388–391; 5, 971–981; 6, 35–37]. There are not summarized data on the GI of specific products in the domestic literature.

According to domestic and foreign authors foodstuffs were selected into 3 groups: with high GI (70 % or more), medium GI (40–70 %) and low GI (< 40 %) [7, 87].

At present time, GI does not take into account in the diet of patients with overweight and obesity at all. Typically, doctors recommend these patients to increase the amount of fruits and vegetables in the diet without taking into account their GI. Common and prevailing fruits and vegetables (potatoes, carrots, beets, bananas, raisins, etc.) have high GI, so that they, as well as bakery products from flour, sweet drinks and pastries, can raise insulin level in blood (subject to insulin metabolism) without providing any feeling of satiety, promoting overeating. Therefore, when drawing up the diet for patients with overweight and obesity it is necessary to achieve the selection of carbohydrate-containing foods with a certain GI. This object is achieved by the prescribed low calorie diet, which mainly includes carbohydrate foods with GI < 40 % [6, 35–37; 7, 87].

Carbohydrate foods with low GI are vegetables, fruits, berries, as well as cereals and products of wheat flour, which are based on cellulose and vegetable fibers. Should be considered that cellulose is hardly absorbed by the body, however, filling the stomach, it creates a feeling of satiety. Foods that rich in cellulose contain many vitamins, and so the water that does not add calories but fills the stomach. Therefore, it is possible to achieve a stable weight loss due to the fact that products with low GI (because of the high content of dietary fibers) do not give marked burden on the insular apparatus. In addition, they provide enhanced gastric fullness, normalizing the appetite.

Aim: to study the adsorption rate of carbohydrates (glycemic index) in the dietary intake of children and adolescents with obesity.

It was examined 28 girls and 26 boys aged 11 to 15 years, diagnosed with exogenous constitutional obesity I, II and III degree. During outpatient survey they estimated nutritional status, as well as health, activity and mood of patients. The actual nutrition in children and adolescents was studied using a map-based questionnaire. Collection of material was carried out in expeditionary conditions, 2 times a year (winter-spring and summer-autumn periods) with registration in the individual sheets factual products eaten by children and adolescents for 6 days.

The content of basic nutrients and energy was calculated from the chemical composition tables of food (8). The magnitude of the absorption rate of carbohydrates — glycemic index in the dietary intake of children and adolescents were calculated by E. H. Lobykina table et al. [9, 14–21].

Obtained results were compared with average daily norms of rational consumption of food for the population of Uzbekistan (sanitary norms and rules (SanNandR) № 0105–01 and № 0250–08) [10, 25; 11, 38]. The data were subjected to statistical analysis on the computer Intel Core i7, Microsoft Office 2013 [12, 143].

Results

According to the questionnaire, the diet of children with obesity was characterized by the predominance of bread, flour, cereals and confectionery. The high content of saturated fats, salt and sugar in the diet against the background of not doing food standards for fresh fruits and vegetables (deficiency of dietary fibers in the diet being 80 %) was noted. In the main group the content of meat and meat products (sausages, frankfurters, etc.) in the diets were significantly higher than normal. During a week, teenagers with obesity were eating fast food (hamburger, hot dog, French fries, etc.) without limitation. Calculations of children diets showed that excess consumption of meat and meat products in children aged 11 to 15 years was 12.1 % in the winter-spring period, 8 % — in the summer and autumn period, but in the control group there is a shortage of these products on the 1.3 and 2.75 % (Table 1).

Table 1. – The average range of staple foods in diets of children and adolescents aged 11–15 years

Products, g.	* Norm, g.	Children and adolescents with obesity		Children and adolescents with hormonal physical growth	
		Winter and spring period	Summer and autumn period	Winter and spring period	Summer and autumn period
Meat and meat products (in terms of meat)	150	169 (112.7)	162 (108.0)	148 (98.7)	140 (93.3)
Milk and dairy products (milk equivalent)	491	480 (97.8)	420 (85.5)	410 (83.5)	380 (77.4)
Fish and fish products	35	25 (71.4)	22 (62.9)	19 (54.3)	16 (45.7)
Eggs (piece)	1.0	0.9 (90)	0.8 (80)	0.8 (80)	0.7 (70)
Bread and bakery products (in terms of bread)	314	495 (157.6)	443 (141.1)	427 (136.0)	398 (126.8)
Potatoes	181	238 (131.5)	221 (122.1)	215 (118.9)	196 (108.3)
Animal fat	21	30 (142.9)	28 (133.3)	19 (90.5)	16 (76.2)
Vegetable oil	16	18 (112.5)	17 (106.3)	15 (93.8)	14 (87.5)
Vegetables and melons	296	250 (84.5)	300 (101.4)	275 (92.9)	318 (107.4)
Fruits and berries	325	230 (70.8)	340 (104.6)	245 (75.4)	330 (101.5)
Sugar and confectionery (in sugar)	67	85 (123.2)	76 (110.1)	70 (101.4)	65 (98.5)

Note: * — When preparing the table the recommended range and the number of products per day by (SanNandR) № 0105–01 and № 0250–08 has been taken into account

Dairy products like milk, cheese, sheep cheese and cottage cheese were explicitly deficient; the range of these products mainly includes yogurt, kurt (product of salty curd), kaimak (clotted cream), sometimes sour clotted milk, especially in winter-spring period, and respectively were lower to recommended standards; the deficit ranged from 39.2 % to 45.0 %, and in summer-autumn period from 29.8 to 37 %. In the control group the above products cottage cream, kurt were not identified in the diet, but milk and dairy products were lower the standards by 16.6 and 22.6 %, as well. Fish and fish products were used very rarely. Deficiency of vegetable fat was relatively little. Butter, lamb and beef were used as animal fat. The obvious lack (about 2 times less than the norm) of the consumption of vegetables, melons, fruits and berries was found in children with obesity and in control group. Fried potatoes seemed to be a favorite dish for the every third surveyed, especially in boys, which exceeded the norm by 30 and 22 %, in the control group was also higher than the norm by 18 and 8 %. Sugar and confectionery were higher on 23 and 10 % in the main group and in the control group on 1.4 % in the winter and spring period, but in summer period the lack was 1.5 %. Analysis of collected data showed that the energy value of nutrition of school children with obesity was on 27 % higher than in the control group, due to excessive consumption of high-calorie foods: saturated fat, salt and sugar, as well as baked goods. The calculation of biological value of the diets of children and adolescents with obesity showed that the content of total protein was 1.2 and 1.4 % higher than normal. In the control group, in winter-spring period protein deficiency was 4.7 %, and in summer-autumn period — 2.2 %. The animal fats which amounted to 66.5 ± 1.3 by 6.7 % dominated in the diet above normal in winter-spring period, 62.7 ± 2.1 by 10 % above normal in summer and autumn period. In the control group 51.5 ± 1.7 (9.6 %) and 50.8 ± 1.2 (8.2 %) was lower than normal. As compared to the control group in children and adolescents with obesity the animal protein intake was significantly prevailed ($P > 0.001$).

The fat content in the daily diet exceeded the physiological norm by 30.8 and 20 %, while in the control group it was lower the norm by 3.7 and 2.2 %. The optimal ratio of fat consumption of plant and animal origin is the content of animal fat in the daily diet at least 21 %, and plant more than 16 %. The animal fats dominated in the diet, they amounted to 121.6 ± 4.2 (130.8) in the winter-spring period and 111.6 ± 4.9 (120.0) in the summer and autumn. The level of animal fat consumption was significantly different from that in the control group and was 1.2 times higher ($P > 0.001$). In the comparable groups of children the excess amount of carbohydrates in actual food rations was noted: in obese children by 32.5 and 25 % and in the control group by 3 of 10 %. There found the high content of mono- and disaccharides in daily diet, specified by accessibility for children with obesity to high-calorie confectionery and pantry products (crackers, nuts, cookies, popcorn, etc.). Therefore, in comparison with the control group in 58.9 % of obese children the consumption of carbohydrates was significantly more prevalent.

Based on these data, it was found that the excess of daily caloric content achieved due to the excess of dietary fat and carbohydrates. Wherein the ratio of the macronutrients was 1 : 1.5 : 5.5 at a rate of 1 : 1 : 4.

On estimation the micronutrients in the daily diet it was revealed the following: in the main group the calcium content was recorded rather higher than normal (4 and 5 %); and in the control group was lower the norm by 28.4 %, 1.1 times was higher than the recommended daily levels of magnesium, probably due to excess cereals, and in the control group

was lower normal by 21 and 17 %; the phosphorus content was normal, and in the control group was lower the norm by 17.8 and 19.8.

In assessing the micronutrients in the daily diet it was revealed the iron deficiency that was 13.3 ± 2.4 and 13.8 ± 2.8 mg/day in obese children, but 12.6 ± 2.9 and 13.1 ± 2.1 mg/day in the control group, at the appropriate level was 16.5 mg.

Analysis of the daily intake of vitamins in obese children showed the reduction for normal intake of vitamins A, E and C, and their combined use, as it is known, is a powerful antioxidant factor [3, 3–10]. The content of vitamin A in the diets of obese children was lower than normal in winter-spring period by 53.3 %, in summer-autumn period by 47.8, 62.0 and in the control group 62.0 and 58.0. The content of vitamin B_1 in obese children exceeded the norm by 41.7 and in the control group 33.3 %; vitamin B_2 was lower than normal by 1.2–1.5 times (29 %), while in the control group to 1.5 times (28.5 %).

The content of vitamin PP in the diets of the main group was higher than normal at 10 and 5 % and in the control group was lower at 7.6 and 4 %. They established the reduced indicators of vitamin C. Our studies showed that the deficiency of vitamin C (ascorbic acid) in the body of obese children ranged from 20 to 22.5 %, and in control group up to 20.0 %.

After studying the actual nutrition of children and adolescents, we studied the glycemic index of some foods that were above normal. On average, the children consumed 237.2 + 0.7 g. (instead 65.5 g.), 43.3 % higher than normal bakery products from extra flour: wheat bread from extra flour 120 g., GI of one portion is 25 g., 95 %; bakery products — loaves 100 g., 85 %; ice-cream 120 g., GI of one portion is 60.0 g., 70 %; corn flakes, sticks 137 g., GI of one portion is 12 g., 70–85 %; potatoes 238 g., GM is 181 g. per serving, 95 %; 85 g. sugar, GI is 60 %. Children consumed fruits and berries, especially in summer time, that exceeded the normal of fruits and berries, raisins have high GI (70 %). Vegetables and melons, included in the dietary intake, were lower the standards that have low GI (less than 40 %), based on cellulose and fibers. In the control group for the above products GI lower than 40 %.

As indicated above, the nutritional products are distributed into three groups: those with high (70 % or more), medium (40–70 %) and low (less than 40 %). The children and adolescents with obesity examined by us had the value of GI, reflecting the absorption rate of carbohydrates in the dietary intake of many foods is high. The current level of nutrition needs clear recommendations on the number and qualitative composition of carbohydrate-containing products, which differ in the rate of absorption.

It should be noted that fruits and vegetables: potatoes, carrots, beets, bananas, raisins, watermelon, etc., have high GI, so that, as well as bakery products from extra flour, sweet drinks and pastries, they can raise insulin levels in the blood and do not provide long-term satiety, contributing to overeating [9, 14–21].

Thus, analysis of the nutrition of children with obesity showed not only qualitative and quantitative inferiority, but not adjustable to hygienic standards in almost all parameters. The diet and bakery products, as well as some fruits and vegetables have high GI, which exceed the norms by 20–30 %. More pronounced imbalance in their nutrition is a significant risk factor for children and adolescents of functional disorders and it requires the obligatory correction.

Conclusions:

1. The actual nutrition is inadequate for the expenditure of energy in the side of their excess is characterized by high level of fats and carbohydrate consumption and are not fully adequate for the content of vegetable fats, polysaccharides, cellulose, some vitamins (A, E and C) and minerals (iron).
2. The diet and bakery products, as well as some carbohydrate-containing foods have high GI, which reflect the rate of absorption of carbohydrates.

References:

1. Global Strategy on Diet, Physical Activity and Health. Report of WHO Expert Committee. – 2012. – P. 12–44.
2. Pavlov N. N., Kleschina Yu., Eliseev Y. Y. Assessment of dietary intake and nutritional status of today's children and adolescents.//Man and his health. – 2011. – № 1. – P. 128–132.
3. Shayhov G. I., Rakhimov B. B. Prevention of obesity in children and adolescents./Guidelines – 2010. – P. 3–10.
4. Jenkins D. J. A., Wolewer T. M. S., Jenkins A. L.//Lancet. – 1984. – Vol. 2. – P. 388–391.
5. Jenkins D. J. A., Wolewer T. M. S., Wong G. S.//Am. J. Clin.Nutr. – 1984. – Vol. 40, № 5. – P. 971–981.
6. Kasatkina E. P., Odud E. A.//Probl. endocrinol. – № 6. – P. 35–37.
7. Koltun V. Z., Lobykina E. N. Overweight (what to do): Guidelines. – Novokuznetsk, 2001. – P. 87.
8. Chemical composition of foods: Manual/Ed. Corresponding Member. MIA, prof. Skurikhina I. M. and Acad. of Medical Sciences, prof. Tutelian V. A. – M.: print Delhi, 2002. – P. 236.
9. Lobykina E. N., Koltun V. Z., Hvostova O. I. The glycemic index of foods and its use in the dietary management of obesity.//Nutrition. – 2007. – Vol. 76, № 1. – P. 14–21.
10. The average daily rate of rational food consumption by sex and age, professional groups in Uzbekistan: SanNandR № 0105–01. –2001. – P. 25.
11. The norms of physiological needs nutrients and energy for different groups of the population of Uzbekistan: SanNandR № 0250–08. –2008. – P. 38.
12. Mamatkulov B. The bases of medical statistics (biostatistics). – Tashkent, 2005. – P. 143.

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Rehabilitation and prevention of complications after total hip arthroplasty

Abstract: A comparative analysis of the structure and frequency of complications after total hip replacement (THR) and basic methods of prevention based on experience treating 303 patients with diseases and injuries of the hip joint.

It is proved that a comprehensive system of rehabilitation of patients, which includes preoperative preparation, prevention of complications, operation planning and original methods of treatment, diagnostics and physiotherapy, for each stage of treatment, up to the final physiological and social rehabilitation, provides a significant reduction in the number of complications, achieving optimal outcomes of treatment and functional outcomes.

Keywords: treatment, prevention, complications, arthroplasty, hip joint.

Introduction

The most effective method of medical and social rehabilitation of patients with degenerative-dystrophic diseases and injuries of the hip joint is a total hip replacement surgery [1; 3; 5; 6]. It has significant advantages over traditional interventions (corrective osteotomy, arthrodesis, osteosynthesis and others), and thus is becoming more common in practice [2; 4]. The number of operations is constantly increasing and there is reason to believe that it is now more than 1.5 million operations performed annually [8]. Despite improvements in implants and surgical technique, the number of complications arising during and after THR remains quite high. It is accepted to divide these complications into intraoperative, early and late postoperative types.

Frequent early complication is a dislocation of the femoral head, which occur in 0.3–11 % of cases and more commonly — after revision arthroplasty, as well as when using the posterior approach to the joint [11]. In the first 3 months after surgery, they account for 70–90 % of the total number of dislocations and 0.5–3 % of the total number of operations [1].

In this regard, the study of the question of rehabilitation treatment and prevention of complications after THR is an important issue of reconstructive surgery.

Purpose

The purpose is to determine necessity of rehabilitation treatment and prevention of complications after THR and to determine the effectiveness of the complex developed methods of rehabilitation treatment for the prevention of early and late postoperative complications.

Materials and methods

The results of the study of 499 patients undergone surgical treatment of diseases of the hip joint were analyzed. The sample consisted of patients treated in trauma and orthopedic hospitals in Tashkent and regions of the Republic of Uzbekistan for 5 years from 2009 to 2013. Of these, 303 patients had THR and 196 patients underwent other reconstructive operations. More than a third of patients were of working age, significant share was represented by retirees, including the elderly (over 80 years). Most patients had underlying disease for 5–10 years or more. This has led to the presence of disability of different stages in half of the patients.

The main diseases that led to affecton of the hip joints were hip dysplasia, deforming coxarthrosis, rheumatoid arthritis, aseptic necrosis of the femoral head; traumatic injuries and ankylosing spondylitis. All patients had bilateral disease process. All patients had dysplastic arthrosis deformans diagnosed with stage 2 and 3, and in aseptic necrosis of the femoral head stage 3 and 4. Preoperative assessment Harris scale was 40.6 points, biomechanical parameters were affected in 86.5 % of patients.

When planning operations conventional radiographic parameters for selecting prosthesis and fixation method, as well as gender, constitutional parameters of patients and the primary disease caused by anatomical changes were taken into account.

Results and discussion.

It was found that, except for two deaths, including two patients operated on for "deep suppuration" in the joint in all cases, the wounds healed by first intention. Cases of superficial suppuration or fistula formation was not observed.

In connection with the development of various complications 5 patients have been successfully operated. Reported deaths of two patients due to pulmonary embolism, develops 1–2 days after surgery. In our study, mortality rate was lower than indicated in the literature — 0.29–0.69 % [9].

Intraoperative complications were diagnosed in 5 of 303 patients. Periprosthetic fractures were recorded in 3 cases, with an average of 0.8–2.3 %. In the early stages of work one case with massive blood loss and one premature polymerization of bone cement were noted.

The frequency of occurrence of early dislocation of the head after the THR, according to different authors, comprises 0.5–3.0 % (1.2). We have obtained this complication only in 4 observations, which is consistent with the literature.

These data on the incidence of thrombophlebitis and embolism veins of the lower extremities, including pulmonary thromboembolism fatal also comparable with literature data.

A similar conclusion can be drawn regarding cases with "deep infection", the frequency of which is minimal (0.28 %), as well as in terms of frequency of occurrence of neurological disorders (0.56 %) occurs much less frequently than other researchers mentioned.

It can be regarded as obvious that the reduction of various complications mainly due to the successful implementation of the first stages of the developed complex of rehabilitative treatment; targeted preparation of the patient and the rational planning of the operation, preventive measures, as well as the early onset of therapeutic exercises. Naturally, the leading role at this stage is a careful observance of the safety of surgical intervention with the use of modern tools.

Development of late postoperative complications often lead to reoperation and largely determines the degree of social and physiological adaptation of the patient. According to Von Knoch M. C. et al. [7] who summarized the experience of 19,680 operations, head dislocations occur in 2.6 % of cases, of which 32 % occur after 5 or more years after the surgery, which leads to the development of the instability of the endoprosthesis (EP). I. F. Akhtyamov and I. I. Kuzmin [1] indicate that the "secondary" dislocations (up to 5 years after surgery) occur in 9.6 % of cases. A relatively high incidence of this complication marked by V. I. Nuzhdin et al. [4] is to explain complex technical conditions encountered by the authors. After reimplantation of the joint due to infection the incidence of dislocations increases from 6 to 18 % of cases [10].

It should be noted that the incidence of late postoperative complications in our study was significantly lower than in many distinguished literature. This conclusion holds true for the frequency of formation after surgical complications, which we only diagnosed in 18 patients and only 10 of them belonged to 2nd and 3rd class of Harris score.

Effective complex of rehabilitative treatment as an effective method of preventing the development of postoperative complications confirms outcome assessment of hip operations on Harris score.From this it is clear that excellent and good results were achieved in 49.1 % of cases.

Primary prevention of intra- and postoperative complications was the system of remediation activities we developed at all stages of the treatment, which included:

– rational planning of the operation;

– a set of post-operative preparation: treatment of the underlying disease, relief of pain and inflammation in the affected hip by medications and physiotherapy facilities, psychological preparation of the patient, teaching patients therapeutic exercises and urging the patient its performance;

– medicational prevention;

– carefully-observance of the safetyof operation and intervention constant brigade led by an experienced surgeon and anesthetist;

– rehabilitative treatment in early, immediate and late postoperative period (up to 1 year) until complete physiological and social rehabilitation of the patient;

– antibiotic treatment carried out according to the "long-term" moment of sedation by internal administration of antibiotics for no more than 3–5 days;

– low molecular weight heparins (Fraxiparine, Clexane, Fragmin) in prophylactic doses (0.3, 04–2500 IU respectively) were used 7–10 days to prevent venous thromboembolism;

– elastic bandaging of the lower extremities is required;

– physiotherapy at all stages, starting from 1st day after surgery is included as part of the range of preventive therapy.

The effectiveness of this method is confirmed by long-term results of treatment (more than three years from the date of surgery) tracked in 67 patients of working age. It is determined that they returned to their former employment in various specialties (drivers, welders, guides, accountants, and others), and 29 of them refused to continue the disability, since they adapted well to the conditions of social and employment environments.

Thus, concluding the discussion of the problem, it should be noted that, unfortunately, it was impossible to completely avoid complications during or after THR. However, the proposed system of complex staged treatment allowed to minimize the frequency of both early and late complications.

Conclusion

1. Reduction of various complications is mainly due to the successful implementation of the first stages of complex restorative treatment we developed.

2. Development of late postoperative complications often lead to conduct reoperations and largely determines the degree of social and physiological adaptation of the patient.

3. The complex restorative treatment as an effective method of prevention of postoperative complications is confirmed by the assessment of the outcomes of hip surgery.

4. The main method of primary prevention of intra- and postoperative complications is system of rehabilitative actions we have developed which must be undertaken at all stages of treatment.

5. The proposed system of complex stage treatment enables to minimize the frequency of both early and late complications.

References:

1. Akhtyamov I. F., Kuzmin I. Errors and complications of hip replacement. – Kazan: Center of operational print, 2006. – P. 328.
2. Zagorodnii V. D. Arthroplasty during injuries and diseases of the hip joint (doctoral dissertation). – 1998. – P. 34.
3. Mamontov V. D. Infectious complications of hip replacement. Book: Traumatology and Orthopedics. Injuries and diseases of the lower limb. – St. Petersburg: "Hippocrates", 2006. – P. 251–285.
4. Nuzhdin V. I., Trotsenko V. V., Erohin P. A. Total hip replacement in patients undergoing osteotomy of the proximal femur. Bulletin of traumatology and orthopedics. – Moscow, 2007. – P. 72–79.
5. Berry D. J., Von Knoch M., Schleck C. D. The Cumulative long-Term risk of dislocation after primery Charnley Total Hip Arthroplasty.//Z. Bone Jt Sarg. – 2009: 86. – P. 9–14.
6. Koval K. C., Zuckerman Z. D. Handbook of Fractures. 2nd ed. – Lippincott Williams &Wilkens, Phil, 2010. – P. 22–24.
7. Von Knoch M., Berry D. J., Harmsen W. S. Late Dislacation after Total hip arthroplasty//Z. Bone Jt Sarg. – 2002. – 84. – P. 1949–1953.
8. Ochsner P. E. Total Hip Rentacement. – Spinger, Verlag, 2008. – P. 107–122.
9. Paavolainen P., Pakkala E., Pulkкinen P. Causes of death atter total Hip Arthoplasty: a Nation Wide cohort study with 24 638 patents.//Z. Arthroplasty, 2002. – 17. – P. 274–281.
10. Hsieh P. N., Shin C. N., Chang V. N. Two-Stage Revision Hip arthropiasty for infection: complasty for infection: Comparision between the interin use of antibiotic-loaded cement beeds and a spacer protesis.//Z. Bone Z.T Surg. Am. J. – 2004. – 86. – P. 1989–1997.
11. Wooison S. T. Intermitten Pneumatic Compression Prophylaxis for Proximal Deep Venous Thrombosis after Total Hip Replacement.//Z. Bone Jt Surg. – 2009. – Vol. 784, № 11. – P. 1735–1770.

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Children vascular anomalies management: results of photodynamic therapy in Uzbekistan

Abstract: This study reports about the role of photodynamic therapy in management of children vascular anomalies. A 3-year (2009–2012) retrospective study on the challenges and outcome of 245 children with vascular anomalies referred for surgical management was undertaken at the Tashkent Medical Academy, Uzbekistan. After multidisciplinary discussion, all patients underwent photodynamic therapy under general anesthesia, with 5-ALA as the photosensitising agent. In a time of treatment 85 out 108 patients who presented with long-term pain reported improvement after treatment. Also, 43/46 reported significant reduction of bleeding related to their vascular anomaly. Improvement of swelling was reported by 189/199 patients; while reduction of infection episodes was evident in 61/63 patients and 176/205 reported reduction in the disfigurement caused by their pathology. Clinical assessment showed that more than half of the patients had good response to the treatment. Significant clinical response was reported by 148 (60.4 %) patients, moderate result by 70 (28.6 %). Radiological and ultrasound assessment comparing imaging 6-week post-PDT to the baseline showed moderate response in 78 (31.8 %) patients and significant response in 122 (49.8 %) patients.

Keywords: haemangioma, congenital and infantile, malformations, children, laser, surgery.

Introduction

Vascular anomalies are congenital anomalies of vascular development causing a variable degree of soft tissue abnormalities. These anomalies tend to occur most commonly in the head and neck and affect approximately 1 in 22 children. The most recent classification of vascular anomalies ISSVA includes two main categories: vascular tumours and vascular malformations [14]. Vascular tumours include infantile type and congenital type haemangiomas; the former being the most common vascular tumour as well as vascular anomaly. Other types include pyogenic granuloma, tufted angiomas and haemangioendotheliomas, angiosarcomas [3].

Vascular malformations, involve a variety of aberrations including: venous, arteriovenous, capillary and lymphatic. Slow-flow ones include capillary, venous and lymphatic; while, arteriovenous malformations are fast-flow. Vascular malformations differ, from vascular tumours, by having progressively enlarging aberrant and ecstatic vessels composed of a particular vascular architecture and do not contain hyperplastic cells [10].

Haemangiomas are more common in females and 80 % occur in the head and neck. Haemangiomas, usually present as isolated, multifocal or segmental, result from endothelial cell hyperplasia. Infantile haemangioma develop shortly after birth and follow the expected course of proliferation and prolonged involution. They are one of the most vascular tumours. The rarer congenital haemangioma do not follow the same growth pattern but it does present at birth as the result of endothelial cell hyperplasia; and may rapidly involute or never involute. The cause of the aberrant and focal proliferation of endothelial cells in these lesions remains unclear [5; 6].

Venous malformations are usually slow-flow vascular malformations composed of ecstatic venous channels that continue to grow throughout the patient's life. They commonly occur in the head and neck area, with a predilection for the oral cavity, airway and muscle groups. These lesions have unpredicted growth behavior when it comes to how much growth will occur or where; and many lesions expand well beyond their initial clinical boundaries and and actual invasion of surrounding tissue may be occurring. These lesions are frequently symptomatic, depending on the locations involved and are usually obvious at birth. They fill with dependency and are compressible with variable color depending on the depth of involvement. Symptoms can be related to clot formation either from trauma or venous stasis and patients usually present with pain and swelling [2].

Lymphatic malformations are slow-flow congenital collections of ecstatic lymph vessels that form endothelial lined cystic spaces. They can be classified into macrocystic (containing cysts ≥ 2 cm.) or microcystic (< 2 cm.); the former carries a better prognosis. Usually diagnosed on prenatal ultrasound and may require special preparations for delivery if suspecting airway compromise. Lesions in the head and neck can be focal, multifocal, diffuse, macrocystic or microcystic; with frequent involvement of the oral cavity and airway [16]. If not identified prenatally, diagnosis is made during childhood with a slow growing lesion which may rapidly swell during infection or with hormonal changes. Clinical presentation include pain, swelling, dysphagia, odynophagia, airway and speech problems and recurrent infections. The lesions are fluid filled and are non-compressible [1].

Arteriovenous malformations are fast-flow vascular malformations consisting of abnormal capillary beds shunting blood from the arterial system directly into the venous system resulting in a high-flow vascular abnormality [10]. They grow throughout the patient's life and are associated with frequent and aggressive growth spurts. They are commonly identified in the lips, cheeks, neck, scalp, ear, tongue and mandible, extending to involve multiple cervico-facial regions. They clinically present with various symptoms, suggesting a spectrum of disease and not only one disease process [19].

The various therapeutic options are available for vascular anomalies as well as the recent advances in psychosocial aspects of care, interventional radiology, laser and pharmacological therapy [7, 22].

Important to choose the method of treatment depending on skin types (T. B. Fitzpatrick, 1975) — see Table 1. Because Asian people had brown color of skin, this skin type satisfy III–IV by Fitzpatrick classification scale. All surgical treatment access complicate with the scars, wich mostly visible in dark skin. Laser access can complicate with depigmentation or hyperpigmentation. Hyperpigmentation aspect binded with high ultraviolet insolation of Uzbekistan region [8].

Table 1. – Fitzpatrick skin classification

Type	Color	Reaction to sun exposure
I	White	Always burns/never tans
II	White	Usually burns/tans with difficulty
III	White	Sometimes mildburn/average tan
IV	Moderate brown	Rarely burns/tans with ease
V	Dark brown	Very rarely burns/tans very easily
VI	Black	Never burns/tans very easily

Photodynamic therapy (PDT) is a developing technology, used in the treatment of advanced tumours. The main application for PDT is to target tumours of the head and neck, gastrointestinal tract, pulmonary malignancies and skin pathologies. One advantageous feature of PDT is that it does not cause damage to nerves (cold photochemical reaction); this has lead to its use in the treatment of benign neoplasmas [4].

The effects of PDT are a result of the interaction between a photosensitiser, oxygen and light. PDT may be provided under local, regional or general anasthesia and it may be delivered by surface illumination or interstitial application, via inserted optical fibres. The photosensitiser, administered whether locally or systemically, is selectively taken up and retained by tissues with a high vascular flow rate [17]. Activation by light of a specific wavelength results in the production of oxygen free radicals or singlet oxygen which leads to apoptosis and/or direct cell death, as well as vascular shut down and subsequent inflammatory/immunological response [17].

Traditionally, light is delivered to the target tissue by surface illumination, whereby a optic probe is held over the target tissue (distance 5 cm.). It can penetrate up to a depth of 1 cm., when used with 5-ALA due to its wavelength and not properties of the photosensitiser. Interstitial PDT followed by the insertion of thin optical fibres into the needles, to allow light maximal tissue illumination [8]. The application of interstitial PDT, in combination with preoperative imaging, including computer tomography, magnetic resonance imaging (MRI) and ultrasound (US) images has been shown to improve the accuracy of the technique.

In this study we present the outcome following the management of vascular anomalies using PDT. Patients' reports on quality of life with clinical and radiological evaluation were the main parameters used to assess the outcome.

Material and methods

In this clinical study, 245 patients were referred between 2009 and 2012 to the General and Maxilla-facial Surgery Department, Tashkent Medical Academy (Uzbekistan) for

treatment of vascular anomalies. Demographics of these patients are characterized by the following quantities.

Gender: male — 54 patients (22 %); female — 191 (78 %).

Age (years): mean — 1.2; minimum–maximum — 0.1–3.4; stand. deviation — 0.4.

Race and type of skin by Fitzpatrick scale: Central Asian — 220 patients (89.8 %), among them I type — 8 (3.6 %), II — 26 (11.8 %), III — 80 (36.3 %), IV — 68 (30.9), V — 38 (17.2 %). European — 19 patients (7.7 %), among them I type — 5 patients (26.5 %), II — 14 (73.6 %). Different with VI type — 6 patients (2.4 %).

Primary site position are: oral cavity — 25 patients (10.2 %); upper face — 37 patients (15.1 %); middle face — 62 (25.3 %); lower face — 46 (18.8 %); neck — 38 (15.5 %); thorax, abdomen — 13 (5.3 %); upper extremity — 18 (7.3 %); lover extremity — 6 (2.4 %).

Vascular tumours included: infantile haemangioma — 74 patients (30.2 %); congenital haemangioma — 6 (2.4 %).

Vascular malformations included: venous malformation — 46 patients (18.8 %); lymphatic malformation — 57 (23.3 %); arteriovenous malformation — 62 (25.3 %).

Disease staging: local (localised) — 35 patients (14.3 %); regional (extended) — 210 (85.7 %).

Presentations: disfigurement — 205 patients (83.7 %); swelling — 199 (81.2 %); pain — 108 (44.1 %); infection — 63 (25.7 %); breathing problems — 5 (2.0 %); bleeding — 46 patients (18.8 %).

Previous management included: surgery — 78 patients (31.8 %); embolisation — 8 (3.3 %); sclerotherapy — 46 (18.8 %); alcohol therapy — 28 (11.4 %); CO_2 laser — 68 (27.7 %); adjuvant chemoradiotherapy — 11 (4.5 %); none — 6 patients (2.4 %).

The patients' symptom-related disease included pain, bleeding, swelling, infection, disfigurement, breathing problems. One hundred eight patients observed with chronic/recurrent pain which was associated with local pressure of the anomaly on nearby nerves. 46 patients observed bleeding which was mostly associated with trauma to their haemangiomas and arteriovenous malformations. Swelling problems were reported in 199 patients, while disfigurement was reported in 205 patients. Recurrent infection was identified in 63 patients, mostly in patients with lymphatic malformations. Breathing difficulties was associated with pathological growth in the nasal region in 5 patients.

The anomaly volume was assessed using preoperative imaging (MRI, US).

Further conventional treatment rejected by 165 patients (67.3 %); further treatment not offered to 80 (32.7 %).

78 patients refused further conventional therapy (i. e. surgery) and elected to receive PDT, while 80 patients were not offered further conventional treatment and elected to receive PDT; the other 87 patients chose to undergo PDT.

All patients were discussed at a multidisciplinary meeting involving surgeons, radiation and medical oncologists, interventional clinical radiologists and allied healthcare professionals. It was agreed to offer PDT under general anesthesia, using 5-ALA (alasens) as the photosensitising agent. Photosensitizer doses were 200 mg/kg intravenous for malformation, 500 mg. as 20 % ointment was administered on skin surface, or 3 % solution inject into vascular anomaly 6 hours (min 6, max 24) prior to light treatment. Irradiation was carried out at a energy fluence of 10–20 J/cm^2 and a standardised fluence rate (power density) of 100 mW/cm^2. This would allow the agent to accumulate in the pathological area which would increase effectivity. Patients were usually kept in a side room (with a dim light) to avoid systemic photosensitisation. Intraoperatively, an US probe was used to examine the centre and periphery of the anomaly when assessing volume, depth, invasion of large vessels, hollow organs and/or hard tissue. This was followed by insertion 18 Gauge 70 mm. long spinal needles under US-guidance into the target tissue. Great care was taken to ensure that the needles are inserted parallel to each other with 7–9 mm. distance in between. If the treatment was close to a major blood vessel, a safety distance of 1 cm. between the needle and the vessel was implemented.

An Iso-illumination treatment plan was carefully implemented and supervised by a senior physicist to ensure adequate light delivery to all suspect areas. A 635 nm. wave-length diode laser was used for illumination. Diffuser fibres were used with/out bare polished tip fibres, with a core diameter of 400 μm., to deliver light. Light energy was then delivered from the fibres to the target tissue at 20 J per site. Tissues outside the target area were shielded completely to avoid photoactivation by scattered or reflected light.

All precautions were taken to avoid direct illumination of the patient with surgical lamps in theatres. Unplanned or emergency surgical interventions within 30 days from the photosensitiser administration were undertaken only if absolutely necessary and the potential benefits outweigh the risk to the patient. Precautions were applied to avoid exposure of skin and eyes to direct sunlight or bright indoor light during the first 15 days after injection. Patients were re-introduced to normal light gradually. No drug interactions have been observed.

The number of PDT rounds was: 1 session obtained 39 patients (15.9 %); 2 — 13 (5.3 %); 3 — 159 (64.9 %); 4 — 11 (4.5 %); 5 — 23 (9.4 %).

The patients were discharged from hospital care at a mean of 5 days (min 3, max 9) postoperatively. Patients were followed-up and asked to report on the outcome of their therapy if there is any improvement, no change or worsening of symptoms. Clinical assessment outcome was performed by a team of surgeons/physicians trained in PDT at approximately 6 weeks postoperatively. The clinical assessment criterion was based on reduction of lesional size and improvement of the initial clinical symptoms.

MRI imaging and US was performed 5–6 weeks postoperatively. Comparisons were then made to assess radiological outcome. Our radiological assessment parameters included: no response-progressive disease (increase in pathology size), no response-stable disease (no change in pathology size),

minimal response (reduced size by < 25 %), moderate response (reduced size by < 50 %) and significant response (reduced size by 50–75 %). Identification of peri-lesional inflammation, assessing response to PDT, was also reported. The time between the rounds was 3–6 months, with treatment indicated when the patient becomes symptomatic. The mean follow-up for those patients was 21 months (min 5, max 45, stand. deviation — 4.3).

The results of study were performed using the SPSS 17 (Statistical Package for Social Scientists) by an independent statistician. The patients' data were entered onto proformas which were validated and checked by interval sampling. The fields included a range of clinical, operative and radiological parameters related to the outcome following photodynamic therapy. The results were cross tabulated and the Chi-squared statistic was used to test for differences in the incidence of outcome. Fisher's exact test was used for the analysis of contingency tables and therefore to measure the *P*-value.

Results

Eighty five out of 108 patients (78.7 %) who presented with long-term or recurrent pain reported significant improvement of their symptoms ($P < 0.001$); while the rest 23 of the group (21.2 %) reported no change. Worsening was not be observed.

Also 43 of 46 patients (93.5 %) with bleeding problems reported improvement ($P < 0.001$), 3 patients (6.5 %) remained without changes, and nobody was reported about worsening bleeding episodes.

Swelling improvement was observed in 189 of 199 patients (95.0 %, $P < 0.001$); no changes reported 10 patients (5.0 %).

176 of 205 patients (85.9 %, $P < 0.001$) reported improvement of their disfigurement, and 29 (14.1 %) remained without changes.

Rate of infection problems, connected with hemangioma and malformations, was reduced in 61 of 63 patients (96.8 %, $P < 0.001$), and only 2 (3.2 %) have not improvement.

3 patients of 5 ones (60.0 %, $P < 0.001$) with breathing problems observed improvement; 2 (40.0 %) remained without changes.

Clinical assessment showed that good responce on PDT had 148 (60.4 %) patients of 245; 70 (28.6 %) — moderate response, 22 (9.0 %) — minimal, and only 5 (2.0 %) — no response.

Radiological images assessment before and 6 week after PDT treatment showed stable pathology with no change in size in 23 (9.4 %) of 245 patients; minimal response (< 25 % reduction) — in 37 (15.1 %) patients, moderate response (<50 % reduction) — in 78 (31.8 %) patients, and significant response (50–75 % reduction) — in 122 (49.8 %) patients. 5 patient (2.0 %) during the treatment showed pathology progression (lymphangioma of the mid face).

Complications of PDT: pain was reported by 12 patients (4.9 %) and was mild-moderate; bleeding — 5 patients (2.0 %); swelling — 40 (16.3 %); infection — 2 (0.8 %); skin burn — 6 patients (2.4 %), in sequence they were observed hyperpigmentation. Skin ulceration/necrosis, sensory and motor nerve injury and hypopigmentation are not observed.

Discussion

Hemangioma prognosis established that hemangioma resolve in 50 % children by 7 of age. This case leads physicians to manage these patients conservative approach, but recent studies showed that patients may present with disease specific complication. This condition requires intervention and complete resolution is quite difficult to achieve. Problematic haemangiomas can cause severe functional issues including ulceration, disfigurement and affect breathing, swallowing and speech. Common locations for these problematic haemangiomas include face, ear, orbit, lower lip and airway [14].

Conventional management can include systemic or intra-lesional corticosteroids, beta blockers, chemotherapeutic agents, surgery, laser or a combination of these methods. Where lesions are large, surgery can have marked adverse effect on form and function and due to difficulty in delineating these lesions recurrences can be high. The side effects of chemotherapy are well known and radiotherapy carries the risk of inducing new tumours. Propranolol, a known non-selective beta-blocker, has been reported to induce regression in haemangiomas in newborns [11].

Conservative measures have been initially applied in the treatment of venous malformations but it had little effect. It can be usefull to control growth of large lesions.Other interventional measures were applied and found to be effective, including laser surgery, sclerotherapy and surgery. Laser ablation is the gold standard management of mucosal and skin malformations. Commonly in Asian patient should be carefully applied, to prevent laser pigment skin complication. Sclerotherapy remains a good option and several authorities recommend its application with more literatures emerging regarding different techniques and injectable substances [18].

Spontaneous resolution of lymphatic malformations is extremely rare. The lesions that have been reported to resolve without treatment were small, macrocystic and within the posterior triangle of the neck [12]. Sclerotherapy is the most common intervention in many centres around the world. Laser surgery have been reported as the most useful in the management of airway malformations and vesicular eruptions on mucosal surfaces. However, when it comes to complex lesions surgery is always considered as the first option. Resection of all diseased tissue is advocated as failure results in regrowth. Several studies have reported the use embolisation with varying substances (i. e. glue, coils and alcohol) in the management of arterio-venous malformations. This is mainly used in small and focal arterio-venous malformations, but can be used in very large life-threatening arterio-venous malformations, followed by microvascular free flaps to reconstruct the defect.

Since PDT is a non-heat generating process, there is no bystander tissue heating, and connective tissues such as collagen and elastin are largely unaffected. As a result, many tissues heal with little scarring in comparison to thermal treatment

and hollow organs such as trachea, the gastrointestinal tract and major blood vessels maintain their mechanical integrity. PDT not effect on pigmentary layer of the skin and can be applied to all types of skin [20].

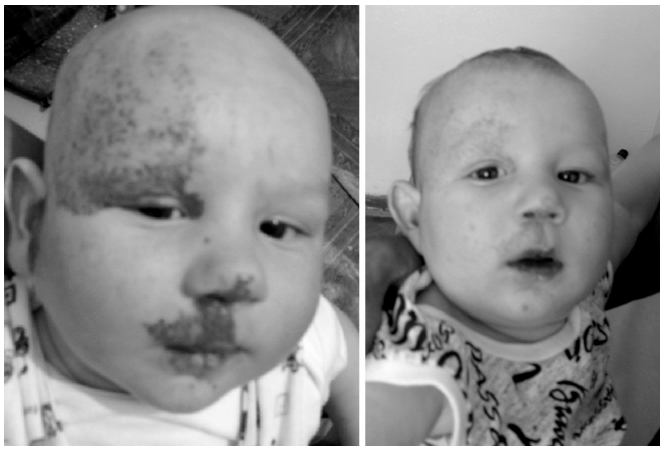
The effectiveness of PDT is dependant on the dosimetric profile. Ideally one would quantify the distribution of the light, fluence rate, the optical properties, the drug concentration and tissue oxygenation for PDT. The other advantage of PDT is that it can be repeated without cumulative toxicity. The success of PDT is dependent on upon the depth of necrosis being greater than the depth of the individual malformation. Thus, interstitial PDT represents as ideal, in that it allows more effective treatment of the target tissue volume [20].

This clinical study highlights the advantage of US, in combination with PDT. It is relatively simple to perform, easily available and examinations are non-invasive. It is inexpensive, quick, and convenient and there are no known harmful effects, since it uses non-ionising radiation suited to the soft tissues and it does not cause any pain. Ultrasound can be used to guide the optical fibres to the appropriate disease volume, enabling more accurate evaluation of treatment doses.

Conclusion

The management of vascular anomalies continue to be extremely challenging. Although several modalities have been developed and the literature reports successful treatment in many, data from long term studies reports relapse in many and the need for re-treatment or another intervention. PDT is not superior to other modalities, but it is characterised by being one of the least invasive, being repeatable with no residual toxicity and with a minimal bystander effect on the overall tissue architect and integrity as well as nerves.

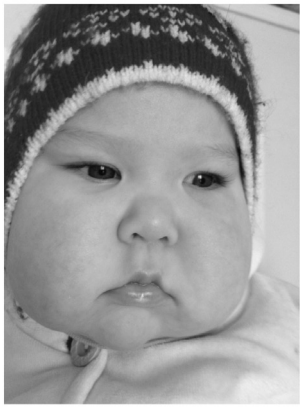
The growing body of evidence regarding its efficacy, the increasing use of image guided PDT, and the innate minimally invasive characteristics of PDT suggest that it should become an important addition to the various techniques used in the management of vascular anomalies.



Before After

Fig. 1. Capillary malformation (upper eyebrow, lips) subjected to PDT. Clinical evaluation reported good response to the therapy. Radiological response was significant

Before PDT



After PDT

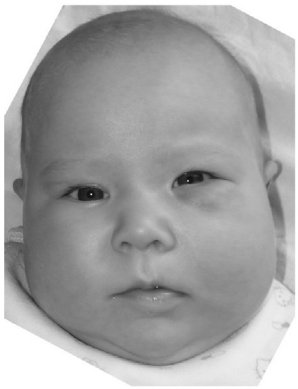
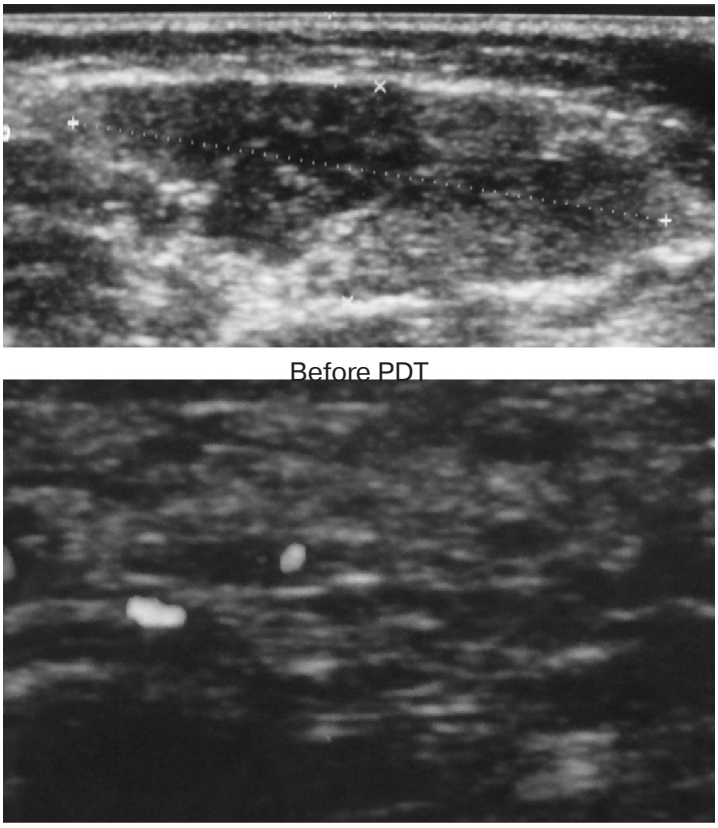


Fig. 2. Venous malformation (lower eye lid) subjected to PDT. Clinical evaluation was good response



Before PDT

After PDT

Fig. 3. Doppler ultraltrasound evaluation reported good response to the therapy

References:

1. Blei F. Congenital lymphatic malformations.//Ann. N. Y. Acad. Sci. – 2008. – 1131. – P. 185–194.
2. Boon L. M. Glomuvenous malformation (glomangioma) and venous malformation: Distinct clinico-pathologic and genetic entities./L. M. Boon, J. B. Mulliken, O. Enjolras, M. Vikkula M.//Arch. Dermatol. – 2004. – Vol. 140, № 8. – P. 971–976.
3. Buckmiller L. M. Diagnosis and management of hemangiomas and vascular malformations of the head and neck./L. M. Buckmiller, G. T. Richter, J. Y. Suen//Oral Dis. – 2010. – Vol. 16, № 5. – P. 405–418.
4. De Visscher S. A. mTHPC mediated photodynamic therapy (PDT) of squamous cell carcinoma in the head and neck: A systematic review./S. A.de Visscher, P. U. Dijkstra, I. B. Tan et al.//Oral Oncol. – 2012. – № 12. – P. 1368–1375.
5. Drolet B. A. Hemangiomas in children./B. A. Drolet, N. B. Esterly, I. J. Frieden//New Engl. J. Med. – 1999. – Vol. 341, № 3. – P. 173–181.
6. Duyka L. J. Progesterone receptors identified in vascular malformations of the head and neck./L. J. Duyka, C. Y. Fan, J. M. Coviello-Malle et al.//Otolaryngol. Head Neck Surg. – 2009. – Vol. 141, № 4. – P. 491–495.
7. Ethunandan M. Haemangiomas and vascular malformations of the maxillofacial region: review./M. Ethunandan, T. K. Mellor//Brit. J. Oral Maxillofac. Surg. – 2006. – Vol. 44, № 4. – P. 263–272.
8. Fitzpatrick T. B. Soleil et peau.//Journal de Médecine Esthétique. – 1975. – № 2. – P. 33–34.
9. Hennig G. Photobleaching-based method to individualize irradiation time during interstitial 5-aminolevulinic acid photodynamic therapy./G. Hennig, H. Stepp, A. Johansson//Photodiagnosis Photodyn. Ther. – 2011. – Vol. 8, № 3. – P. 275–281.
10. Jeong H. S. Treatment for extracranial arteriovenous malformations of the head and neck./H. S. Jeong, C. H. Baek, Y. I. Son et al.//Acta Otolaryngol. – 2006. – Vol. 126, № 3. – P. 295–300.
11. Kohout M. P. Arteriovenous malformations of the head and neck: Natural history and management./M. P. Kohout, M. Hansen, J. J. Pribaz, J. B. Mulliken//Plast. Reconstr. Surg. – 1998. – Vol. 102, № 3. – P. 643–654.
12. Léauté–Labrèze C. Propranolol for severe hemangiomas of infancy./C. Léauté–Labrèze, E. Dumas de la Roque, T. Hubiche et al.//New Engl. J. Med. – 2008. – Vol. 358, № 24. – P. 2649–2651.
13. Mavrikakis I. The role of thrombosis as a mechanism of exacerbation in venous and combined venous lymphatic vascular malformations of the orbit./I. Mavrikakis, M. K. Heran, V. White, J. Rootman//Ophthalmology. – 2009. – Vol. 116, № 6. – P. 1216–1224.
14. Mulliken J. B. Classification of pediatric vascular lesions./J. B. Mulliken, J. Glowacki//Plast. Reconstr. Surg. – 1982. – Vol. 70, № 1. – P.120–121.

15. North P. E. Congenital non–progressive hemangioma: A distinct clinico–pathologic entity unlike infantile hemangioma./ P. E. North, M. Waner, C. A. James et al.//Arch. Dermatol. – 2001. – Vol. 137, № 12. – P. 1607–1620.
16. Perkins J. A. Clinical outcomes in lymphocytopenic lymphatic malformation patients./J. A. Perkins, R. M. Tempero, M. C. Hannibal, S. C. Manning//Lymphat. Res. Biol. – 2007. – Vol. 5, № 3. – P. 169–174.
17. Richter G. T. Arteriovenous malformations of the tongue: A spectrum of disease./G. T. Richter, J. Suen, P. E. North et al.//Laryngoscope. – 2007. – Vol. 117, № 2. – P. 328–335.
18. Sandell J. L. A review of in–vivo optical properties of human tissues and its impact on PDT./J. L. Sandell, T. C. Zhu//J. Biophotonics. – 2011. – Vol. 4, № 11–12. – P. 773–787.
19. Schumacher M. Treatment of venous malformations – comparison to lymphatic malformations./M. Schumacher, U. Ernemann, A. Berlis, J. Weber//Lymphology. – 2008. – Vol. 41, № 3. – P. 139–146.
20. Seccia A. Combined radiological and surgical treatment of arteriovenous malformations of the head and neck./A. Seccia, M. Salgarello, E. Farallo, P. G. Falappa//Ann. Plast. Surg. – 1999. – Vol. 43, № 4. – P. 359–366.
21. Svanberg K. Photodynamic therapy: superficial and interstitial illumination./K. Svanberg, N. Bendsoe, J. Axelsson et al.//J. Biomed. Opt. – 2010. – Vol. 15, № 4. – P. 041502.
22. Wu J. K. Auricular arteriovenous malformation: Evaluation, management, and outcome./J. K. Wu, A. Bisdorff, F. Gelbert et al.//Plast. Reconstr. Surg. – 2005. – Vol. 115, № 4. – P. 985–995.

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The choice of treatment of patients with liver echinococcosis in children

Abstract: For the Article by Salimov Sh. T. as co-author on the topic: "The choice of treatment in patients with hepatic echinococcosis in children". The article analyzes the results of treatment of 96 patients aged 3 to 18, who underwent laparoscopic echinococcectomy between 2007 and 2015. Solitary echinococcosis was detected in the liver of 66 (68.8 %) patients, multiple (two or more cysts) — in 30 patients (31.2 %). A total of 147 echinococcus cysts were removed.

Of the 96 taken laparoscopic liver echinococcectomy in 7 (7.3 %) cases due to intrahepatic localization of the cyst and due to technical difficulties, conversion was required.

Residual cavities located in the anterior segments of the liver — were laparoscopically sutured inside. Rigid RC (residual cavities) of IV–V liver segments in the vicinity of the gate of the liver and gall bladder were dabbed with greater omentum. Fibrous capsule of residual cavity of visceral surface of the liver was excised circularly within the liver tissue and external drainage was performed. Medium and large size of the residual cavity of VI–VII and VIII segments of the liver, after excision of the fibrous capsule was drained as well. In fine and small residual cavity of echinococcus cyst was performed laparoscopic coagulation of the inner wall of the fibrous capsule with abdominization without drainage

In 89 (92.7 %) patients after laparoscopic liver echinococcectomy postoperative period was much more favorable than after traditional echinococcectomy. Patients intensified by the end of 1–2 days. 5 (5.2 %) patients had bile leakage on drainage, which independently docked at 8–11 day, suppuration of the residual cavity was observed in — 3 (3.1 %), non-parasitic cyst formation in the late period was observed in 7 (8.3 %) patients. The average hospital stay in the postoperative period was 6.5 ± 0.5 bed days.

Laparoscopic elimination of residual cavity at echinococcectomy liver with kapitonnage, external drainage, abdominization, omentoplasty methods is accompanied by a significant attenuation of the cavity and extends the subsequent elimination of the residual cavity.

Keywords: echinococcosis, liver, surgical treatment, children.

The rapid development of modern endovideosurgery technologies significantly expand the list of possible surgical procedures performed by minimally invasive means. Interest in use of modern laparoscopic technology in liver echinococcosis caused by the fact that traditional interventions are accompanied by severe surgical trauma and long-term rehabilitation of patients [2; 4; 8].

According to M. A. Aliev etc al. [3], the broad introduction endovideosurgery treatment of parasitic cysts in liver prevents mainly following: the likelihood of contamination of the abdominal cavity, the lack of an effective method of disinfection, the problem of eliminating the residual cavity of liver [1; 6].

Until now, surgeons not reached unanimity in the selection methods of processing the fibrous capsule and ways to eliminate residual cavities arising after echinococcectomy [10; 12].

Despite the large number of investigations that proved the invasion scoleces of fibrous sheath, the ratio of surgeons to this issue remains controversial. Series of clinicians consider leaving the fibrous sheath with careful antiparasitic treatment is quite reasonable, and other a radical operation is considered complete removal of the fibrous capsule [7; 9].

Traditional removal of hydatid cysts of liver by laparotomy and body surgeries blowing pushes them to the rank of operations of despair. A number of children's surgical clinics designed testimony and introduced into clinical practice of minimally invasive methods of treatment of parenchymal organscysts: laparoscopic and percutaneous puncture-removal of which have an undeniable advantage safety of organ. Overview of the current state of the problem points to the absence of diagnostic difficulties in echinococcosis of abdominal cavity and need to justify a single treatment and tactical concepts, to find the most radical way of getting rid of the child from minimally invasive parasitic liver cysts [5; 11; 13].

The purpose of research — to evaluate the therapeutic tactics and ways to improve the elimination of residual cavities after laparoscopic echinococcectomy of liver in children.

Material and research methods. In the period from 2007 to 2015 we analyzed the results of treatment of 96 patients aged 3 to 18 years who underwent laparoscopic echinococcectomy with the principles aparasitics. Solitary echinococcosis was detected in liver — in 66 (68.8 %) patients, multiple (two or more cysts) –in 30 patients (31.2 %).

Among the patients we observed a primary hydatid – in 81 (84.4 %), recurrent – in 15 (15.6 %) children. There were removed 147 echinococcosis cysts (EC).

When analyzing the clinical materials we have adhered to the EC classification by size and scope of the proposed by A. T. Pulatov (1983). Among them, small EC of liver were in 9 (9.4 %), small – in 26 (27.1 %), secondary in 43 (44.8 %), large in 18 (18.7 %).

The most frequently (over 70.8 %) EC were located in the right lobe of liver, in 26 (16.6 %) patients had defeated both lobes (Table 1).

Table 1. – Distribution of patients according to localization of cysts

Localization	Fine cyst	Small cyst	Average cyst	Big cyst
Right proportion	4 (4.2 %)	15 (15.6 %)	24 (25.0 %)	9 (9.4 %)
Left proportion	2 (2.1 %)	8 (8.3 %)	12 (12.5 %)	6 (6.3 %)
Both proportion	3 (3.1 %)	3 (3.1 %	7 (7.3 %)	3 (3.1 %)

The right lobe of the most frequently localized in EC V–VI–VII–VIII, the left lobe — II–III segment (Table 2).

During the investigation of patients we used traditional methods of research: clinical and biochemical blood tests, immunological tests, ultrasound and CT of the abdomen.

Clinical and biochemical blood parameters were determined in all patients at admission and during the treatment.

A survey of various forms of echinococcosis liver using ultrasound showed that in most cases, using ultrasonography can get detailed information for setting a definite diagnosis. Ultrasonography of the abdomen and retroperitoneal space was performed on devices «Aloka 1100» and «Philips Clear Vue 350». They use sensors of linear and convex type with an operating frequency of 3.5; 5 and 7.2 MHz.

MSCT was performed only in cases of doubt, for the differential diagnosis festering EC differentiation of parasitic and non-parasitic cysts of liver, with recurrent lesions as well as with multiple cysts and combined lesions of other organs of the abdominal cavity. MSCT was performed in 47 (23.1 %) children, with apparatus "Brilliance 64 Philips" and "Ge, Light Speed 64", which allowed to determine the exact topographic localization of EC communication of the great vessels, the size, the volume of the cyst.

Table 2. – The distribution of patients depending on the number and localization of EC in liver segments

Liver segments	Quantity of cysts	%
II	8	5.4
II–III	5	3.4
IV	13	8.8
III–IV	7	4.9
V	19	12.9
V–VIII	11	7.5
IV–V	9	6.1
VI	10	6.8
V–VI	13	8.8
V–VI–VII	8	5.4
VII	19	12.9
VIII	18	12.2
VI–VII–VIII	7	4.9
Altogether 147		100

Results and discussion

Since 2007, in our clinic at the echinococcosis disease of the abdominal cavity, we give preference endovisual-laparoscopic echinococcectomy of the benefits that are undeniable, compared with traditional "open" echinococcectomy. With regard to the method of percutaneus-puncture, which has recently become widely practiced in adult surgery, we take this method very carefully consider the use of this method due to the possibility of dissemination the parasite of abdominal cavity. It is known that even in the structure of EC of adult and child are distinguished by different characteristics. Children very rarely observed calcification cysts relatively thin chitinous shell and the pressure in the cavity of the EC is higher than in adults, so now the most optimal believe laparoscopic echinococcectomy.

Hitherto 96 taken laparoscopic liver echinococcectomy in 7 (7.3 %) cases, in connection with intrahepatic localization of cysts and because of technical difficulties required conversion; followed by "open" traditional echinococcectomy.

When laparoscopic echinococcectomy satisfy the following necessary stages of intervention:

To comply with the principles aparazitic operations to avoid getting the contents of the EC in the abdomen, the operation zone cover with gauze soaked in a solution of 100 % glycerol, a cyst summed belay tube electric pumps.

- *Puncture of the cyst with the evacuation of the liquid contents of electric pumps.*
- *Opening of the fibrous capsule cysts, removal of chitin shells were left with the evacuation of the contents.*
- *Antiparasitic treatment of residual cavity echinococcosis wall.*
- *Revision of residual cavities, the complete removal of the cuticular membrane and detection of biliary fistulas using endovideoscopic residual cavity of the liver.*
- *If find gall fistula his coagulated with endoscopic bipolar coagulator or sewn thread Ethibond № 3.0–4.0.*

The elimination of the residual cavity (RC) is the final stage of liver surgery for liver echinococcosis. RC that located in the anterior segments of the liver with a thin wall of fibrous capsule unrigid laparoscopic sutured inside. Rigid RC in IV–V liver segments in the vicinity of the gate of the liver and gall bladder dab greater omentum. Fibrous capsule RC visceral surface of the liver was excised circularly within the liver tissue was performed and external drainage. Medium and large size of the residual cavity in VI–VII and VIII liver segments, we are also after excision of the fibrous capsule drained. The RC with small and little EC after the above described steps necessary laparoscopy performed coagulation of the inner wall of the fibrous capsule abdominisation of RC without drainage (Table 3).

Table 3. – Methods for elimination of residual cyst cavity after laparoscopic liver echinococcectomy

Types of laparoscopic management	Quantity of cysts n = 147	
	abs.	%
Laparoscopic suturing echinococcectomy of residual cavity inside	37	25.2
Laparoscopic partial excision echinococcectomy fibrous capsule, swabbing to backfilling of residual cavity	28	19.0
Laparoscopic partial excision echinococcectomy fibrous capsule with external drainage	51	34.7
Laparoscopic partial excision echinococcectomy fibrous capsule unipolar coagulation of the inner wall of the fibrous capsule abdominisation of residual cavity without drainage	31	21.1

In all cases, removal of cysts bed under hepatic and/or under the diaphragmatic region, depending on the localization of cysts drainage.

In 89 (92.7 %) patients after laparoscopic liver echinococcectomy in postoperative period was significantly more favorable than after traditional echinococcectomy. Patients intensified by the end of 1–2 days. In 5 (5.2 %) patients had bile leakage of drainage, which independently docked at 8–11 hours, festering RC noted in — 3 (3.1 %), education, non-parasitic cysts in the long-term period was observed in 7 (8.3 %) patients (Table 4).

In 4 cases, the formation of non-parasitic cysts larger than 5 cm. and in 2 patients with suppuration of the residual cavity under ultrasound failed to produce a percutaneous drainage. In these patients, postoperative complications were observed. The average hospital stay in the postoperative period was 6.5 ± 0.5 bed-days.

Table 4. – Postoperative complications after laparoscopic liver echinococcectomy

Types of complications	Laparoscopic echinococcectomy n = 89
Suppuration of the residual cavity	2 (2.2 %)
Forming nonparasitic cysts	7 (7.9 %)
Bile leakage from residual cavity	5 (5.6 %)
Altogether	15 (16.9 %)

Conclusion:

Laparoscopic liquidation RC echinococcectomy capitonnage of liver, external drainage, abdominisation, omentoplasty accompanied by a significant decrease of the size of the cavity and extends the capabilities of the subsequent liquidation of RC.

Laparoscopic elimination of residual cavities reduces the incidence of postoperative complications, reduce the duration of postoperative hospital treatment of the patient.

Application endovideosurgery intervention echinococcosis of liver disease in children, showed its obvious benefits, which makes them promising direction in Pediatric Surgery.

References:

1. Abdufatev T. A. New way to eliminate residual cavity during echinococcectomy in 2, 3, 5, 6 segments of the liver in children./T. A. Abdufatev, S. B. Davlyatov, H. I. Ibodov, etc.//Annals of Surgical Hepatology. – 2006. – T. 11, № 3. – P. 176.
2. Alikhanov R. B. Laparoscopic echinococcectomy: Analysis of short- and long-term results./R. B. Alihanov, S. I. Emelyanov, M. A. Hamidov//Annals of Surgical Hepatology. – 2007 – T. 12, № 4. – P. 7–10.
3. Aliev M. A., Seisembayev M. A., Doskaliev M. A., Belek J. O., Djorobekov A. D., Alaiku S. M. Echinococcectomy using the laparoscopic technique: Fast lecture. 1 All-Russian conf. for endoscopic surgery. The endoscopic Surgery. – 1997. – 1: 40.
4. Vetshev P. S. Echinococcosis: A modern view on the status of the problem./P. S. Vetshev, G. H. Musaev//Annals of Surgical Hepatology. – 2006. – T. 11, № 1. – P. 111–117.
5. Gergenreter Y. S. Surgical treatment of hepatic echinococcosis.//Bulletin of Medical Internet conferences. – 2011. – V. 1, № 1.
6. Nartaylakov M. A. New technologies in the surgical treatment of liver echinococcosis./M. A. Nartaylakov, I. A. Safin, D. R. Musharapov//Annals of Surgical Hepatology. – 2008 – T. 11, № 3. – P. 52.
7. Lotov A. N. Sparing surgery for liver echinococcosis/A. N. Lotov.
8. Karimov S. I. Problems and prospects of surgical treatment of patients with liver and lung echinococcosis./Sh. I. Karimov, N. F. Krotov, V. L. Kim, U. B. Berkinov//Annals of Surgical Hepatology. – 2008. – T. 13, № 1. – P. 56–60.
9. Karimov S. I. Laparoscopic and Video-intervention in surgery of liver echinococcosis./Sh. I. Karimov, N. F. Krotov, S. E. Mamaradzhabov//Annals of Surgical Hepatology. – 2007 – T. 12, № 4. – P. 91–96.
10. Khamidov A. Dynamics of reduction of residual cavities after liver echinococcectomy./A. I. Khamidov, I. G. Akhmedov//Annals surgical hepatology. – 2000. – № 5. – P. 38–41.
11. Dagher I. Laparoscopic liver resection: results for 70 patients./I. Dagher, J. M. Proske, A. Carloni et al.//Surg. Endosc. 2007. – V. 21, № 4. – P. 619–624.
12. Yaghan R., Heis H., Bani-Hani K. et al. Is fear of anaphylactic shock discouraging surgeons from more widely adopting percutaneous and laparoscopic techniques in the treatment of liver hydatid cyst?//Am J Surg. – 2004. – 187: 4: 533–537.
13. Kapan M., Yavuz N., Kapan S. et al. Totally laparoscopic pericystectomy in hepatic hydatid disease.//J Laparoendosc Adv Surg Tech A. – 2004. – 14: 2: 107–109.

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The state of hemostasis in patients with premature abruptio of normally situated placenta in women with thrombophilia

Abstract: In article the questions, concerning features of a hemostasis of pregnant women are considered at placentary insufficiency, with the increased maternal and perinatal risk at aberrations in system of regulation of an aggregate state of blood against thrombophilia.

Keywords: placental abruption, thrombophilia, pregnancy.

Actuality. The acute placental insufficiency, which develops as a result of premature abruptio of normally situated placenta, presents specific clinical problem in modern obstetrics. Despite the fact that this complication of pregnancy and childbirth, occurs with a frequency up to 0.5–1.2 %, it is always considered as a state of vital danger, as in 30 % of cases it is

a cause of massive hemorrhage, leading to maternal mortality. Perinatal mortality in case of premature abruptio of normally situated placenta can reach 25 %. Children, who have been born by mothers with placental abruption, have a high risk of neurological pathology development. The hemostatic system plays an important role in the pregnancy development, starting from the ovulation and implantation processes and up to placental complex functioning. It is known that in women who had miscarriages before 12 weeks of pregnancy, most frequent can be observed such complication as severe preeclampsia, the syndrome of fetal growth retardation, intrauterine fetal death, premature abruptio of normally situated placenta (PANSP) [2; 5]. Perhaps exactly hemostatic system failure, which occurs at the early stages of pregnancy, makes negative contribution to the quality and depth of implantation and subsequent placental development.

Nowadays there is no doubt that thrombosis is one of the main causes of deaths in the world. Many researchers indicate that for every 1,000 births fall 2–5 cases of thrombotic complications [3; 8; 9]. Up to 50 % of venous thromboses occur in patients up to 40 years, and, as a rule, they are associated with pregnancy.

Number of works emphases the role of blood coagulation system changes in in the origin of premature abruptio of normally situated placenta [9; 11]. The risk of venous thromboembolic disorders development in pregnant women is 4–10 times higher than in nonpregnant women of the same age. Herewith the risk increases with the pregnancy beginning and reaches a maximum in the postnatal period [6; 7]. To estimate degree of risk of pregnancy complications development in case of thrombophilia, information about the proband's genetic features is not enough. Most likely, the risk can be adequately assessed only with regard to genetic defects phenotypic manifestations that manifest with clinical symptoms of thrombophilia and can be detected by coagulation system studying [9; 10].

Aim. The aim of this study is to investigate the state of coagulation system in case of PANSP on the background of thrombophilia.

Materials and methods. Investigation of the state of coagulation system has been carried out in 70 (main group) pregnant women with complicated obstetric history and premature abruptio of normally situated placenta (PANSP). The age of patients ranged from 18–40 years, and average meaning was 28.2 ± 0.7 years.

The average gestation term at labor in patients of the main group was 34.2 ± 0,5 weeks. Very early premature labor (VEPL) occurred in 6 patients (12 %) with gestational age of 23–24 weeks, early premature labor (EPL) occurred in 4 (8 %) patients with gestational age of 30–33 weeks, premature labor (PL) occurred in 9 (18 %) patients with gestational age of 34–36 weeks, and in the rest 51 (62 %) labor occured in gestational age of 37–40 weeks. Therefore, the majority of examined women (88 %) at the time of delivery were in the third trimester of pregnancy, according to the WHO nomenclature.

The control group consisted of 20 women with uncomplicated pregnancy and "physiological hypercoagulation" in similar periods of gestation, which have vaginal delivery. The standardized tests, which can characterize all phases of blood coagulation: activated partial thromboplastin time (APTT), prothrombin time (PT), prothrombin index (PTI), and the level of fibrinogen in plasma, have been used for hemostasis system state examination.

Identification of blood thrombogenic activity markers (thrombinemia) included an assessment of the soluble fibrin-monomeric complexes (SFMC) level.

The state of platelet hemostasis link has been assessed by the number of platelets in citrated blood in the Goryayev's camera using phase contrast determining.

Results and discussion. According to the obtained data of conducted hemostasis studies (table), the number of platelets in the peripheral blood of the patients from the main group according to the average values did not significantly differ from results obtained from women from the control group (to 211.3 ± 2.1*10^9/l and 218.2 ± 4.3 *10^9/l; $p > 0.05$) that correspond to the data of V. N. Serova, A. D. Makatsaria (1998), M. S. Zainulina [2] (2006) and other authors.

The standard study of the coagulation system, which has been carried out using the traditional methods, did not reveal any abnormalities in women with PANSP. An activated partial thromboplastin time (APTT), which characterize the internal coagulation path, was not significantly different from that of women in the control group (38.2 ± 0.9 seconds and 37.8 ± 1.2 seconds, respectively; $p > 0.05$) according to the average values. Prothrombin time (PT), which characterize the external coagulation path, was similar with that of women in the control group (15.6 ± 0.4 seconds and 15.6±0.6 seconds, respectively; $p > 0.05$) according to the average values. The fibrinogen concentration in patients from the main group had no significant differences with the control group (3.7 ± 0.1 g/l and 4.0 ± 0.2 g/l, respectively, $p < 0.05$), so the results of our studies did not differ from the data obtained by M. S. Zainulina [2] (2006).

However, all women with PANSP have increased level of soluble fibrin-monomeric complexes (SFMC) which are markers of intravascular coagulation, can be found in plasma in dissolved state and reflect the degree of intravascular coagulation intensity (thrombinemia) and the expression of fibrin formation processes. Here the SFMC level exceeded such values of patients from the control group in 1.4 times (6.4 ± 0.3 μg/100 ml and 4.7 ± 0.3 μg/100 ml, respectively; $p < 0.001$) and correlated with the degree of fibrinogen concentration increasing with the medium positive relationship ($r = +0.35$).

During the intravascular hemostasis conditions of pregnant women with PANSP study using the coagulation techniques the following trends in the hemostasis system have been observed (table 1).

According to the data in the table 1, in 16 patients (first subgroup) with normal values of platelet count

(215.45 ± 4.66x10^9/l; p > 0.05) chronometric hypercoagulation (reliable APTT decreasing up to 28.63 ± 0.51 seconds vs. 37.8 ± 1.2 seconds in the control and PT up to 13.38 ± 0.88 seconds versus 15.6 ± 0.6 seconds, similarly; p < 0.05 and p < 0.05, respectively) has been revealed. Here the fibrinogen concentration, though did not have significant differences with the control group, exceeded its average values. Among members of this subgroup we observed increased thrombogenic blood activity, which was expressed with reliable increasing of the SFMC level in serum, which in 1.8 times exceed the value of this parameter in the control group (8.43 ± 0.75 μg/100 ml compared with 4.7±0.3 μg/100 ml; p < 0.001). Moreover, the SFMC level in serum correlated with the degree of fibrinogen concentration increasing with the medium positive relationship (r = +0,4).

Table 1. – The coagulogram parameters in women from the main group of pregnant women with PANSP

Hemostasis parameters	Control group (n = 20)	Main group (n = 70)	Main group		
			I (n = 16)	II (n = 38)	III (n = 16)
Platelets *10^9/l	218.2 ± 4.3	211.3 ± 2.1	215.45 ± 4.66	211.03 ± 3.03	207.71 ± 2.5
Ht, %	35.8 ± 0.8	35.56 ± 0.57	36.25 ± 0.79	35.82 ± 0.58	34.25 ± 1.92
APTT, sec.	37.8 ± 1.2	38.2 ± 0.9	28.63 ± 0.51*	38.55 ± 0.69	46.75 ± 1.17*
PT, sec.	15.6 ± 0.6	15.6 ± 0.4	13.38 ± 0.88*	15.53 ± 0.44	18.13 ± 0.7*
PTI, %	86.9 ± 1.04	86.31 ± 0.64	89.56 ± 1.96	86.18 ± 0.53	83.38 ± 1.23*
Fibrinogen, g/l	4.0 ± 0.2	3.7 ± 0.1	4.22 ± 0.26	3.51 ± 0.12*	3.52 ± 0.21
SFMC, μg/100 ml	4.7 ± 0.3	6.4 ± 0.3	8.43 ± 0.75*	5.66 ± 0.17*	6.03 ± 0.53*

Note: * — p < 0.05 compared with the control group

38 women (second subgroup) on the background of platelets level moderate reduction (211.03 ± 3.03*10^9/l; p > 0.05) have expressed multidirectional violations of coagulation basic parameters conversion of hypercoagulation to hypocoagulation (APTT and PT have phase changes), so these indicators did not differ from the control group (p > 0.05 and p > 0.05, respectively) on average value. Here we can observe fibrinogen concentration significant decrease (p < 0.05) and SFMC concentration increase (5.66 ± 0.17 mg/100 ml; p < 0.05). Absence of correlation (r = +0.04) between levels of SFMC in the serum and fibrinogen concentration in the plasma indicated processes of fibrin cross-polymerization as a result of intravascular coagulation observed during deployed clinical picture of premature abruptio of normally located placenta.

Patients from the III subgroup on the background of the continuing platelets level decreasing (207.71 ± 2.5*10^9/l; p > 0.05), have pronounced chronometric hypocoagulation according to the main evaluative tests (prolonged APTT up to 46.75 ± 1.17 seconds vs. 37.8±1,2 seconds, and PT up to 18.13 ± 0.7 seconds versus 15.6 ± 0.6 seconds in the control group; p < 0.05 and p < 0.05, respectively), with significant decreased prothrombin index up to 83.4 % vs 86.9 ± 1.04 % (p < 0.05), moderate decreased fibrinogen concentration up to 3.52 ± 0.21 g/l (p > 0.05) and increased SFMC in serum concentrations up to 6.03 ± 0.53 μg/100 ml compared with 4.7±0.3 μg/100 ml in control group (p < 0.05). The SFMC level in the serum correlated with the fibrinogen concentration with low positive relationship (r = +0.15) or the same reason as in the previous group.

Our results once again confirm the experts' opinion that the prevailing value in the laboratory diagnosis of DIC belong not to the identification of hyper — or hypocoagulation shift and hypofibrinogenemia (which is typical for fulminant forms of the disease and the terminal phase of deep blood incoagulability), but to the identification of thrombocytopenia and high levels of thrombinemia markers (SFMC and D-dimer), the physiological anticoagulants consumption, which reduction degree together with expressed thrombocytopenia and the severity of clinical manifestations reflects the DIC severity.

Thus, the hemostatic system of patients with PANSP was characterized by a pathologic activation of intravascular blood coagulation on the background of the normal platelets level, which at the time of delivery in 22.9 % of women came to be a chronic form of DIC with signs of chronometric hypercoagulation and increased SFMC concentration. The laboratory symptom complex of 54.2 % of patients from the main group resemble a subacute form of DIC with phase changes in the main evaluative tests (APTT, PT, PTI) and decreased fibrinogen concentration, and laboratory symptom complex of 22.9 % resemble the initial phase of consumption coagulopathy of the acute DIC.

Conclusions: Study of hemostasis system in patients with such complication of pregnancy as PANSP showed that they have significant changes in the hemostatic system manifested as hypercoagulation in the plasma hemostasis link, coagulopathy of consumption, and hypocoagulation with the occurrence of intravascular coagulation activation markers in plasma (SFMC). Pregnant women with PANSP with a congenital hemostasis system defects the SFMC level exceed similar parameter obtained from the group of healthy pregnant women more than 1.8 times.

References:

1. Akopova K. A. The diagnosis gestation complications at the background of thrombophilia of different genesis improvement: Abstract. Dissertation of candidate of medical sciences. – Volgograd, 2010. – P. 24.
2. Zainulina M. S. Premature abruptio of normally situated placenta: aspects of pathogenesis, predicated risk, prophylaxis. Abstract. MD dissertation. – Sankt–Peterburg, 2006. – P. 43.
3. Krasnopolskiy V. I., Melnikov A. P., Bokarev I. N. Modern problems of blood coagulation disorders in obstetrics.//Russian journal of obstetrics and gynecology. – 2010. – № 2. – P. 20–27.
4. Liakhno. I. V. The management of hemostasis system at pregnant women with preeclampsia: a focus for obstetric bleeding.//Emergency medicine. – 2012. – № 3 (42). – P. 23–27.
5. Yashuk A. G., Maslennikov A. V., Timershina I. R. The state of vascular–platelet hemostasis in pregnancy: signs of norm and pathology.//Russian journal of obstetrics and gynecology. – 2010. – № 4. – P. 17–19.
6. Hoffmann E., Hedlund E., Perin T. Is thrombophilia a risk factor for placenta–mediated pregnancy complications?//Arch Gynecol Obstet. – 2012. – Vol. 28.
7. Simioni P. Thrombophilia and gestational VTE. Thrombophilia and gestational VTE./Simioni P.//Thrombosis Research. – 2009. – 123: Suppl. 2: 41–44.

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Features of chest trauma in patients admitted to the Republican Research Centre of Emergency Medicine

Abstract: Objective of the study was to improve the results of treatment of patients with chest trauma by early and wide use of VATS. There analyzed the findings of examination and surgery cases of 1396 patients with chest trauma. They divided into two groups: 552 patients who had been made examination and traditional treatment without VATS and 844 patients who underwent VATS during primary diagnostics and surgery.

Due to VATS we were able to reveal all of the most probable variants of chest injuries and avoid useless thoracotomy. VATS prevails the other noninvasive and minimally invasive methods of diagnostic of chest trauma. VATS also allows eliminating injuries with minimal operation procedures for the patient. Postoperative complications occurred in 25.4 % patients of first group and in 10.9 % patients of second group.

VATS allows diagnosing on time the injuries of thoracic organs. Also it helps to stop bleeding, make hermetic lung ruptures and chest sanation. We can reach early activation of patients, and reduce in-hospital days by using VATS in patients with chest trauma. Surgical approach of treatment for chest trauma needs to be determined not only by the results of primary chest drainage but also by the results of VATS revision.

Keywords: chest trauma, VATS, thoracotomy, complications.

Introduction. One of the important medical and social problems in industrial countries has become an injury of people that require huge financial expenditure [3, 32; 8, 48–52]. Chest trauma takes the third place (30–40 %) after traumatic brain injury (TBI) and extremities trauma. 90 % of injured patients are able-bodied population [1, 42–45; 10, 43–44; 11, 44–50; 15, 111–114; 17, 190–195; 18, 1273–1294]. Chest trauma characterized by long term treatment and rehabilitation with septic complications (up to 20 %) and high fatal outcomes (17–30 %) [5, 32–38; 6, 4–9; 7, 78–80; 9, 62–63; 14, 479–489; 16, 368–370].

According to literature, 15 % of died patients from chest trauma without fatal injuries died due to medical aid defects. One of them is late diagnostics of injuries in chest trauma [2, 39–43; 12, 509; 13, 328; 19, 3–9]. Poor resolution of simple X-ray of thorax does not allow estimating on time the

chest injuries [4, 10–14; 18, 1273–1294]. Diagnostic difficulties of chest trauma lead to unreasonably conservative therapy of patients when surgery is needed. The result of this is development of severe complications and increase of death rate. Herewith, the frequency of useless thoracotomy in chest trauma ranged from 10 to 15 % [13, 328].

Objective. Improve the results of treatment of patients with chest trauma by early and wide use of videothoracoscopy (VATS).

Material and methods. There analyzed the findings of examination and surgery cases of 1396 patients with chest trauma. First group included 552 (39.5 %) patients who had been made examination and traditional treatment without VATS. Second group were 844 (60.5 %) patients who underwent VATS during primary diagnostics and surgery. There were male 1192 (85.4 %) and female 204 (14.6 %) aged between 17 to 83 years. Half of the injured patients (51.9 %) are admitted within first 6 hours. 952 (68.2 %) patients had blunt chest trauma and 444 (31.8 %) patients had penetrating stub-cut chest injuries.

We observed that blunt chest trauma had frequent similar localization on the right and left sides (43.7 % and 50.8 % correspondingly) whereas penetrating stub-cut chest trauma prevailed on left side (68.5 %).

Multiple traumas observed in 152 (27.5 %) patients of first group and 204 (24.2 %) patients of II group. There were a lot of cases of combination of chest trauma and TBI or fractures of extremities.

Diagnostic methods of patients with chest trauma included general clinical and laboratory examinations, US and X-ray methods, chest drainage and VATS (in II group).

Statistical analysis was performed using Statview version 5. For normally distributed data an unpaired *t*-test was used and for skewed data a Mann–Whitney *U*-test was used. χ statistics were used to compare proportions in the groups. Statistical significance was assumed if $P<0.05$.

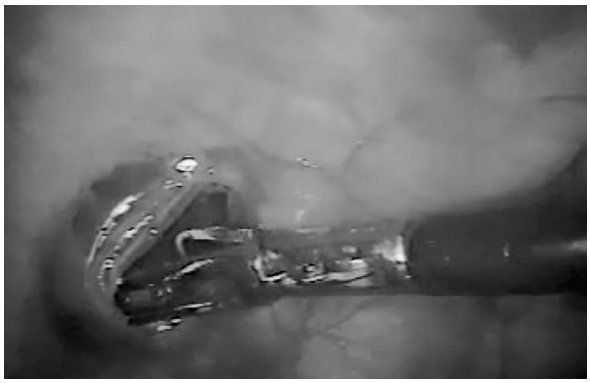

Fig. 1. VATS. Parietal pleura laceration

Fig. 2. VATS. Lung laceration

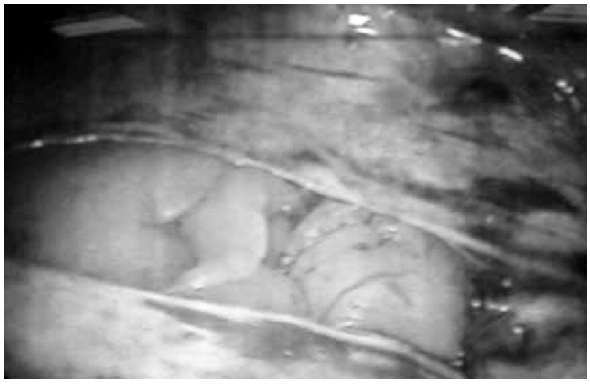

Fig. 3. VATS. Diaphragm laceration

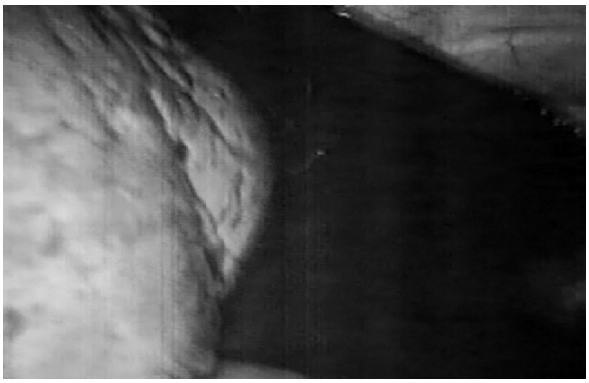

Fig. 4. VATS. Hemothorax

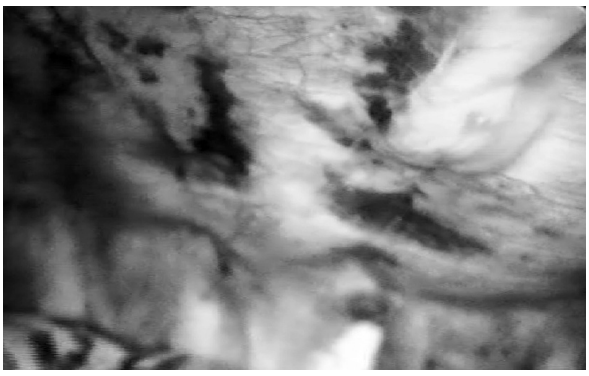

Fig. 5. VATS. Subpleural bleeding and hematoma

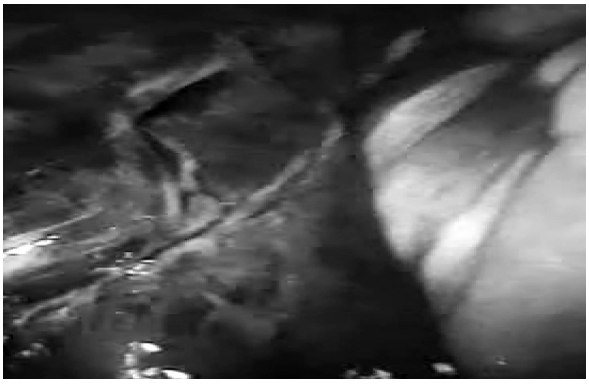

Fig. 6. VATS. Lung parenchyma hematoma

Results and discussion. General clinical manifestations of chest trauma were pain in 1352 (96.8%) patients, short breath in 964 (69.1%) patients and common fatigue in 1248 (89.4%) patients. It should be noted that every fourth injured patient (26.4%) had a sign of lung tissue damage – blood spitting.

X-ray of thorax revealed different pathological changes in 1304 (93.4%) patients. Thus, hemothorax was determined in 240 (17.2%) patients, pneumothorax was in 360 (25.8%) cases, hemopneumothorax — in 768 (55.0%), subcutaneous emphysema of thorax — in 684 (49%), lung contusion — in 36 (2.6%), heart shadow dilatation — in 28 (2%) patients and pneumomediastinum — in 28 (2%) patients. Single rib fracture was revealed in 208 (21.9%) patients of the first group and in 84 (18.6%) patients of the second group. Multiple rib fractures were found in 328 (68.9%) cases of 1 group and in 328 (72.6%) cases of 2 group.

US of thorax and abdominal cavity were performed in 1284 (92%) patients. The main task of sonography at chest trauma was to detect hemothorax which was revealed in 884 (68.8%) cases. US was not informative due to subcutaneous emphysema of thorax in 104 (8.1%) patients. Meanwhile, US allowed to identify injuries of abdominal organs in 304 (23.7%) patients with multiple trauma.

VATS was used in second group. Indications to VATS were hemopneumothorax in 540 (64%), hemothorax in 160 (19%), pneumothorax in 124 (14.7%), isolated subcutaneous emphysema without hemopneumothorax signs in 12 (1.4%) and dilated heart borders by X-Ray in 8 (0.9%) patients.

Table 1. – Character of injuries revealed by VATS in blunt chest trauma (n=452)

Injuries	n	%
Subpleural bleeding and hematoma	452	100
Parietal pleura laceration	444	98.2
Lung laceration	408	90.3
Bulla laceration	8	1.8
Lung contusion	60	13.3
Lung parenchyma hematoma	32	7.1
Mediastinal hematoma	4	0.9
Mediastinal pleura laceration	12	2.7
Pneumomediastinum	32	7.1
Diaphragm laceration	8	1.8
Hemothorax	372	82.3
Intrapleural bleeding from:		
• Muscular vessels	44	9.7
• Intercostal vessels	8	1.8
• Lung lacerations	60	13.3
• Rib fractures parts	12	2.7
• Small vessels of mediastinum	12	2.7
• Diaphragm lacerations	4	0.9

Due to VATS we were able to reveal all of the most probable variants of chest trauma (fig. 1–6). It has been determined, that ribs fractures in blunt chest trauma combines with subpleural hematomas (452 cases) and parietal pleura laceration (444 cases). In all cases, when hemopneumothorax, pneumothorax and subcutaneous emphysema were indicated for VATS, we determined lung laceration (408 patients) or bulla laceration (8 patients) (table 1).

The value of VATS increases in penetrating chest trauma with damage of heart and diaphragm. Thus, we revealed diaphragm injures in every fourth thoracic injured patient, who underwent VATS (Table 2). In 8 cases, when clinical, X-ray, US signs were absent, VATS allowed to determine severe heart injury. It should be noted that we have done no misdiagnosing in VATS group.

Table 2. – Character of injuries revealedby VATS in penetrating stub-cut chest trauma (n=392)

Injuries	n	%
Parawound subpleural haematoma	132	33.7
Rib and cartilage injury	20	5.1
Lung injury	156	39.8
Lung parenchyma hematoma and subpleural lung bleeding	20	5.1
Wound and hematoma of mediastinum	8	2.0
Pericardial injury	24	6.1
Inferior vena cava injury	4	1.0
Heart injury	8	2.0
Diaphragm injury	92	23.5
Hemathorax	288	73.5
Intrapleural bleeding from:		
• Muscular vessels	76	19.4
• Intercostal vessels	24	6.1
• Internal thoracic artery	8	2.0
• Lung injuries	60	15.3
• Inferior vena cava	4	1.0
• Pericardial and heart injuries	12	3.1
• Diaphragm injuries	52	13.3

Chest punction (128 patients), chest drainage (400 patients) and primary wide thoracotomy with traditional surgery approach (24 patients) were used in first group (Table 3). Small hemothorax or pneumothorax up to 1/3 of lung volume was an indication for chest drainage. About half of patients (56, 43.8%) underwent chest punction we were not able to get expected results, therefore we had to perform chest drainage in 48 (37.5%) cases and in 8 (6.3%) cases — wide thoracotomy as well. In recent years we have declined thoracic punction way of diagnostic and treatment of chest trauma.

In both groups primary wide thoracotomy provided adequate extensive surgical approach for reliable elimination of all revealed consequences of chest trauma, but primary VATS allowed avoiding useless thoracotomy. In all 40 cases of second group wide thoracotomy after VATS were made manipulations which are technically difficult to carry out with endoscopic technique (suturing of lung lacerations — 12, inferior vena cava injuries — 4, heart injuries — 8, pericardial injury — 16. Meanwhile, in first group we had to evacuate retained hemotorax in 12 cases of thoracotomy, suturing of superficial lung laceration in 12 cases and suturing of lung bulla laceration in 8 cases. All mentioned procedures could be performed by VATS (table 4 and fig. 7–12).

Table 3. – Results of primary surgical treatment

Character of primary intervention		n	Recurrent interventions		
			Character	n	%
I group	Chest punction	128	Chest drainage	48	37.5
			Thoracotomy	8	6.3
			Total	56	43.8
	Chest drainage	400	Redrainage	8	2.0
			Thoracotomy	20	5.0
			VATS	12	3.0
			Total	40	10.0
	Thoracotomy	24			
	Total	552		96	17.4
II group	VATS	804	Thoracotomy	4	0.6
	VATS + thoracotomy	40			
	Total	844		4	0.5

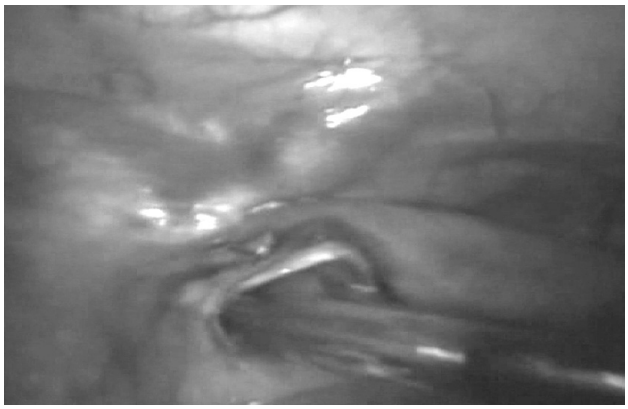

Fig. 7. VATS. Mediastinal pleura cutting

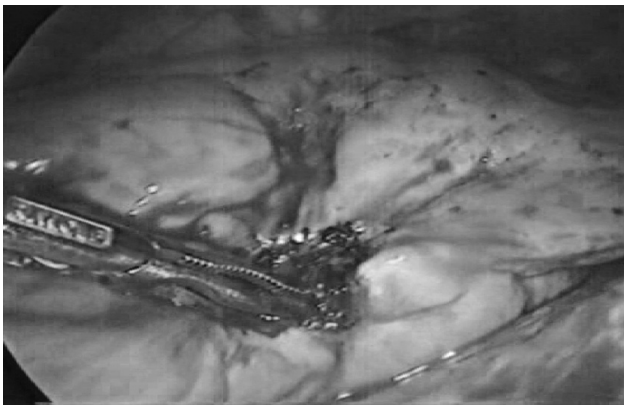

Fig. 10. VATS. Coagulation of lung laceration

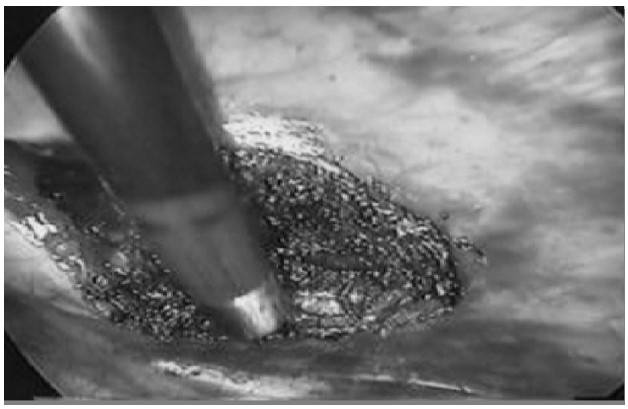

Fig. 8. VATS. Coagulation of parietal pleura laceration

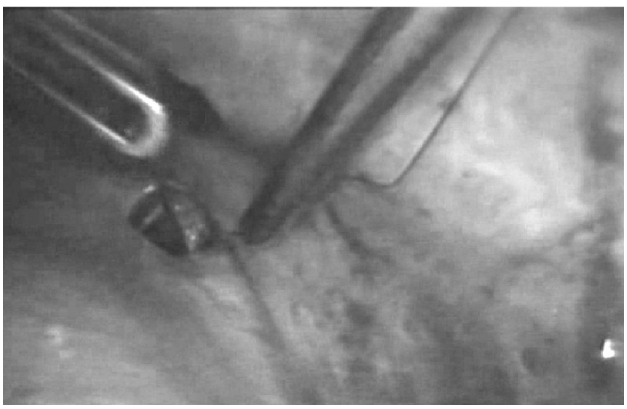

Fig. 11. VATS. Suturing of diaphragm injury

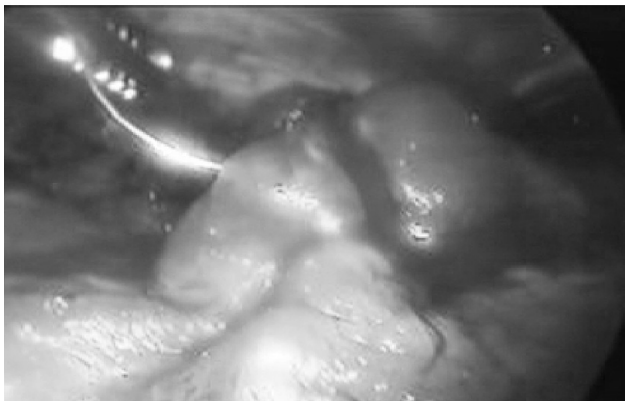

Fig. 9. VATS. Lung laceration suturing

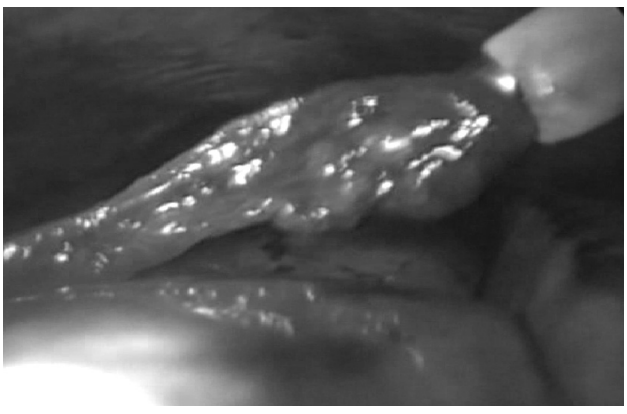

Fig.12. VATS. Elimination of retained hemothorax

Table 4. – VATS surgery in chest trauma

Surgery	n	%
Pleural cavity sanation	792	93.8
Haemothorax evacuation	452	53.6
Bleeding control from:	240	28.4
• muscular vessels	120	14.2
• intercostal vessels	24	2.8
• internal thoracic artery	4	0.5
• injury of lung	52	6.2
• small vessels of mediastinum	12	1.4
• Rib fractures	12	1.4
• injury of diaphragm	16	1.9
Videoassisted suturing of lung laceration	84	10.0
Incision of mediastinal pleura	20	2.4
Videoassisted suturing of diaphragm injury	8	0.9
VATS suturing of lung laceration	4	0.5
Coagulation of bullas' rupture	4	0.5

Adequate endoscopic revision and assessment of chest trauma allowed selecting optimal surgical approach and decreasing the frequency of reoperations in 0.6 % cases in second group versus 17.4 % in first group.

Clinical experience, skills and assurance gained during this investigation by using of diagnostic and treatment opportunities of VATS allowed us to implement endoscopic technique much wider in multiple chest and abdominal trauma. In second group such combitation of trauma was in 148 (17.5 %) cases. Usually laparoscopy was performed at the second stage after VATS. Indications for laparoscopy were: penetrating diaphragm injuries (80), diaphragm lacerations (4) revealed by VATS; penetrating injuries of upper abdominal wall (4) and abdominal US scoring system (60).

We could avoid useless laparotomy in 52 (35.1 %) cases due to using laparoscopic technique: we excluded the damage of abdominal organs in 40 patients and we performed laparoscopic hemostasis successfully in 12 patients with superficial liver injury. In other cases we have made surgery by laparotomy.

Postoperative complications occurred in 140 (25.4 %) patients of first group and in 92 (10.9 %) patients of second group (Table 5).

Most of postoperative complications were eliminated conservatively or by the means of minor surgery (by pleural punctions and chest drainage). Secondary surgeries such as thoracotomy for postoperative complications were made in 28 (5.1 %) cases of first group and 4 (0.5 %) cases of second group.

In table 6 we can see comparison of two groups by the frequency of thoracotomy, duration of operative interventions and duration of chest draining, complications in early period.

None of patients in these groups had fatal outcome.

Thus, VATS prevails the other noninvasive and minimally invasive methods of diagnostic of chest trauma. VATS also allows eliminating injuries with minimal operation procedures for the patient.

Conclusions. VATS allows diagnosing on time the injuries of thoracic organs. Also it helps to stop bleeding, make hermetic lung ruptures and chest sanation. We can reach early activation of patients, and reduce in-hospital days by using VATS in patients with chest trauma. Surgical approach of treatment for chest trauma needs to be determined not only by the results of primary chest drainage but also by the results of VATS revision.

Table 5. – Postoperative complications

Complications	I group, n=552		II group, n=844	
	absolute	%	absolute	%
Unspecific complications	40	7.2	44	5.2
• Postoperative pneumonia	40	7.2	44	5.2
Specific complications	100	18.1	48	5.7
• Wound infection	8	1.4	8	0.9
• Ongoing pneumothorax	56	10.1	-	-
• Retained hemothorax	4	0.7	-	-
• Exudative pleuritis	24	4.3	36	4.3
• Lung atelectasis	4	0.7		
• Intrapleural bleeding	4	0.7	4	0.5
Total:	140	25.4	92	10.9

Table 6. – Comparison of two groups

Indication	I group n=552	II group n=844	P
Frequency of thoracotomy, %	9.4	5.2	$\chi^2 = 7.12$ $p < 0.05$
Duration of chest draining, days	4.6 ± 0.31	2.2 ± 0.32	$t = 5.56$ $p < 0.05$
Common frequency of complications, %	25.4 %	10.9 %	$\chi^2 = 8.51$ $p < 0.05$
Durations of in-patient treatment, days	8.1 ± 0.36	7.1 ± 0.27	$t = 2.22$ $p < 0.05$

References:

1. Abakumov M. M., Lebedev N. V., Makarchuk V. I. Objective assessment of trauma severity in injured patients with combined injuries.//Surg. vestn. – 2001. – 160 (6): 42–45.
2. Bisenkov L. N., Kochegarov O. V. Diagnosing and treatment of heart injury.//Thoracic and cardiovascular surgery. – 1999. – 2: 39–43.
3. Borisov A. E., Mitin S. E., Chlopov V. B. et al. Endovideosurgery opportunities at treatment of chest trauma.//Endoscopic surgery. – 2001. – 3: 32.
4. Brusov P. G., Kuricin A. N., Urazovski N. Yu. et al. Operative videothoracoscopy at surgical treatment of bullet penetrating thoracic trauma at medical evacuation stages on local military conflict.//Endoscopic surgery. – 1998. – 3: 10–14.
5. Dobrovolski S. R. Treatment of chest trauma.//Surgery. – 2007. – 5: 32–38.
6. Ermolov A. S., Abakumov A. V., Pogodina A. N. et al. Diagnostics and treatment of posttraumatic retained haemotorax.//Surgery. – 2002. – 10: 4–9.
7. Karimov Sh. I., Krotov N. F., Shoumarov Z. F. et al. The first experience of videothoracoscopic operation at various surgical pathology.//Surgery of Uzbekistan. – 1999. – 3: 78–80.
8. Kochergaev O. V. Diagnostic features of direct lung injuries on combined chest traumas.//Thoracic and cardiovascular surgery. – 2002. – 1:48–52.
9. Krotov N. F., Ganiev Sh. A., Berkinov U. B. et al. The role of videothoracoscopy in diagnosing and treatment of chest trauma.//Surgery of Uzbekistan. – 2006. – 3: 62–63.
10. Ismailov D. A., Tashbaev A. M., Kurbanov S. Qualified surgical aid on chest trauma.//Surgery of Uzbekistan. – 2000. – 3: 43–44.
11. Porhanov V. A., Polyakov V. B., Kononenko V. B. et al. Videothoracoscopy in treatment of patients with traumatic injuries of chest.//Annals of surgery. – 2001. – 2: 44–50.
12. Florikyan A. K. Surgery of chest trauma (Pathophysiology, clinical features, diagnostics, treatment). – Charkov: Osnova, 1998. – 509 p.
13. Sharipov I. A. Chest trauma (problems and release). – 2003. – 328 p.
14. Ahmed N., Jones D. Video-assisted thoracic surgery: state of the art in trauma care.//Int. J. Care Injured. – 2004. – 35: 479–489.
15. Carrillo E. H., Kozloff M., Saridakis A. et al. Thoracoscopic application of a topical sealant for the management of persistent posttraumatic pneumothorax.//J. Trauma. – 2006. – 60 (1): 111–114.
16. Chan L., Reilly K. M., Henderson C. et al. Complication rates of tube thoracostomy.//Amer. J. Emerg. Med. – 1997. – 15 (4): 368–370.
17. Esme H., Solak O., Yurumez Y. et al. The prognostic importance of trauma scoring systems for blunt thoracic trauma.//Thorac. Cardiovasc. Surg. – 2007. – 55: 190–195.
18. Gavelli G., Canini R., Bertaccini P. et al. Traumatic injuries: imaging of thoracic injuries.//Europ. Radiol. – 2002. – 12: 1273–1294.
19. Villavicencio R. T., Aucar J. A., Wall M. J. Analysis of thoracoscopy in trauma.//Surg Endosc. – 1999. – 13 (1): 3–9.

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Integral assessment program for development of specific complications and tolerability of gastropancreatoduodenal resection in patients with periampullar tumors

Abstract:

Purpose: experience of radical surgical treatment of 51 patients with periampullary tumors have been analysed. Based on the original study of fatal cases of 7 patients, the integral assessment program for specific complications in

patients underwent the gastropancreatoduodenal resection has been developed. Postoperative lethality was 6.8 %, caused by intraoperational complications.

Keywords: periampullary tumors, specific share of factor, confounding factor.

Introduction

As the studies showed, the results of surgical treatment of periampullar tumors (PAT) remain disappointing [1]. Development of many technological methods and their implementation into clinical practice, different management methods for their prevention have not led to a significant reduction of postoperative complications diagnosed after gastropancreatoduodenal resection (GPDR) with incidency from 32.5 to 100 %, with a mortality rate of 3.0 to 25.7 % [2; 3].

However, apart from different approaches in the diagnosis and treatment of PAT, a high percentage of postoperative complications and mortality, relatively low life expectancy of the patients about high relevance of the problem [4–11].

The purpose of the report is to improve the results of surgical treatment of periampullary tumors by developing an integral programm of evaluation of specific complications after pancreaticoduodenal resection.

Materials and Methods

Analysis of unsatisfactory outcomes of the control group showed that despite the ability to perform radical surgery, according to laboratory and instrumental methods of treatment, not all the patients might tolerate a radical surgery. Different opinions on criteria of choosing the final treatment method leads to the fact that often exceeds the volume of surgical treatment.

Given the unsatisfactory results of radical surgical treatment, the study phase developed a program to assess the possible development of specific complications after the PDR. During creation of this program we adhered to the following principles:

1. Prediction of the outcome of the disease in its pure form has low value for the clinician, because even with extremely poor prognosis doctor still ought to do everything possible to save the patient's life.
2. The full range of probability of lethal case from a minimum to a maximum would represent nothing less than the percentage amount of signs leading to the outcomes.
3. Severity index shall be a number variable in accordance with the probability of death from the minimum value to the maximum.
4. The severity of the patient should be determined by the method of calculation before the alleged radical operation.
5. Calculation method of the index must be sufficiently simple, suitable for use in hospitals, providing high-tech surgery.
6. Method should only be based on objective values, and should guarantee the same degree of gravity not only by physicians of a clinic, but any other hospital specialists with adequate definition of evaluation criteria.

Based on the foregoing, the factors were identified that affect the likelihood of developing complications or success. To assess the significance of these or other factors on treatment outcome, as well as for assessing the feasibility of surgical treatment and its efficiency indicators were calculated such as risk (R, P) and odds ratios (OR).

The term "risk" is necessary to understand the probability of any event (in lethal case) under one or another factor. Risk indicators were calculated on the basis of four-base tables. It consists of the following options.

Absolute risk (AR, AP) — probability of dying after surgery when the studied factor or its absence, was calculated according to the formulae:

$$ARkg = a/a + b,$$

where: ARkg — absolute risk in the group with lethal outcomes; a — the number of patients who died with the presence of a sign; b — the number of patients without lethal outcome, experiencing the sign.

$$ARog = c/c + d,$$

where: ARog — overall risk without lethal outcome; c — the number of patients who have died without this or that sign; d — the number of observations with no deaths in a group of patients without the sign.

The relative factor (RR) characterizes the degree of importance of the factors influencing the target outcome. So, when the RR > 1 — likelihood of the studied outcome is statistically significant. When RR < 1 — the factor had no impact on the outcome and was calculated according to the formula:

$$RR = ARkg / ARog$$

Absolute risk reduction (ARS) is a value that indicates the degree of how the outcome correlates with effect of the factor, calculated by the formula:

$$SAR = ARkg – ORog$$

Relative risk reduction (RRR, COP) is a value that indicates how many times the probability of target outcome in the absence of studied factors, determined by the formula:

$$RRR = ARkg – ARog/ARog.$$

Odds ratio (OR, ОШ) is the ratio of the probability of the studied outcome to his absence, it shows how many times increases or decreases the likelihood of death when exposed to the investigated factor, calculated by the formula:

$$OR = a*d/b*c.$$

In this regard, an analysis was made of the results of unsatisfactory results of radical operations observed in control (7 patients) and basic (3 patients) groups. 41 patients in the studied groups convalesce.

Thus, it was determined the specific weight of each sign, the total number of which made it possible to identify the percentage of complications and possible death of the core group.

Table 1 – List of aggravating factors in the patients with PAT in planning radical surgery (n = 51)

No.	Measurable factors	Criteria factors	Specific weight of the factor (points) identifying the risk of death	%	Specific gravity of the factor (%)
1	*2*	*3*	*4*	*5*	*6*
1.	Persistent itchy skin after EBI	Yes	4.8	4.0 %	3.7 %
		No	0.4		0.3 %
2.	Persistent weakness after EBI	Yes	7.2	5.9 %	5.6 %
		No	0.4		0.3 %
3.	The presence of lower back pain	Yes	4.6	3.7 %	3.6 %
		No	0.2		0.2 %
4.	Nausea and vomiting	Relieved	3.1	3.9 %	2.4 %
		Not relieved	1.1		0.9 %
		No	0.8		0.6 %
5.	Duration of jaundice prior to EBI	More than 3 weeks	10.8	9.5 %	8.4 %
		Up to 3 weeks	1.44		1.1 %
		Up to 2 weeks	0.1		0.1 %
6.	Volume of discharged bile after EBI	500–700 ml	0	0.0 %	0.0 %
		up to 500 ml	0		0.0 %
7.	The persistence of hyperthermia after EBI	Yes	3.1	2.9 %	2.4 %
		No	0.6		0.5 %
8.	Age of patient	70 and older	3.7	5.0 %	2.9 %
		59–70 years	1.2		0.9 %
		45–59 years	1.1		0.9 %
		Up to 45	0.4		0.3 %
9.	Sex	Male	0.8	1.6 %	0.6 %
		Female	1.3		1.0 %
10.	Patient build	Hyperstenic	3.6	3.9 %	2.8 %
		Asthenic	1.2		0.9 %
		Normostenic	0.2		0.2 %
11.	Previously performed PAT operations	Yes	2	2.3 %	1.5 %
		No	1		0.8 %
12.	Weight loss	Expressed	2.3	2.0 %	1.8 %
		Moderate	0.3		0.2 %
13.	Presence of concomitant pathology	Decompensated HD, endocrine and lung diseases	8.6	17.7 %	6.7 %
		Decompensated HD, endocrine and lung diseases	7.4		5.7 %
		Compensated lung diseases	6.1		4.7 %
		No	0.8		0.6 %
14.	Tumour markers (CEA, CA 19.9)	Dramatically increased	8.2	8.0 %	6.3 %
		Moderately elevated	2.2		1.7 %
15.	Anaemia	II — III degrees	2.2	2.6 %	1.7 %
		I degree	1.1		0.9 %
16.	Total blood protein	Less than 50 g/l	1.2	2.6 %	0.9 %
		More than 50 g/l	2.2		1.7 %
17.	Blood enzymes (ALaT, ASaT)	No downward trend	1	1.4 %	0.8 %
		Tends to reduce	0.8		0.6 %
18.	Hyperbilirubinemia	More than 60 μmol	2–4	2.8 %	1.9 %
		Up to 50–60 μmol	1.2		0.9 %
19.	MRPChG	Block of OVC in middle and upper third	9.2	8.0 %	7.1 %
		Block of OVC in lower thirds	1.2		0.9 %
		No	0		0.0 %

1	2	3	4	5	6
20.	Fibrinogen indicators	More than 2.5 times	1.2	1.6 %	0.9 %
		Elevated 1–2 times	0.9		0.7 %
		No	0		0.0 %
21.	Hypercoagulability	Expressed	2.1	1.8 %	1.6 %
		None	0.2		0.2 %
22.	Stage of liver failure	Sub and decompensated	2.5	2.8 %	1.9 %
		Compensated	1.1		0.9 %
23.	The patient's ability to pay for a radical operation	Yes	1.2	4.3 %	0.9 %
		No	4.4		3.4 %
24.	Previously performed instrumentation data	CTI+angiography	1.5	1.6 %	1.2 %
		MRPChG + MSCTA	0.6		0.5 %

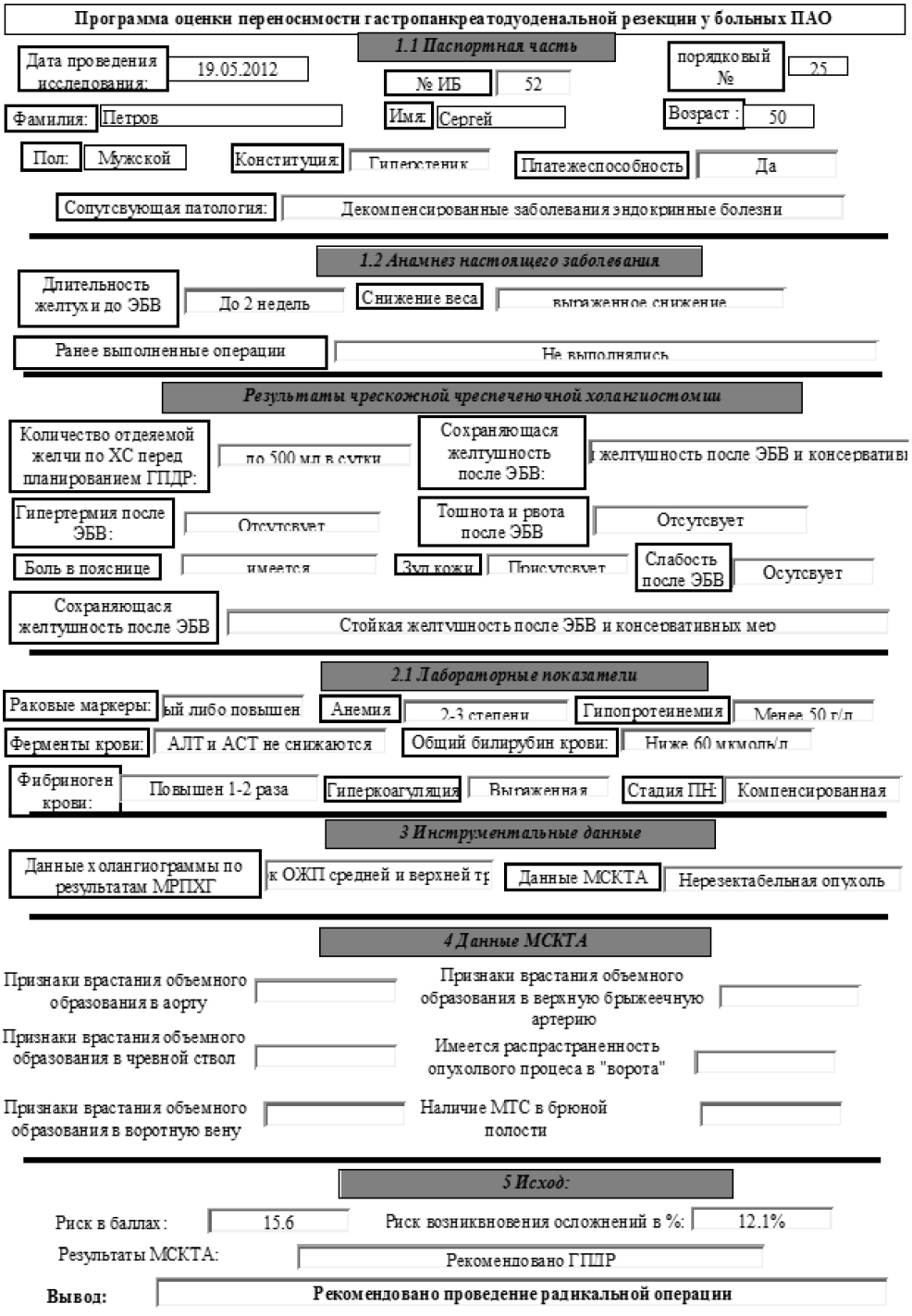

Fig. 1. "PPGPDR" program interface (DGU 0384 d/d 14.08.2015)

The study included anamnestic data, laboratory data, results of MRPChG and MSCTA, which allowed to determine ability to perform radical surgery.

Thus, in proportions equal to 15.7 points or above, and according to instrumental methods of diagnosing the case was resectable, it was the fulfillment of the GPDR.

If the amount is less than 15.7 (12.2 %) points, regardless of the extent of the State, from any interference should refrain with dynamic monitoring of the condition of the patient.

Based on these data, the original computer program «PPGPDR» (Program portability of gastropancreatoduodenal resection) was developed — DGU 0384 d/d 14.08.2015.

Under this program, individual patient data shall be entered into a form with fixed parameters, each of which had its own specific weight, the sum of which allowed to determine the risk of complications and the tactics of the final treatment (Fig. 1).

So, in the control group of 24 radically operated patients, seven patients have died (29.1 %). Causes of deaths were from 4 patients — pancreatic fistula and three patients (24.5 %) — underestimation of confounding factors. At the same time, in the main cause of the deaths of all three patients were pancreatic fistula.

The study showed the effectiveness of the proposed method, which has reduced the proportion of deaths from 29.1 % to 9 %.

Therefore, our proposed assessment program of GPDR identified the main factors that lead to unsatisfactory results of surgical treatment that helps you assess the effectiveness of the treatment and diagnostic activities and anticipated final treatments.

Conclusions:

1. Developed integrated program evaluation of the possible developments of complications and tolerance of radical surgical treatment allows to determine the potential risk of developing specific complications, deaths with the definition of accuracy of the method to the 84–86 %.

2. The proposed method of calculation is simple, can be supplemented by other factors and can be recommended for general use.

References:

1. Kubyshkin V. A., Vishnevsky V. A. Pancreatic cancer. – M.: Medpraktika, 2003 – 386.
2. Patyutko Y. I., Kotelnikov A. G. Cancer surgery of the biliopankreatoduodenal zone organs. – M: Medicine, 2007
3. Kelemen D., Papp R., Baracs J., Kaposztas Z., Al-Farhat Y., Horvath O. P. Treatment of pancreatic and periampullary tumours in our department in the last 10 years.//Magy Seb. – 2009. – Vol. 62, № 5. – P. 287–92.
4. Cieslak J. A. Cullen J. J. Treatment of Pancreatic Cancer with Pharmacological Ascorbate.//Curr Pharm Biotechnol. – 2015. – Vol. 16, № 9. – P. 759–70.
5. Lowery M. A., O'Reilly E. M. Novel Therapeutics for Pancreatic Adenocarcinoma.//Hematol Oncol Clin North Am. – 2015. – Vol. 29, № 4. – P. 777–87.
6. Mohammed A., Janakiram N. B., Pant S., Rao C. V. Molecular Targeted Intervention for Pancreatic Cancer.//Cancers (Basel). – 2015. – Vol. 7, № 3. – P. 1499–542.
7. Oyasiji T., Ma W. W. Novel adjuvant therapies for pancreatic adenocarcinoma.//J Gastrointest Oncol. – 2015. – Vol. 6, № 4. – P. 430–5.
8. Ponz-Sarvise M., Tuveson D. A., Yu K. H. Mouse Models of Pancreatic Ductal Adenocarcinoma.//Hematol Oncol Clin North Am. – 2015. – Vol. 29, № 4. – P. 609–17.
9. Prakash L., Lee J. E., Yao J., Bhosale P., Balachandran A., Wang H., Fleming J. B., Katz M. H. Role and Operative Technique of Portal Venous Tumor Thrombectomy in Patients with Pancreatic Neuroendocrine Tumors.//J Gastrointest Surg. – 2015.
10. Sadowitz B. D., Luberice K., Bowman T. A., Viso A. M., Ayala D. E., Ross S. B., Rosemurgy A. S. A Single Institution's First 100 Patients Undergoing Laparoscopic Anti-Reflux Fundoplications: Where Are They 20 Years Later?//Am Surg. – 2015. – Vol. 81, № 8. – P. 791–7.
11. Strosberg J., Goldman J., Costa F., Pavel M. The Role of Chemotherapy in Well-Differentiated Gastroenteropancreatic Neuroendocrine Tumors.//Front Horm Res. – 2015. – Vol. 44. – P. 239–47.

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Dynamics of mineral density of the calcaneus by ultrasound densitometry at the patient in treatment of acetabular fractures

Abstract: Enhanced core compression-distraction device reduces the time of treatment and rehabilitation of patients with injuries of explosives, it contributes to a more rapid and complete recovery of function of the hip joint.

Using the author device, allows to make an early activation of the patient on the 2nd day after the operation, which contributed to the recovery of BMD 22 (78.6%) of the 28 studied.

Keywords: acetabular fractures, ultrasound densitometry.

The damage of the acetabulum is one of the most difficult types of injuries of the pelvis and consist of in their structure from 7 to 22% [1; 3]. The aseptic necrosis of the femoral head after injuries hip joint develops in 30–40% of the victims. Post-traumatic deformingarthrosis diagnosed in 20–40% of victims [5]. Impaired microarchitectonicsof the trabecular and increased their fragility, characteristic for osteoporosis of the proximal part of femur, become a cause microfractures, which in turn leads to circulatory problems, necrotic changes and other processes characteristic of this disease [2; 4; 6].

A certain diagnostic value has bone densitometry method, that allows to detect changes in bone mineral density (BMD) of the affected area at different stages of the disease [4].

Objective: to study the heel bone mineral density in the dynamics by ultrasound densitometry in patients with injuries of the acetabulum, which used the author's device.

Material and Methods: the Republican Specialized Surgery Center of joints and hands, as well as the second clinic of the Tashkent Medical Academy from 2001 to the present, when damaged acetabulum preferred surgical treatment. During this period, we conducted clinical-radiological analysis of case histories of 189 patients with fractures of the acetabulum, of which 156 were men, 33 women, age ranged from 16 to 68 years. It was found that for the most common mechanisms of damage to the acetabulum include the direction of the impact of the greater trochanter — 89, in the knee joint — 77 on foot — in 18 and 5 patients history, because of the severity of the condition was unknown. Surgical treatment of injuries, of the posterior edge and the roof of the acetabulum (with subluxation or dislocation of the hip) in 64 cases, was to fix the bone fragments with screws or plates, of which 28 cases additionally imposed rod compression-distraction device with dynamic unloading. All this made it possible to load the limb on the second day after the surgery with preservation of motion in the joint in three planes: flexion — extension, adduction — abduction and rotary motion (Fig. 1).

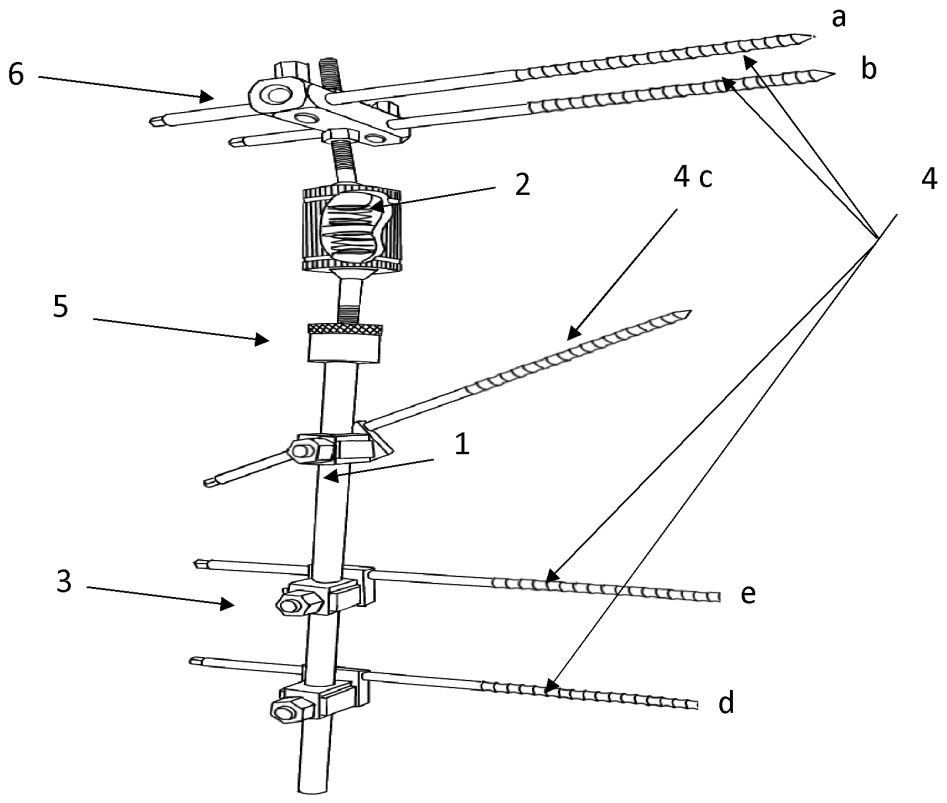

Fig. 1. Scheme of device, dynamic unloading in the hip joint (1 – Rod, 2 – ball mechanism with two internal springs, 3 – clamps, 4 – pin, 4 c – sharpening rod, 5 – coupling, 6 – lock rod for acetabular region

Settingtechnique of the dynamic device was as follows: two rods — 4 a, 4 b — injected into supraacetabulararea parallel to each other, and then the rod 4 c introduced to the greater trochanter towards the head of the femur and two bars — 4 d, 4 e — in the thigh. 4 c rod inserted into the greater trochanter, had a sharpening in the middle part, which prevents back migration of stem and enable to dose dynamic unload of joint. The rods introduced into the femoral bone, are fixed with latches on the rod with a swivel device giving the possibility of movement in the two planes, and the rods introduced in supraacetabularportion fixed on the retainer rods acetabularregion which is connected to the femoral component. Rotary movements are due to the rotational movement of the bar inside.

All this made it possible to strengthen the patient and limb loading on the second day after the surgery with preservation of joint movement in three planes.

In the firstdays after the injury for all patients on a healthy foot measured bone mineral density (BMD) by ultrasonic densitometer "SONOST 3000" (Korea). Further dynamics of BMD at the heel bone were measured at 3, 6 and 12 months, the results of which were compared with each other.

Results and discussion: UZDM — characterizes the state of bone mineral density in terms of the speed of passage of ultrasound (SOS — Speed of sound) and broadband attenuation (BUA — Broadband ultrasound attenuation) and reflects the number, size and spatial orientation of the trabeculars of bone.

After operation, setting rod compression-distraction device with dynamic unloading to the hip joint, UZDM conducted on healthy limb in 1–2 days and after 3 months in the affected limb after removal of the device, in order to avoid distortion of the results, because automatic program summarizes bone density and device, thus giving knowingly false results.

When surgical treatment with the use of dynamic unloading apparatus, we obtained the following results. A normal BMD came from these indicators BMD of healthy limbs. This group consisted of 28 patients. UZDM results in injuries of the acetabulum were: the first day was the norm — in 24 (85.7 %), osteopenia in 3 (10.7 %) and osteoporosis in 1 (3.6 %) patients. After 3 months of normal BMD have not been identified, all patients with acetabular fractures observed: osteoporosis in 24 (85.7 %), and osteopenia in 4 (14.3 %).

After 6 months of normal BMD were observed: 14 (50.0 %), osteopenia in 8 (28.6 %), osteoporosis-6 (21.4 %) patients. These BMD at 18 months were as follows: normal values of bone mineral density in 22 (78.6 %), osteopenia in 4 (14.3 %) and osteoporosis in 2 (7.1 %) patients.

Changes in osteopenia and osteoporosis in healthy limb dynamics we have not obtained. In the group of patients with fractures of the acetabulum, who used the device of dynamic unloading device recovered of BMD in 22 (78.5 %) patients.

Thus, the dates UZDM shows, that — 22 (78.5 %) from 28 patients recovered with normal BMD, which was imposed author rod compression-distraction apparatus with dynamic unloading device, as a consequence, early static load on the limb was the prevention of osteoporosis.

Conclusions:

1. The use of traditional treatments (plaster cast, skeletal traction) and immobilization 3–4 months, leading to inactivity and loss of bone mineral density, thus reducing the quality of life of patients.
2. Using the author device, allows to make an early activation of the patient on the 2nd day after the operation, which contributed to the recovery of BMD 22 (78.6 %) of the 28 studied.

References:

1. Beletsky A. V., Varanovich A. I., Murzich A. E. Determine indications for surgery and the choice of surgical approaches for complex fractures of the acetabulum.//Journal of Traumatology and Orthopedics N. N. Pirogov. – 2010. – № 4. – P. 30–37.
2. Buachidze O. Sh., Onopriyenko G. A., Voloshin V. P., Zubikov V. S. Surgery of the hip joint. – M.: Medicina, 2002 – 136 p.
3. Landa V. A., Bulibina T. I. To diagnosis and treatment of patients with fractures of the acetabulum.//J. Health and Medical Technology. – 2005. – № 8. – P. 22–23.
4. Rakhimzhanova R. I., Abdrakhmanov J. S., Spichak L. V. Radiological diagnosis of aseptic necrosis of the femoral head.//Consilium. – 2010. – № 6. – S. 26–28.
5. Berry D. J., Halasy M. Uncementedacetabular components for arthritis after acetabular fracture.//Clin Orthop Relat Res. – 2002. – P. 164–167.
6. Gary J. L., Van Hal M., Gibbons S. D., Reinert C. M., Starr A. J. Functional outcomes in elderly patients with acetabular fractures treated with minimally invasive reduction and percutaneous fixation.//J Orthop Trauma. – 2012. – P. 278–83.

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Characteristics of panss's values and theirs dynamics among individuals with schizophrenia who have committed grave socially dangerous acts

Abstract: The paper attempts to evaluate values of the PANSS scale of positive and negative syndromes of schizophrenia among 157 individuals with schizophrenia who have committed grave socially dangerous acts according to psychopathological mechanisms. The PANSS scale confirmed the specificity and isolation of the identified

psychopathological mechanisms of commitment of grave socially dangerous acts by schizophrenics, and also revealed the dynamics of psychopathological symptoms, which is important in the working out of differentiated treatment and preventive activities.

Keywords: schizophrenia, socially dangerous acts, psychopathological mechanisms, PANSS scale, forensic psychiatry.

Introduction

In 1996, at the 49th session of the World Health Assembly, the resolution WHA 49.25 was adopted. It declared violence to be the major and ever-growing public health problem all over the world. In the "World report on violence and health", an ecological model of interpretation of violence was used to study relationships between individual and contextual factors, which considered violence as a product of multiple factors that influence person's behavior [4]. Multiple factors take part in the genesis of grave socially dangerous acts committed by schizophrenics, so it is necessary to develop and improve special methods, taking into consideration both medical and legal aspects, to prevent such acts [5; 6], especially because it is very difficult to predict aggression and violent acts by schizophrenics [1; 2; 3]. The PANSS (Positive and Negative Syndrome Scale) is one of the most important rating instruments for patients with schizophrenia.

Objectives

This study was to evaluate symptoms and signs of schizophrenia in patients who have committed grave socially dangerous acts, by using the PANSS scale of positive and negative syndromes of schizophrenia and to compare these results according to psychopathological mechanisms of socially dangerous acts of mental patients.

Materials and methods

According to the law of the Republic of Uzbekistan, individuals who have committed grave socially dangerous acts because of a mental disorder and who are found not guilty by reason of insanity by the courts, are exculpated and subject to compulsory treatment for an indefinite period of time (in the Tashkent High Security Psychiatric Hospital, the only high-security hospital for mentally-ill offenders in Uzbekistan). Patients of this hospital, who have committed serious assaultive acts (homicide, attempted homicide, grievous bodily harm) and met ICD-10 criteria for schizophrenia were included in the study. The data were collected via face-to-face interviews, and also from the patients' charts and forensic psychiatric examination statements. To evaluate the mental state and its dynamics we used the PANSS scale. We measured values at the time of commitment of socially dangerous acts and one year later, during the compulsory treatment and then calculated the difference between them. We evaluated the mental condition of 157 patients whose medical documentation contained comprehensive information, so we were able to use all features of the PANSS scale.

The data were analyzed using Statistica v.10. Statistical analysis included the Kruskall-Wallis test was used for ranking the variables. The significance level was set at 0.05.

Results

We used the systematics of psychopathological mechanisms of socially dangerous acts of mental patients (Maltseva M. M., Kotov V. P.) to study the deluded experiences of patients who had committed socially dangerous acts by productive-psychotic mechanism. We found that the content of morbid experiences was miscellaneous and not always included active aggression against the victims. Therefore, depending on the degree of the subject's participation in realization of the morbid experiences, we identified two separate psychopathological mechanisms in the structure of the productive-psychotic mechanism, which we called "unconditional-psychotic" and "conditional-psychotic" mechanisms.

Unconditional-psychotic mechanism assumes psychopathological symptoms that force the patients (regardless of their mentality) to commit socially dangerous acts. Such symptoms included consciousness disorder, delusion, and perceptual disturbance, when patients experience an imagined imminent threat to themselves or to family members (persecutory delusion with deadly threat, delusion of poisoning), delusion with significant affective component (delusion of littleness, altruistic delusion), automatic behavior, and impulsive actions associated with thought process disorder. The criteria of this mechanism are a lack of self-restraint from committing actions as a result of deep psychotic state (consciousness disorder, significant affective disorder, automatic behavior, though disorganization ruling out any purposeful activity) or the content of deluded experiences, which drive responses based purely on self-preservation instinct, and inconsistence of the aggression with the actual situation that lacks any threat to the patients' (or their family members') life or health.

Conditional-psychotic mechanism assumes psychopathological symptoms that do not force the patients to act aggressively. This mechanism prevails in cases where the content of delusion doesn't include an imminent threat to the life of the patient who decided to respond in a socially unacceptable way (delusion of detriment, delusion of reference, delusion of control), or where imperative hallucinations make the patient to act aggressively. The criteria of this mechanism are conditionality of socially dangerous acts owing to deluded experiences: patients think that someone harms them (physically or morally), or the presence of imperative hallucinations that "order" the patients to commit aggressive acts, and inconsistence of the aggression both with the actual and imagined situation that lacks any threat to the patients' life or health.

In case of negative-personality mechanism, a socially dangerous act is committed because the patient (owing

to defective condition or a combination of acquired personality deformation and social personality characteristics) finds such illegal acts, which are related to the external situation and/or the patient's impulses, acceptable.

This mechanism doesn't rule out psychotic symptoms at the moment of commitment of socially dangerous acts in case of an external situation that, though being incongruous with the patient's psychotic experiences, triggered the aggressive response mechanism specific to this patient. The criteria of this mechanism are the commitment of socially dangerous acts based on common (for example, domestic) motives and negative psychopathological symptoms.

To evaluate the mental state and its dynamics depending on the identified psychopathological mechanisms, we used the PANSS scale. We measured values at the time of commitment of socially dangerous acts (Table 1) and one year later, during the compulsory treatment (Table 2), and then calculated the difference between them (Table 3).

Table 1. – Distribution of PANSS scale indicators for schizophrenics at the time of commitment of socially dangerous acts depending on the psychopathological mechanism of offence

	Psychopathological mechanism								
	Unconditional-psychotic (n = 41)		**Conditional-psychotic (n = 55)**		**Negative- personality (n = 61)**		**Kruskal-Wallis ANOVA by Ranks**		**Intergroup comparison**
	Average	**M**	**Average**	**M**	**Average**	**M**	**H**	**p**	
Scale of positive syndromes	23.58	5.81	22.49	4.26	18.95	4.97	19.91	< 0.001	1,2 > 3
Scale of negative syndromes	26.55	7.53	20.95	5.39	26.16	7.47	19.21	< 0.001	2 < 1,3
General psychopathological scale	51.40	9.80	44.47	8.76	43.97	9.54	15.86	< 0.001	1 > 2,3
Total points	101.52	19.13	87.91	14.51	89.08	18.53	13.83	< 0.001	1 > 2,3
Bipolar composite index (±)	–2.98	7.13	1.55	5.66	–7.03	7.89	17.10	< 0.001	2 > 3

The highest values on all three scales were obtained for schizophrenics whose grave socially dangerous acts were based on unconditional-psychotic mechanism. The lowest values on the scale of positive syndromes, the general psychopathological scale, and composite index were obtained for schizophrenics whose offences were based on negative-personality mechanism. The lowest values on the scale of negative syndromes were obtained for schizophrenics whose offences were based on conditional-psychotic mechanism; these patients' results for the other scales were between the ones obtained for schizophrenics whose offences were based on the unconditional-psychotic and negative-personality mechanisms.

Table 2. – Distribution of PANSS scale indicators for schizophrenics one year after the commitment of socially dangerous acts, during compulsory treatment, depending on the psychopathological mechanism of offence

	Psychopathological mechanism								
	Unconditional-psychotic (n = 41)		**Conditional-psychotic (n = 55)**		**Negative- personality (n = 61)**		**Kruskal-Wallis ANOVA by Ranks**		**Intergroup comparison**
	Average	**M**	**Average**	**M**	**Average**	**M**	**H**	**p**	
Scale of positive syndromes	12.23	2.81	12.47	3.39	12.82	4.10	0.24	0.89	ns
Scale of negative syndromes	22.25	7.57	20.29	6.20	25.08	5.04	16.97	< 0.001	2 < 3
General psychopathological scale	32.20	7.59	30.16	6.95	34.08	7.74	10.69	0.005	2 < 3
Total points	66.68	15.71	62.93	13.75	71.98	14.31	9.71	0.008	2 < 3
Bipolar composite index (±)	–10.03	7.11	–7.82	6.65	–12.24	5.44	14.23	< 0.001	2 > 3

PANSS scale-based re-evaluation of the patients one year after the commitment of socially dangerous acts, during compulsory treatment, had not revealed any significant differences on the scale of positive syndromes between schizophrenics whose offences were based on different psychopathological mechanisms, which could be explained by the administration of antipsychotic drugs that mostly affected productive psychopathological symptoms. The lowest values on the scale of negative syndromes and the general psychopathological scale, and the lowest values of composite index were obtained for schizophrenics whose offences were based on conditional-psychotic mechanism. The highest values on the scale of negative syndromes were obtained for schizophrenics whose offences were based on negative-personality mechanism.

Table 3. – Difference between PANSS scale indicators during the compulsory treatment of schizophrenics (one year after they committed socially dangerous acts) and at the time of committing the offence

	Psychopathological mechanism								
	Unconditional-psychotic (n = 41)		Conditional-psychotic (n = 55)		Negative- personality (n = 61)		Kruskal-Wallis ANOVA by Ranks		Intergroup comparison
	Average	M	Average	M	Average	M	H	p	
Scale of positive syndromes	–11.35	5.86	–10.02	4.56	–6.13	4.99	24.21	< 0.001	1,2 < 3
Scale of negative syndromes	–4.30	7.56	–0.65	4.59	–1.08	4.98	6.81	0.033	1 < 2
General psychopathological scale	–19.20	11.94	–14.31	9.70	–9.89	8.42	16.43	< 0.001	1,2 < 3
Total points	–34.85	21.65	–24.54	15.46	–17.10	14.69	18.07	< 0.001	1 < 3
Bipolar composite index (±)	–7.05	7.82	–9.36	5.56	–5.21	6.39	12.03	0.002	2 < 3

Conclusions

By analyzing mental state dynamics, we found the greatest difference between the offence-time and treatment-time values on all three scales for schizophrenics whose offences were based on unconditional-psychotic mechanism. The smallest difference on the scale of positive syndromes and on the general psychopathological scale was obtained for schizophrenics whose offences were based on negative-personality mechanism. The smallest difference on the scale of negative syndromes were obtained for schizophrenics whose offences were based on conditional-psychotic mechanism; these patients' difference for the other scales were between the ones obtained for schizophrenics whose offences were based on the unconditional-psychotic and negative-personality mechanisms. These differences allow one to detect the psychopathological mechanism of socially dangerous acts using the PANSS scale when no follow-up data are available.

References:

1. Monahan J., Steadman H. J., Appelbaum P. S., Robbins P. C., Mulvey E. P., Silver E., Roth L. H., Grisso T. Developing a clinically useful actuarial tool for assessing violence risk.//The British Journal of Psychiatry. – 2000. – vol. 176. – P. 312–319.
2. Steadman H., Mulvey E., Monahan J., Robbins P., Appelbaum P., Grisso T., Roth L. and Silver E. Violence by people discharged from acute psychiatric impatient facilities and by other in the same neighborhood.//Archives of General Psychiatry. – 1998. – vol. 41. – P. 395–401.
3. Wallace C., Mullen P., Burgess P., Palmer S., Ruschena D. and Browne C. Serious criminal offending and mental disorder. Care linkage study.//British Journal of Psychiatry. – 1998. – vol. 172. – P. 477–484.
4. World report on violence and health: summary. – Geneva, World Health Organization, 2002.
5. Мальцева М. М., Котов В. П. Опасные действия психически больных. – М., 1995. – 256 с.
6. Шостакович Б. В. Психические расстройства и преступность.//Механизмы человеческой агрессии. – М., 2000. – С. 150–160.

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Rehabilitation methods of treatment of acetabulum damage

Abstract: The article is devoted to solving improvement of rehabilitation treatment methods in acetabular injuries. Offered algorithm enables to improve rehabilitation treatment methods of acetabular injuries and to introduce its usage widely in traumatology-orthopedics practice.

Keywords: rehabilitation methods, acetabulum damage, innovation algorithm.

Rehabilitation treatment is a main stage of restoration of functioning hip joint in patients with acetabulum damage. How shows our experience, inopportune started or inadequate rehabilitation methods of treatment may threaten even high qualitatively performed surgical interventions. At present a great number of recommendations are worked out aimed at rehabilitation of this group of patients. But majority of them went out of date and require revision taking into account

a stable renewal and perfection of arsenal of implants and surgical techniques [1; 3]. Therefore novel innovation methods of rehabilitation treatment undoubtedly help practical physician to reach maximum number of positive medium-dated and remote results in treatment of this cohort of patients [2].

Purpose of research was aimed at working out innovation methods of rehabilitation treatment of acetabulum damage.

Material and methods: Within the last 15 years in the Republican Specialized Center of Joint & Hand Surgery as well as in the Second Clinic of the Tashkent Medical Academy since 1997 till now surgical methods of treatment are preferred in fractures of socket of hip. During this period clinical rentgenologic analysis of histories of the cases of 180 patients with acetabulum fractures was conducted, of them were 147 males and 33 females, their age varied from 16 to 78. It was established that to the most typical mechanisms of arising acetabulum fractures belong as follows: direction of blow towards greater trochanter — 87, knee joint — 77, on foot — 11 and fractures occurred in 6 patients due to unknown causes.

Diagnosis of acetabulum damage presents definite difficulty because cup-like cavity locates in not easily accessible for examination area and clinical symptoms in the given area (painfulness, labored motion in cotyloid cavity, shortening, forced attitude of extremity) are not pathognomonic, they can be noted in other fractures of hypsiloid bones. Besides, careful clinical examination is not always possible due to severity of common state of the injured person — mental blankness, shock. Final diagnosis may be established based on poly-position rentgenography and multi-spiral tomography.

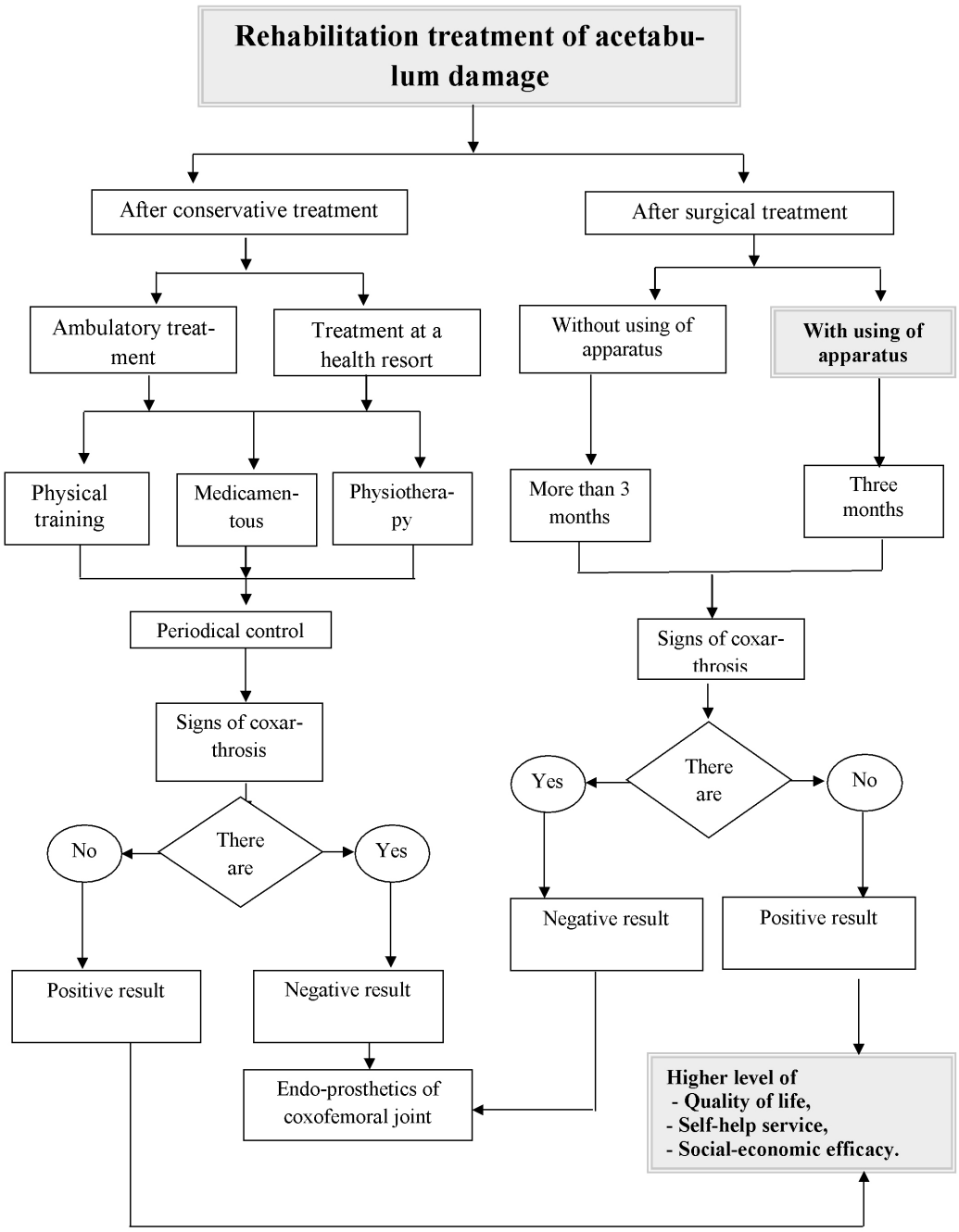

Fig.1. Scheme of algorithm of rehabilitation treatment of acetabulum damage

Results and discussion: Innovation aspects of rehabilitation methods of treatment of acetabulum damage (AD) is, first of all, in fixation of fragments with screws in 46 cases and additively in applying apparatus of dynamic unloading on joint in 22 cases. All that gave a possibility to load an extremity on the second day after operation with preservation of motion in joint in three planes: flexion — deflexion, adduction — abduction and rotation motions. The method of applying apparatus of dynamical unloading is based on innovation construction worked out by us. For this construction we received a positive decision of the Agency of Intellectual Property of the Republic of Uzbekistan.

Apparatus of dynamical unloading allowed sufficiently reduce a stay of patients in hospital. If skeletal traction through femoral epicondyles was put after osteosynthesis patients with acetabulum damage for 4–6 weeks, then after using of the worked out by us apparatus patients were activated on the second day after surgical treatment that permitted to load the injured extremity and accomplish functional motions in joint.

Summarizing it may be noted that a possibility of an early activation and reduction of a number of stay days in hospital occurred in 22 patients that additively were underwent applying of authors' apparatus of dynamical unloading. An early static loading on extremity resulted in prevention of osteoporosis and increased a level of quality of life of patient.

How is given on Figure 1, algorithm of rehabilitation includes blocks of conservative (including blocks ambulatory, treatment at a health resort, medicamentous) and other methods of treatment of acetabulum damage as well as control block. Block of endo-prosthetics of coxofemoral joint is also provided for in case of detection of signs of coxarthrosis.

According to algorithm elaborated by us, after surgical rehabilitation treatment we provided for block with using of innovation apparatus and block without its application. Algorithm of rehabilitation also includes block of detection of coxarthrosis signs that provides for analysis of results of rehabilitation treatment of injuries of cotyloid cavity. Medicamentous methods of treatment with optimization of dosage, multiplication factor and prolongation of application of preparation aimed at prevention of thromboembolic complications in accordance with generally conventional international standards were also used by us in accomplishment of innovation rehabilitation methods of AD treatment. With that end of view the physiotherapeutic methods in postoperative period of rehabilitation starting from the third day have been used in our Center. Therapeutic physical training in regime of forced loading optimizing an intensity of loading in dependence on type of acetabulum damage aimed at improvement of rehabilitation methods of treatment of AD was used. All that allowed shorten terms of unloading of extremity, perfect self-help service and recurrence of patients to functional motor activity.

Innovation algorithm of perfecting rehabilitation methods of treatment of AD contributes to expansion of an implementation sphere in traumatic surgery and orthopedics practice. It allows practical physicians to build a clear algorithm of postoperative rehabilitation for this complicated cohort of patients with AD.

References:

1. Rakhimzhanova R. I., Abdrakhmanov J. S., Spichak L. V. Radiological diagnosis of aseptic necrosis of the femoral head.//Consilium. – 2010. – № 6. – S. 26–28.
2. Berry D. J., Halasy M. Uncementedacetabular components for arthritis after acetabular fracture.//Clin Orthop Relat Res. – 2002. – P. 164–167.
3. Gary J. L., Van Hal M., Gibbons S. D., Reinert C. M., Starr A. J. Functional outcomes in elderly patients with acetabular fractures treated with minimally invasive reduction and percutaneous fixation.//J Orthop Trauma. – 2012. – P. 278–83.

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Estimation a condition of blood cytokine profile at performing a conservative myomectomy

Abstract: In purpose on to studying of influence of operative techniques of conservative method of myomectomy at women of reproductive age on a cytokine state of blood profile in aspect of reduction of intraoperation surgical trauma of the tissue there have been made conservative myomectomy (CME) by laparatomy at 46 women with a uterine myoma on developed by us technique. Efficiency of a technique on the 3rd and 5th days of the postoperative period estimated with definition in dynamics of Interleukin 1, 6 and TNF-a level in blood. For 3rd days after the operational period in group of women with which it has been made conservative myomectomy

by a traditional method marked authentically sharp increases in level of maintenance of IL-1; IL-6 and TNF. Results showed high efficiency of new technique CME in comparison with a traditional method in preservation of reproductive to function of women.

Keywords: a uterus myoma, myomectomia, cytokine.

Introduction. Studying of results of surgical treatment shows, that the current of the postoperative period is in many respects connected as with volume of surgical intervention in a abdominal cavity, and with localisation and the sizes of an operational wound [3; 6; 9]. In reply to any damage, whether it be the trauma, surgical operation, an infection, etc., in an organism develops a complex of the physiological reactions directed on localisation of the centre of damage and restoration of disturbed functions [1; 2; 3; 5].

This difficult process, directed on preservation of a homeostasis, is known as an inflammation, and a complex local and system changes, originating after damage, makes concept of an acute phase of an inflammation. Cytokines play basic role in realisation of the inflammatory answer to the surgical trauma. Cytokine production reflects a traumatizing of surgical intervention. The strengthened synthesis of cytokines begins in reply to penetration into organism a microorganisms or damage of fabrics. After extensive surgical interventions a cytokine concentration reaches a maximum by 24 o'clock and remains increased throughout 48–72 hours of the postoperative period.

Last years, because of development of methods of quantitative definition of levels of cytokines production, it has been reached considerable progress on understanding of the role of some cytokines in norm and in pathology [2; 4]. The high level of studied cytokines testifies to development of a local and general inflammation. So, IL-1 in consequence of the ability to increase of body temperature it is established as endogen pirogene. The tumor necrosis factor-a (TNF-a) stimulates a local inflammation, and in system — causes a syndrome of a septic shock, activates and damages cells, operating on cells of hypothalamus, causes a fever, secretion of IL-1, IL-6, fibers of acute phase [2; 3; 5]. At studying of results of operative interventions it is necessary to note the traumatizing factor or "surgical stress".

It is known, that blood cytokine level reflect a current condition of work of immune system and development of protective reactions, gravity of inflammatory process and its transition to system level. Cytokine production reflects on traumatizing of surgical intervention [3; 7; 8; 9].

Purpose of this work was to studying of influence of operative technics of conservative myomectomy (CME) method at women of reproductive age on a condition of blood cytokine profile in aspect of reduction of intra operative surgical trauma of tissue.

Material and methods. Research and treatment was conducted in department of operative gynecology of the Republican specialised scientifically-practical medical centre of obstetrics and gynecology (RSSPMC O&G), Tashkent. In total there have operated 66 women at the reproductive age, suffering with uterine myoma of various localisation and the sizes. All patients have been divided on two groups depending on a technique of performed CME method. The basic group was made by 46 patients by whom it has been performed CME by the technique which developed by us; and the comparison group included 20 women at whom CME was made by a traditional method. The age of patients varied from 20 up to 42 years (in average 33.51 ± 2.4 years) in both groups. Research the maintenance of interleykin-1 (IL-1), interleykin-6 (IL-6), The tumor necrosis factor (TNF-a) in blood plasma of women determined by immune enzyme analyzing on commercial test systems of firm "Vector-best" by means of IFA analyzer "Anthos-2010" (Austria) in dynamics before operation and on the 3rd, 5th days of the postoperative period.

Results and discussion

As a result of the carried out researches it is established some features of change of cytokine status in blood plasma in women with uterine myoma, depending on a performed method of CME.

As a presented datas from table show, preoperative initial levels of IL-1 in both groups essentially did not differ among themselves and have made 1.84 pg/ml in the basic group and 1.48 pg/ml in comparison group ($p > 0.05$). On the 3rd days after operation there has been noted sharp increase of maintenance of IL-1 up to 135.74 pg/ml in comparison group, that on 90 times exceeded its initial level. In the main group a maintenance of IL-1 essentially has not changed and has made 1.98 pg/ml. On the 5th day of postoperative period a level of IL-1 in main group has decreased nearer to its initial level though in group of comparison with its initial level did not reach initial sizes. Although, IL-1 is endogen pirogen, owing to the ability to increase of body temperature, we can explain temperature reaction at 16 patients in comparison group. In the main group subfebrile temperature was registered only in 3 patients.

Results of research of IL-6 levels at women in compared groups were given by following data. In patients from comparison group the level of IL-6 has made — 6.15 pg/ml, in main group patients — 4.88 pg/ml, and significant distinctions between them is not revealed. However, on the 3rd day at the postoperative period in women who have being performed CME by traditional method the level of IL-6 has made the maximum value — 585.11 pg/ml against 5.46 pg/ml in main group. And in comparison with its preoperative level ($p < 0.001$), on the 5th day we observed decreasing in level of IL-6 to 7.94 pg/ml in comparison group, that came nearer to data before operation on 2 times exceeded similar indicators of the main group which by the end of 5th day have made — 3.82 pg/ml in comparison with its initial data.

Table 1. – Pre-inflammatory cytokines in dynamics prior to and on the 3rd, 5th days after conservative myomectomy (M ± m)

Parameters	Prior to operation	On the 3rd day after operation	On the 5th day after operation
Main group (n = 46)			
IL-1	1.84 ± 0.21	1.98 ± 0.03	1.53 ± 0.32
IL-6	4.87 ± 0.24	5.45 ± 0.39	3.8 ± 0.39
TNF-a	2.046 ± 0.63	2.29 ± 0.54	1.93 ± 0.36
Comparison group (n = 20)			
IL-1	1.48 ± 0.25	135.74 ± 0.31*	2.08 ± 0.25
IL-6	6.1 ± 0.24	585.11 ± 0.30**	7.94 ± 0.34
TNF-a	2.3 ± 0.31	27.59 ± 0.29*	2.99 ± 0.36

Note: * — statistical authentic in comparison with its initial level on $p > 0.05$; ** — statistical authentic in comparison with its initial level on $p > 0.01$

As a received result from the analysis of the condition of TNF-a observed a similar pattern of change of its maintenance in dynamics on the postoperative period (table 1). So, on the 3rd day after performing of CME by a traditional method the level of TNF-a has made 27.59 pg/ml, that on 11 times has exceeded than its initial level (before operation) — 2.3 pg/ml and ($P < 0.005$), on the 5th days it has made — 2.99 pg/ml, coming nearer to its initial data. In the main group at all investigation phases the level of TNF-a was stable and made: 2.05 pg/ml before operation, 2.29 pg/ml — on the 3 days and 1.93 pg/ml on the 5th day accordingly.

Analyzing the received data as a result of our research, we marked authentically sharp increases in level of maintenance of IL-1, IL-6 and TNF-a on the 3rd day after operation period in group of women which has been made CME by traditional method.

It is known, that IL-1, IL-6 and TFN-a are proinflammatory cytokines, so any damages or the microbic agent are named as «mediators» of local inflammatory reaction and acute phase answer of an organism. In a sharp phase of an inflammation at the expense of tissue damage to occur activation of macrophages which synthesize a cytokines, thereof to what there will occur a changes of vascular endothelium, leading to increase in its permeability, expression increase adhesive molecules and infringements in coagulation system of blood.

Thus there is occurring an release of an inflammation mediators, such as histamine, glandins and other, responsible for developments of inflammatory reaction. And it in turn, promotes on stasis of blood in capillaries, venule, leading to strengthening of pre-coagulation link and development of edema [3; 7; 9].

Hyperproduction of cytokines — IL-1, IL-6, TNF-a at women in comparison group is explained by longer and extensive surgical interventions at performing a CME by traditional method. It is unfavorable factor of the postoperative period causing early postoperative complications (pain syndrome, early temperature reaction, tissue swelling).

Summarising the above-stated, it is possible to conclude, that during operative interventions it is necessary to consider so-called "surgical stress", i. e., the factor of traumatizing, which its degree depends on the level of maintenance of proinflammatory cytokines (IL-1, IL-6, TNF-a) in blood.

Conclusion. Thus, it is possible to conclude, that the new method of CME applied by us is less traumatic, which not causing a "surgical stress", that it is proved by not changeable levels of the maintenance of markers of a condition of work of immune system and development of protective reactions — proinflammatory cytokines IL-1, IL-6 and TNF-a in women from main group. Hence, our results showed high efficiency of new technique CME in comparison with a traditional method in preservation of reproductive to function of women.

References:

1. Vlasova G. V., Egorov L. V., Kotov A. J., etc. Pre-inflammatory cytokines.//Cytokines and an inflammation. – 2005. – 4: 39–44.
2. Demjanov A. V., Kotov A. J., Simbirsev A. S. Diagnostic value of research of cytokine levels in clinical practice.//Cytokines and inflammation – 2005. – T. 2. – № 3. – P. 20–35.
3. Karobekova D. A., Rahmatulloeva S. H., Safarov CH. B. Surgical treatment of patients with a uterus myoma.//Bulletin Avisenni – 2014. – № 2 (59). – P. 79–83.
4. Luneva S. N., Popova A. H., Tkachuk E. A. Biochemical indicators in an estimation of efficiency of treatment of a myoma of a uterus.//Basic researches. – 2013. – № 9. – P. 847–851.
5. Pekarev O. G, Majborodin I. V., Pekareva E. O. Experience spontaneous delivery at women with a scare on a uterus after myomectomy.//Obstetrics and gynecology. – 2012. – № 5. – P. 88–92.
6. Plehanov A. N., Tatarova N. A., Ryabinin G. B, Shishkin Ju. A. Restoration of reproductive function at women after conservative myomectomy.//Effective pharmacotherapy. – 2013. – № 18. – P. 42–46.
7. Ushakov J. E., Pruglo A. K., Budak V. S, Kosolapowa N. V. Case of rupture of a uterus during pregnancy after conservative myomectomy without suturing of uterus in anamnesis.//the Taurian medical and biologic bulletin. – 2013. – Vol. 16. – № 2. – T. 2 (62). – P. 166–168.

8. Kondratovich L., Kozachenko A., Adamyan L., Kogan E. Clinical and morphological features of pelvic adhesions in patients with uterine leiomyoma.//The 20th World Congress on Controversies in Obstetrics, Gynecology AND Infertility (COGI). – 2014. – P. 63.

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Dependence of the periodontal state on the gestation period in the pregnant women

Abstract: The stomatological diseases in women during pregnancy present great social problem. Under stomatological examination there were 132 women in the different periods of pregnancy and control group included 50 women without events of inflammatory periodontium diseases. The research showed that the pregnancy results in occurrence and progressing of the parodontium diseases, and the severity of damage achieved maximum in the III trimester, the damage of parodontium induced by pregnancy does not stop in the early postpartum period, remaining statistically significant above the appropriate meanings of control group and index parameters of the I trimester.

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

The high prevalence rate and increasing intensity of the main stomatological diseases in women during pregnancy present great social problem [1; 7]. In the meta-analytical systemic review the authors identified statistic clear association between periodontium and unfavourable outcomes of pregnancy [7]; and in the gram negative bacteria in the oral cavity connected with increase of levels of prostaglandin E2, tumor necrosis factor-α, retardation of the embryo growth and lowering weight in newborns [5], The absence of defensive antibodies due to systemic distribution of mother periodontal infection initiate preterm labor [3; 7].

In the pathogenesis of the periodontium lesions in pregnancy the change of balance between sexual hormones, pregnancy pathology, exacerbation of somatic pathology and others are of special attention [1; 6; 7].

In this connection **the purpose** was to determine prevalence and severity degree of the inflammatory periodontium diseases by CPITN index in the various periods of pregnancy and early postpartum period.

Material and methods. Under examination there were 132 women in the different periods of pregnancy: 132 (trimester I); 110 (trimester II) and 95 (trimester III of pregnancy); and control group included 50 women without events of inflammatory periodontium diseases.

In order to obtain representative data in all trimesters of pregnancy there were preserved identical age ratio. The average age of women in groups fluctuated from 26.3 ± 0.81 to 28.82 ± 1.13 years. The number of pregnant women in groups was comparable in relation to percentage rate.

The frequency of the basic somatic pathology, pregnancy complications in the comparative periods, social-economic status of the pregnant women and control group were equal.

The state of periodontium tissue was evaluated with use of municipal-paradontium.

Index (CPITN), developed by exerts of the WHO Working Group/FDI for population epidemiological examinations. This index allows evaluation of the prevalence and intensity of the indicators of periodontium tissue lesions (stomatorrhagis ant probe taking, presence of perigingival calculus, parodontal pockets of various deep) based on the sextant examination of the oral cavity (4).

The results of stomatological examinations were recorded in the special cards. The statistic processes of the results were performed with use of program Microsoft Excell. The level of reliability between parameters of stomatological status was measured according to Fisher's t-criteria.

Results and discussion. The results of study of pregnant women showed sharp increase in the quantity of sextants reflecting severe inflammatory-destructive periodontium lesion: sextant number with stomatorrhagis (code 1) (21.67 ± 5.82 %) increased by 5.38 % (22.83 ± 4.30 %) ($P < 0.05$); with dental calculus (code 2) (21.83 ± 5.84 %) — even by 38.1 % (30.17 ± 4.71 %) ($P < 0.01$); and with pocket ≥ 6 mm. — by 1600.0 % (8.5 ± 2.86 %) in comparison with 0.50 ± 0.99 % ($P < 0.01$); and in these pregnant women the uncounted sextants appeared (code X) (1.67 ± 1.31 %), being absent in the control group. Thus, in pregnant women there is registered sharp increase in the of periodontal lesions of the highest degree corresponding to high codes of CPITN index.

The receiving of the most objective data is possible only on the basis of the results of dynamic observation of the evolution of separate nosological forms of the periodontal pathology in the same group of pregnant women during all postpartum period, as well as in the first months of the postpartum period.

On the basis of the evaluation of the periodontal status in the homogenous group of pregnant women in the different period of pregnancy there was established progressing of the

severity stage with increase of pregnancy duration. In these cases the number of sextants with code 0 and 1 reflecting favorite periodontal state progressively reduced and a number of sextants indicating about severe periodontal lesion (codes 2, 3, 4 and X) decreased.

It was noted that the value of code 0 reduced in comparison with control (53.33 ± 7.06 %) in the first trimester by 31.25 % (45.45 ± 4.33 %) (P < 0.01); in the second trimester — by 49.38 % (27.0 ± 4.23 %) (P < 0.01) and in the third trimester — by 65.62 % (18.33 ± 3.97 %) (P < 0.01).

The dynamics of code 1 increased in comparison with control (21.67 ± 5.82 %) by 38.44 % (30.0 ± 4.0 %) (P < 0.01) and 7.69 % (23.33 ± 4.03 %) (P < 0.05) in trimester I and II, respectively, and showed reduction in the III trimester by 29.23 % (15.33 ± 3.70 %) (P < 0.01). This dynamics may be explained with regards to clinical positions, when in the II and III trimesters there were registered dental calculus, gingival-dental pockets and absent sextants in stead of gingival hemorrhage.

Thus, value of code 2 (dental calculus) (21.83 ± 5.84 %) increased in trimester I by 16.03 % (25.33 ± 3.78 %) (P < 0.01); in trimester II — by 38.93 % (30.33 ± 4.38 %) (P < 0.01) and in III — by 60.03 % (35.0 ± 4.89 %) (P < 0.001).

The following dynamics of code 3 (box 4–5 mm.) (2.67 ± 2.38 %) accounted for 43.75 % (3.83 ± 1.67 %) (P < 0.01); 293.75 % (10.50 ± 2.92 %) (P < 0.01) and 462.5 % (15.0 ± 3.66 %) (P < 0.001).

Code 4 (box ≥ 6 mm.) (0.50 ± 0.99 %) was, respectively. 733.3 % (4.17 ± 1.74 %) (P < 0.01); 1566.66 % (8.33 ± 2.63 %) (P < 0.001) and 2500 % (13.0 ± 3.45 %) (P < 0.01). At he same time in trimesters II and III there were registered uncounted sextants (code X) (12.67 ± 1.22 % and 3.33 ± 1.84 %), absent in the control, that indicated about progressing lost teeth in the pregnant women as output of tooth extraction due to caries so as due to periodontal lesion.

It is necessary to note that in the first months after pregnancy there was noted improvement of the periodontal state in relation to the corresponding values in the II trimester of pregnancy, however they remained significantly to be higher (P < 0.05) than the corresponding values in the I trimester.

Thus, the number of healthy sextants, code 0, increased more than 2 times and had no significant differences with trimester I (P > 0.05); the quality of sextants with code 1 (hemorrhages) reduced in comparison with trimester III by 32.62 % (P < 0.01); however it was lower than findings of trimester I by 32.22 % (P < 0.01); number of sextants with code 2 (dental calculus) had no significant differences with findings of trimester III (P > 0.05), but prevailed indicator of trimester I by 30.26 % (P < 0.01).

It is necessary to note, what quantity of sextants with codes 3 and 4 (pockets of 4–5 mm. and ≥ 6 mm.), reflecting current of inflammatory — destructive lesion of parodontium, was exceeded the meaning of the I trimester by 37.84 % (P < 0.01) and 21.87 % (P < 0.01) and was of the below the appropriate sizes of the II and III trimester by 170.27 % (P < 0,01) — 2113.24 % (P < 0.001) and 165.63 % (P < 0.001) — 143.75 % (P < 0.001).

Thus, the indexes of loss of dentogingival attachment (code 3 and 4) during pregnancy are higher, than after puerperal period, and quantity of a tooth stone (the code 2) does not undergo significant changes.

Essential that fact is represented, that the level of destructive damage of the parodontium after labors reliably (66.50 ± 5.62 %) (P < 0.01) exceeds the parameters of the I trimester (54.55 ± 5.43 %).

Conclusion. The received results convincingly prove:

1) the pregnancy results in occurrence and progressing of the parodontium diseases, and the severity of damage achieved maximum in the III trimester;

2) the damage of parodontium induced by pregnancy does not stop in the early postpartum period, remaining statistically significant (p < 0.01) above the appropriate meanings of control group and index parameters of the I trimester.

Increase of qualitative and quantitative parameters of the parodontium state in the dynamics of pregnancy progressing and early postpartum period indicates not only about high needs of the pregnant women in parodontological therapeutic care, but also about importance of the improvement of the current method of the oral cavity sanation in this contingent of the patients with parodontitis [2, 6].

References:

1. Esenyan Z. V. Clinical characteristic of parodontial inflammatory diseases in the different periods of pregnancy.//Med. Vestnik Erebuny. – 2007. – № 3 (31). – P. 33–35.
2. Kalinina O. V. Role of individual hygiene in the prevention of inflammatory characteristics in the oral cavity in the pregnant women.//Parodontologia. – 2010. – № 2 (55). – P. 74–76.
3. Adriaens L. M., Alessandri R., Sporri S., Lang N. P., Persson G. R. Does Pregnancy Have an Impact on the Subgingival Microbiota?//J Periodontol. –2009. – Vol. 80. – P. 72–81.
4. Ainamo J., Barmas D., Beagnic G., Cuttess T., Martin J. Development of the WHO Community Periodontal Index of Treatment Needs (CPITN).//Int. Dent. J. – 1982. – P. 284–92.
5. Boggess K. A., Moss K., Madianos P., Murtha A. P., Beck J., Offenbacher S. Fetal immune response to oral pathogens and risk of preterm birth.//Am J Obstet Gynecol. – 2005. – Vol. 193, № 1. – P. 121–6.
6. Boggess K. A., Urlaub D. M., Moos M. K. Knowledge and beliefs regarding oral health among pregnant women.//J.Am. Dent. Assoc. – 2011. – Vol. 142, № 11. – P. 1275–82.
7. Vergnes J. N., Sixou M. Preterm low birth weight and maternal periodontal status: a meta-analysis.//Am J Obstet Gynecol. – 2007. – Vol. 196. –135. – P. e –7.

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Working out and inculcation organizing measures of accreditation of Health. Care primary units institutions activity — rural medical centers (RMC)

Abstract: The developed system of self — estimation of therapeutic-prophylactic institutions can be used for any type level of Healthcare institutions, as it gives the opportunity to motivate the process of medical help administration, to receive objective marks based on the facts and it is directed to increase in formativeness of the institutions of Healthcare on existing problems, demanding the solutions.

Keywords: accreditation, Health Care, primary Health, external evaluation.

Urgency. By the order of the President of the Republic of Uzbekistan "About the further development of reformation system of Health Care" the main role in this sphere is given to the wide availability and high quality of primary medical-sanitary aid to the population especially in rural districts [1]. The high quality of this kind of help can be provided through the introduction of quality control mechanisms and safety of medical aid which include legalization and accreditation if the principles of the process of legalization legally and by standard documents [2; 3; 4] but there are publications in scientific literature dedicated to some directions of accreditation of medical institutions [5; 6; 7].

Modern structure of Health Care in Uzbekistan shows necessity of realization in the research work on working out and inculcation of organizing measures of accreditation of primary health care activity, primarily, of rural medical center's (RMC).

Purpose of the investigation: Work out science — based proposals and to introduce organizing measures on accreditation and external evaluation of activity of RMC.

Materials to methods: The objects of research were the RMC of the republic.

Analysis of statistics of Health Institute, medical statistics, internal audit/self — evaluation, external audit/evaluation of experts, directs observation/interviewing, study of medical documents and therapeutic — diagnosing process, analytic, statistic methods have been used.

Results and discussions. The review of international scientific research shows that accreditation began to be used in some countries of the West Europe and USA in early XXth century.

In the USA, first, special standards to control sanitarian condition and the patients condition in the medical institutions were used. Then accreditation procedures have been worked out in other parts of the world, particularly, in the countries of South — East Asia.

In most countries accreditation of medical institutions is obligatorily carried out on the national level by special representative state organ. There are several international organizations dealing with accreditation such as: International society for quality in Health, The society for International Healthcare Accreditation — SOFIHA.

Organizations, mentioned above, created several generally acknowledged system of accreditation: Trent Accreditation Scheme, Saint Commission International (SCI), Australian Council for Healthcare Standards International (ACHSI), Canadian Council on Health Services Regulation (CCHSA).

We performed the research in several stages.

The First dealt with standards (criteria) of accreditation for self-evaluation — internal audit activity of institutions in primary Healthcare units according to the following directions: effectiveness of organization, management and finance of medical aid; process of administration of high — quality and safe medical assistance; staff potential; material and technical bases; information-resource bank.

At the second stage medical workers of RMC were taught methodology of accreditation and self-evaluation of the institution (internal audit) that was carried out on-sight.

At the third stage internal audit (self-evaluation) of RMC was carried out. After detailed analysis of the results practical recommendations were given to improve the activity of RMC: increase of qualification in organizing and management in Healthcare; revision of organization structure and the fund of financial stimuli zing; improvement in dyspansariation females of fertile age, birthrate, having observative measures, informativeness of patients about medical procedures, their results and possible complications; trainings of medical staff; strengthening of material and technical basis; applying of protocols of diagnostics and treatment in practice.

Analysis of RMC self-evaluation showed the data ranged in 66 % – 73 %, that is an average indication of the medical services level. Also, significant differences in personnel training has been noted both in organization of assistance administration and in problems of patients observation and its quality with patients different conditions.

This fact enabled to conclude on the necessity of personnel training courses according to the programme of quality improvement in Healthcare institutions.

At the fourth stage, in the framework of scientific research on accreditation of primary Healthcare institutions

the training of medical RMC personnel has been performed on the course of "Accreditation and increase of quality in medical aid administration".

The task of the fifth stage was to carry out external experts evaluation/accreditation of pilot RMC.

The evaluation of RMC was done by using the list of indicators for each standard according to "Guidance for pilot accreditation of RMC", then, each indicator was given a quality mark with the report and recommendations.

According to the results of the research, done in cooperation with independent experts, the analysis of accreditation indicator has been performed and each RMC was given a proper category. At the same time the recommendations on the improvement the process of medical aid administration have been suggested as well as the steps on elimination of the reproves according to the final results of external expertising of rural medical centers the average value of resource standards and standards of organization and service in RMC is 80 %. For improvement of resource provision the institutions were given recommendations, concerning adequate water supply, electricity, heating. Planning and realization of control program, testing and service of medical equipment, documents after the testing has been recommended. Special attention is paid to the matter of qualification improvement and continuous professional development (CPD) of the RMC staff. All the institutions were recommended to improve: the order of patients' reference to the specialists or other level of medical aid administration; to make better the content of clinical records; completeness, details, accuracy, diagnose-proof, laboratory tests, treatment, directions to specialists, and timely hospitalization.

At the next stage of external control clinical work of RMC was estimated according to the list of prioritive conditions and measures for primary Healthcare unit. Average value of standard diagnostics and treatment of arterial hypertension (A. H.) in pilot RMC is 74 %. All the institutions were recommended to identify tonometers for measuring BP; prophylaxis, diagnosing and treatment of AH are to be performed strictly according to the clinical guidance.

Average value of I–II degree (ischemic cardiac disease) ICD diagnosing 2 treatment standards also rose to 70 %. Recommendation were directed mainly, to improve rotation of documents of the institution (making and fixing medical notes in patients cards, their completeness, clearness and analysis); optimization of directions — referrals of the patients to the higher level of the service; search of the control methods of proper medicine taking by the patients; also, organization of therapy processes) strictly according to the standards.

On average the fulfillment of standards on iron — deficiency anemia in children and adults composed 75 %. In this direction recommendations mainly concerned the problems of screening diagnostics and treatment.

Average results of fulfillment the standards on antenatal care composed 88 %. In this field the recommendationswere given for working out the measures of taking medicine regularly and the control of the regularity.

The standard of postnatal care showed higher results — 93 %. Recommendations were addressed to improve medical assistance mostly in home nursing document rotation.

All RMC have not high score in the standards of "malignant tumors" such as; breast cancer, cancer of cervix, gastric and respiratory organs carcinomas.

Average standard value composes 65 %. Among the recommendations; giving clear explanations to wide range of population on increasing the knowledge about the symptoms of the diseases; the work on documents rotation, working out and realization of risk group screening at early stages of malignant tumors.

Our investigation shows that the most perfect and well-organized direction in primary unit of Healthcare is immunization. This is certified by 100 % of accreditation standards on the immunization of the population. Also, the percent of "medical assistance" to up to 5 year old children with pneumonia is 92 %.

Apparently, this is the result of the organization, working out and introduction into the practice of clinical standards in medical assistance through arear mentioned above.

Making the conclusions, it can be noted that 8 RMCs successfully passed the pilot accreditation, according to the tasks and the worked-out program. They received a category.

At the sixth stage, the analysis of problems revealed during pilot accreditation of RMC enabled to create a questionnaire on RMCs activity and their effectiveness. According to the results of this stage consolidation of RMC net by liquidation of small ineffective working RMC was suggested; also, it is advised to introduce the position of deputy of the head doctor of the polyclinic — RMC activity coordinator. The chief nurse additionally motivate general practitioners working in long — distant regions, localized in mountain areas as well as the visiting nurses; to introduce new staff norms concerning duties of the nurses.

At the seventh stage Timely Order on the order of evaluation of home nursing RMC activity according to which the work of 684 visiting nurses was evaluated in 96 Bostanlik, Uzbekistan, Shahrisabz, Khivin, Djambay regions of therepublic.

As the result of this stage the evaluation of the efficiency of home nursing activity in 9 main directions and 30 indicators has been introduced; functional duties of the nurses have been determined, also, their every day work activity has been organized; the mechanism of the control in nurses activity with GPs and chief nurse has been worked out; the efficiency of the work of nurses and quality of the population dispensary has been improved.

Taking into account the positive experience in home nursing nurses activity evaluation and the experiment on accreditation of RMC in the Republic of Karakalpakstan and Andijan region recommendations on evaluation mechanism of RMC activity have been given and it was the 8th stage of the research.

As a whole, according to the results of the research:

1. Estimation of activity efficiency of 684 home nursing nurses in 96 rural medical centers of 5 regions of the Republic has been introduced and enabled:
   - To increase the quality of dyspanserization of local population, consequently raised patients detection and the number of hospitalized ones. So, the number of patients reffered to the hospitals from medical centers elevated from 53.1 % to 58.5 %.
   - To minimize the number of patients treated in the departments of emergency care during the period of 9 month, 2013 – 9 month, 2014 from 12.8 % to 11.6 % in the correlation to the general number of treated patients in the hospitals also, the number of calls to first-aid to 4 %, this certifies the proper prophylaxis work timely reveal and planned treatment of the patients in rural medical centers included into the experiment
   - To lower the number of patients reffered to labour medical examination during 9 month, 2013 – 9 month, 2014 to 5 %, and the number of sick leaves given to the patients in this period to 12.9 %.
2. Recommendations on estimation mechanisms in rural medical centers proved by Introductions of ministry of Health of the Republic of Uzbekistan on January 5th 2015 hae been worked out and are being introduced in 319 RMC of 18 regions of the Republic.

Conclusion:

– The system of self — estimation of therapeutic — prophylactic institutions (TPI) can be used for any type level of Healthcare institutions, as it gives the opportunity to motivate the process of medical help administration, to receive objective marks based on the facts and it is directed to increase in formativeness of the institutions of Healthcare on existing problems, demanding the solutions.

– The estimation of experts requires disciplinary skills, so the experts team has to include specialists of all main directions for determination of exact problems requiring improvement.

– For the successful process of accreditation and taking categories, the personnel have to study and adopt the changes of the management of their institution into the standards and indicators of accreditation.

– The introduction of scientifically proved model of RMC accreditation into practical Healthcare provides the improvement of medical help quality without any exive directions foe state level, it means, it can be applideternal investment and resources.

– Standards and indicators of accreditation worked out for the management system of medical help quality in primary healthcare unit can be sugested to be used in the system of financial support of medical workers.

– Scientifically proved organizing model of accreditation of primary healthcare units enables to determine prioritive directions for state level, it means, it can be applied for accreditation of other medical institutions of the Republic of Uzbekistan.

– Taking into account the system structure formed in republic healthcare, evaluation of Completeness and quality of medical help administration in RMCs can be suggested as intermediate stage before introducing of accreditation in the republic.

References:

1. About measures on further strengthening of reforms system of Healthcare. – Resolution of the President of Republic of Uzbekistan of November 28th, 2011. – № 1652.
2. Temporary principles order of legalization of GPs.//Healthcare of Uzbekistan. – Tashkent, 2006. – № 2. – P. 4–5.
3. Grebenyuk I. V. Legalization in the field of Healthcare.//Chef Nurse. – 2000. – № 3. – P. 155–158.
4. Larin A. B., Tyukov Yu. A. Development of law standards of legalization in healthcare.//Economy and management matters for director in healthcare. – M., 2008. – № 1. – P. 5–10.
5. About measures on fur the development of the order of legalization in medical activity. Resolution of the Cabinet of the Republic of Uzbekistan of April 3rd, 2008. – № 61.
6. Kochorova L. V. Actual matters of legalization and accreditation of psychiatric services and perspectives of their development in St.Petersburg.//Russia psychiatric journal. – 2001. – № 1. – P. 61–63.
7. Minn L. State accreditation of healthcare institutions in France.//Russia psychiatric journal. – 2001. – № 3. – P. 57–60.

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Evaluation of patronage nurse at rural medical centre

Abstract: The system of evaluation quality and effectiveness of medical care must functionate constantly, that allows to get operatively the necessary information for control. By that the main factor of turning from quality evaluation and effectiveness to their increase is education and constantly improvement knowledge and skills

of personnel. The disciplinary measuresor punishments are extreme measures and little effective means of improvement quality for medical care.

Keywords: medical care, patronage, nurse, rural medical centre.

Actuality. The quality of medical care is totality of many features, proving correlation of taken care with patient's (population) expectations, modern level of medical science and Technology. In 1980 Avedin Donabedian suggested the next determination: "The quality of medical care is defined with use medical science and technology with the highest benefit for human health, by that without risk increase so the level of quality is the degree of achievement for the above mentioned balance of benefit and risk".

The quality is many — sided problem and, includes adequacy, accessibility, succession and continuity, effectiveness, resultants, safety, timeliness, satisfaction in requirements and expectations, process and results' stability, constant perfection and improvement [1]. As it is knows, for evaluation of quality (result) the standards and indicator are necessary.

The quality of medical services are: care, treatment, services, being concentrated on patient, practicing by every employee, the level of safety, effectiveness and timeless, those, determine possibility of expected results, and corresponds to modern professional achievements of medicine [2].

The quality control is based, first of all, on results evaluation indices. If they are out of range for the results' standards, it will be necessary to make out why it was happened, firstly, to analyses the observation of technology standards, and, then, if it is necessary, to control resources' standards [3].

For all components the standards are made, as, both evaluation and control can be done only with the comparison of standards. By the present we have necessary legislative base, structure, human and material resources, in order to work out the necessary standards at all levels.

The system of evaluation quality and effectiveness of medical care must functionate constantly, that allows to get operatively the necessary information for control. By that the main factor of turning from quality evaluation and effectiveness to their increase is education and constantly improvement knowledge and skills of personnel. The disciplinary measuresor punishments are extreme measures and little effective means of improvement quality for medical care [4].

Purpose of the investigation: Improving of evaluation of patronage nurse at rural medical centre.

Materials and methods: In order to introduce as an experiment, The system of rating evaluation for quality work of patronage medical nurses, and rural medical centers (RMC), in Bostanlik, Uzbekistan, Shahrizabs, Khiva, and Djambay regions of the Republic of Uzbekistan, the temporary regulation was worked out.

The experiment covered 684 patronage nurses, who worked in 96 RMC. From being involved 96 RMC in experiment, 52 % were located on the territory with developed infrastructure, 30 % were in mountain place, 18 % were in steppe zone.

From general number, being involved in experiment 65 % have radius of service to 10 km., 31 % were from 10 to 20 km., 4 % were over 20 km.

Results and discussions. The effectiveness, evaluation of activity for patronage medical nurses was carried out by 9 main directions and 30 indices:

– Indices, determining the volume of performing work in diseases prophylaxy among attaches population (study medical and social state of house keeping (patronage), visiting young families, patronage alone old persons, being in need of care, and, invalids; covering.

Examination of adult population; taking measures on observation infectiousfoci; depending on incubation period of infectious diseases; fluorography examination of population from risk groups).

– Indices, determining volume of carrying out work in prophylaxy of diseases among women of fertile age, pregnant and parturient (visiting pregnant at home (patronage); covering with prophylactic examination of fertile aged woman; patronage of parturient (for 42 days after childbirth).

– Indices, determining volume of carrying out work among children (patronage children under 1 year old at home; patronage children — invalids at home; covering with prophylactic examination children at the age from 1 to 18 years).

– Indicates, determining volume of carrying out work by evaluation and monitoring of physical development children (monitoring of physical development children under 1 year old, from 1 to 3 years old, from 3 to 5 years old, from 5 to 14 years old, from 14 to 18 years old).

– Indices, determining volume of carrying out work in prophylaxy of diseases among children (monitoring of rickets prophylaxy among children under 1 year old, monitoring of breast feeding children under 1 year old).

– Indices, determining volume of carrying about work in vaccination among children (covering with vaccination children of 2 years old, providing control after complications and reactions after vaccination).

– Indices, determining volume of therapeutic work (providing coming patients with chronic diseases system carry out therapeutic measures at home by physician's administration).

– Indices, determining quality of taking medical documentation (passport of family, diary of patronage medical sister, ambulatory cards of patients).

– Qualitative indices, negatively influencing on total effectiveness indices activity of patronage medical nurses (negative points minusing from total evaluation).

– To register pregnant women in late terms (after 12 weeks of pregnancy) spread infections morbidity on attached territory (untimely observation), presence of cases of maternity mortality, cases of infant's mortality (under 1 year old).

By the evaluation results once a month the special report form was worked out.

The points on indices, determining quality of taking medical documentation, and, also on quality indices, negatively influencing on total indices for effectiveness evaluation of patronage medical nurses (negative points, minusing from total evaluation indices) were made by general practitioner and senior medical nurse in RMC.

The calculation of rating points for effectiveness evaluation activity of patronage medical nurse was carried out according to specially worked out system of points counting.

According to given system the maximum points', that can be accumulated, is 100 points. In such case the patronage medical sister having to 100 % carries out her functional duties.

In the case of having point in range from 85 to 100 % the functional duties are carried out effectively; from 72 to 85 % is good; from 55 to 72 % is satisfactory, less than 55 % is unsatisfactory.

At the beginning of taken experiment (April 2014) the rating evaluation effectiveness activity of patronage medical nurses showed, that from 684 patronage medical nurses only 16 gathered more than 85 points, and, their activity was evaluated as effective.

In October 2014 the taken secondary rating evaluation showed, that number of effectively working patronage medical nurses, were 67. Together with it, the number of patronage medical nurses, working "good" (rating point was from 72 to 85 %) also was increased in 1.5 times, the number of unsatisfactory working patronage medical nurses reduced from 14.4 % to 10.6 %.

Conclusion

Introduction of rating system evaluation effectiveness activity of patronage medical nurses allowed:

– To determine clearly functional duties, being responsible patronage medical nurses, and, also, to organize their daily work on planning base.

– To work out control mechanism after activity of patronage medical nurses from the side of general practitioner and senior medical nurse of RMC.

– To increase effectiveness of work for patronage medical nurses.

– To simulate RMC to do their daily work on planning base.

– To improve quality of dispensary system for population, accordingly, to increase revealing of patients and number of hospitalizing patients in inpatient departments.

– To reduce number of patients, being undergone to treatment, in departments of urgent medical care, for the period from 9 months 2013 to 9 month of 2014, from 12.8 % to 11.6 % in relation to general number of having treatment in hospitals, and, also number of carrying out calls of ambulance to 4.6 % witness on planning treatment of patients in RMC, being involved in experiment.

– To reduce number of patients, being directed to examination of labour medical evaluation for from 9 month 2013 to 9 month 2014 to 5 %, and also, number of sick leaves to 12.9 %.

References:

1. Control quality of primary medical sanitation care in Uzbekistan: WHO (documents of World Health Organization). – Copenhagen, 2009. – P. 94.
2. Control quality in public health: licensing, standardization, clinical and economic analysis: Scientific practical conference. – M., 2005. – w. 11. – P. 108–150.
3. Mihaylova Y. V. Quality of medical care and its components.//Medical newspaper. – 2005. – P. 6.
4. Vardosanidze S. L., Lihota A. I. Control quality of medical diagnosis process with use medical standards (minutes). Economy of public health. – 2000. – P. 10–13.

Section 9. Mechanics

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Researching of machines for early harvesting the cereal crops on small farms

Abstract: In the article the results of the research work are brought on development high-performance new and improving technical facilities for early harvesting the cereal crops on small farms.

Keywords: cereal, mower-machine, thresher, grain-cleaner machine.

At present time deficiency of the food-production is getting one of the global problems in the world. According to information of all over the world's Food Agriculture Organization (FAO) nowadays, shortage of the food-production and possibility to buy it are limited, therefore people more than 840 millions are suffering by famine [1; 7].

This shortage may be prevented by other countries which have big possibility to produce agricultural productions and also there is big possibility to produce agricultural production in Uzbekistan.

If there is no water deficiency, it may be got crops 2–3 times from one land area in a year. At present there are two types of the farms in Uzbekistan, they are peasant farmers and large farmers, peasants farmers' area is between 0.1 and 0.5 hectare, large farmers' area is from 10 hectare till about 100 hectare [2, 34; 3, 36].

Last time, on peasant and farmer's farm it is organizing to get crop 2–3 times, they are cereal and after it repeatedly corn, potato, vegetable, melon-watermelon and another crops. For getting sterling and high crops from repeatedly plants, it is connected with to seed them earlier and faster after cereal.

Therefore, we analyzed different type of the harvesting methods, in Uzbekistan cereal plants are harvested their wax ripe period on peasant farms which have 0.1–0.5 hectare, then crops are dried on the stationary area, and we found optimal of this method.

By this method cereal is harvested when its moisture is 35–38 % and no more cereal mass (1.0–2.0 t.) is transported out of the field, and it is stacked, dried. While drying 7–8 days grain's moisture decreases by 17–18 % and it is ripened. The dried cereal is threshed and grain is cleaned. This method gives possibility to seed for repeatedly plants 8–10 days earlier [4, 132–134].

Until recently time harvesting of cereal has been done by hand labour, threshing it has been done by combine harvester, and cleaning grain has been done by big grain cleaner machines. As a result labour expense, energy and exploitation expenses are high.

Therefore, we chose self propelled vertical conveyor reaper, for threshing the mowed cereal and cleaning their grain we created small size thresher and grain cleaner machines.

Reaper's cutting width is 1.5 m., it has double knife cutting mechanism and they cut and lays the cereal's stalks. In the experiment optimal work speed was researched. When work speed was increased from 0.6 up to 1.2 m/s it was known that grain lossless increased from 0.08 % up to 0.42 % (table 1).

Table 1. – Influence to work quality indicators of the speed of mower machine

No.	Indicator's names	Moving speed of the mover machine, m/s						
		0.6	0.7	0.8	0.9	1.0	1.1	1.2
1	Grain lossless, %	0.08	0.08	0.12	0.14	0.18	0.26	0.42
2	Stalks' laying angle, degree	2	3	3	5	8	9	12
3	Cutting height's avoiding, %	4	7	11	15	18	23	31

Besides this, when reaper's speed was 0.6–1.2 m/s grain lossless didn't increase of 0.5 % and it was sterling, work-quality indicators were nice when reaper's speed was 0.6–1.1 m/s for stalk's laying angle.

When speed was 1.2 m/s the defined demand increased from 10°. When cutting height's avoiding was defined by reaper's 0.6, 0.7, 0.8, 0.9, 1.0, 1.1 and 1.2 m/s work speed this indicator was 0.6–1.0 m/s work speed, it increased from 4 % up to 18 %, and didn't increase defined demands (20 %).

However, after work speed increase from 1.0 m/s avoid of the cutting height was worse, and it was known increasing from 20 percent. Besides when it was high speed from 1.0 m/s work speed, worker had to walk faster to manage the reaper.

Therefore, it was known that increasing its load.

So, if reaper's work speed is not increased from 1.0 m/s, its work-quality will be at the level of the demand.

The created thresher's length is 1700 mm., its width is 1350 mm., height is 1000 mm., and its mass is 520 kg.

When this thresher was tested for threshing wheat its threshing efficiency was 99.7 %, for barley threshing efficiency was 99.6 % (table 2).

Table 2. – Testing results of the thresher

No.	Indicator's names	Indicator's quantity		
		According to preliminary demands and technical task	According to results of the test	
			By wheat	By barley
1	Threshing efficiency, %	at least 98	99.7	99.6
2	Breaking and damaging of the grain, %	the most 2	0.6	0.4
3	Cleaning efficiency of the threshed grain, %	at least 95	96.2	96.7
4	Lossless of the grain, %	the most 2	0.7	0.8
5	Choping degree of the straw, %	at least 70	98.7	98.2

Cleaning efficiency of the threshed grain was 95.4–98.2 %, damage of the grain was between 0.4–0.6 %. Lossless of the wheat grain was average 0.7 %, and barley grain was 0.8 %, and it contented full the defined demands.

While testing output capacity of the thresher, it was defined that cereal mass was 710–800 kg/hour, expense of energy was 2.7 kWt. Also, straw's choping level which comes in from thresher was quality and it was known that it is not important to chop additional the straw to give for cattle.

As a result of the done researches, small grain-cleaner machine was created which has smooth surface sieve and it is adapted to primarily clean grain. Length of the grain cleaner machine is 1500 mm., its wide is 800 mm., height is 1100 mm., and mass 305 kg.

When machine was tested to clean grain from major mixture was 99.8 percent, to clean from small mixture was 98.7 and grain cleanliness was average 99.2 percent (table 2). Other grass seed which is grain component was separated 62.1 percent and total grain lossless was 0.6 percent. Output capacity of the machine is 717.1 kg during the main work time, it is 508.3 kg during exploitation time, expenses of energy is 1.8 kWt.

Table 3. – Testing results of the grain-cleaner machine

No.	Indicator's names	Indicator's quantity	
		According to preliminary demands	According to test
1.	Cleaning the grain from major mixture, %	at least 99	99.8
2.	Cleaning the grain from small mixture, %	at least 98	98.7
3.	Cleaning from other grasses' seed, %	at least 60	62.1
4.	Total grain lossless, %	the most 3	0.6

According to the done tests, sieve was given with together frontal swing 3–5 mm. across swing and it was defined that there is possibility to decrease of grain lossless to 20–25 percent than before and there is possibility to improve 1.1–1.2 times the grain cleanliness.

In general, machines which are recommending give possibility to harvest of cereal 8–9 days early than usual, mowing process by hand labour is mechanized on small farms, expenses during the process for threshing and grain cleaning are decreased and labour expenses are decreased 2–3 times.

References:

1. Jose Gratsianu da Silva. The main director's speech the Food Agriculture Organization of the UN at the international conference "Important reserves to produce program of the food-production in Uzbekistan"//Journal Agriculture of Uzbekistan. – Tashkent, Vol. 7. – 2014.
2. Aralov Kh. Forming and legal base of the peasant farms.//J. Agriculture of Uzbekistan. –T., Vol. 2. – 2013. (in Uzbekish).
3. Abduganiev A. It is period's demand development of multi-branch farms.//J. Agr. of Uzb. –T., Vol. 2, 2015. (in Uzbekish).
4. Astanakulov K. D. Economical effectiveness the early harvesting technology of cereal on small farms//Innovation development the economy of the agricultural branch and ways to increase the effectiveness of the agro technologies: Materials of scientific-practical conference. – Tashkent, 2013.

Section 10. Political science

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Visegrad Four and Ukraine: possibilities of cooperation

Abstract: The article deals with the outlook of Ukrainian relations with the Visegrad Group member states. The perspectives of cooperation in "V4+" format are analyzed.

Keywords: Ukraine, Visegrad Group, Russia, European Union, Poland, Czech Republic, Slovakia, Hungary.

Introduction

The fundamental changes in the system of international relations that took place in the late 20th century forced all countries of the European continent to look for their place in the new reality. Foremost it concerned the Eastern Europe states. In order to unite their efforts towards building a democratic society with a market economy and integration into the European Union Poland, Czechoslovakia and Hungary formed the Visegrad Three in 1991 (after the dissolution of Czechoslovakia in 1993 — Visegrad Four). In the founding document the member states pledged to coordinate their policies in cooperation with European institutions, to ensure freedom of contact between citizens, institutions, religious and social organizations, promote the free movement of labor and capital, to attract foreign direct investment, to develop joint infrastructure projects, to cooperate in the fields of ecology, the free flow of information, media development and cultural values, to protect rights of national minorities and promote the expansion of contacts between local authorities [16].

Transformations within member states have proven to be successful, and in year 2004 all of them acquired the full EU membership. Although technically that was considered to be the ultimate goal of the Visegrad Four, the group did not collapse after that, on the contrary, four countries decided to continue coordination of their efforts to ensure further development. During more than twenty years of V4 existence its members managed to achieve a lot, despite the informal character of association. First of all, they were able to achieve an atmosphere of mutual understanding within the group and to bring outside arguments in bilateral relations that could slow down the positive transformations. Traditionally Slovak-Hungarian relations are considered to be the most problematic, primarily because of the status of the Hungarian minority in Slovakia, but even these two countries prefer to find a compromise within V4 [13]. The so-called institution of the presidency also contributes to coordination of policies in various areas. Every year one member state takes on the informal leadership of the association, defines the agenda of its actions for the next year (approved by all members) and is responsible for its implementation. Thanks to this institution Visegrad Four did not turn into a forum or platform for an exchange of views between political leaders after accession of member states to the EU [13].

Within V4 a lot of concrete achievements were made. One of them is the creation of the International Visegrad Fund. Being the only formalized institute of the Visegrad Group, the fund provides grants for development projects related to civil society, with a special focus on non-governmental structures. Since the fund provided also grants for projects from neighboring states, they contribute to the development of international contacts of V4 countries at all levels and eventually, because of the nature of these projects, to the creation of a safer and more developed environment for the whole Visegrad Group [13]. Also the progress in ensuring of the member states' energy security is notable. All four countries are dependent on imported energy resources, mainly from Russia. In early 2009, they were faced with the unpredictability of Russia as a partner and the problem of gas supply depending on the political situation in the region. To prevent the future recurrence of this situation, the Visegrad countries decided to provide a gradual conversion to alternative energy sources and development of infrastructure that would allow them to reduce dependence on Russia (including interconnector networks and liquefied natural gas terminals). Appropriate intentions were fixed in the Joint Statement on 24 February 2010, which, in addition to members of the V4, signed by representatives of Austria, Bulgaria, Croatia, Bosnia and Herzegovina, Serbia, Slovenia and Romania [4].

Today Ukraine finds itself in a more than difficult situation, both in view of the situation inside the country and in terms of foreign policy environment. After the political turmoil in 2013–2014 the European way of development seems the only possible option for the majority of Ukrainians. It is no wonder that today Ukraine calls for help from Visegrad countries. In December 2014 in Kiev there was a meeting of Ukrainian President and the representatives of Czech

Republic, Hungary, Poland and Slovakia, during which Petro Poroshenko expressed his hope for transformation of "V4" into "V5" in the nearest future [10]. Currently Ukrainian hopes are associated with two possible aspects of further interaction with the Visegrad Four. On one hand, it is believed that the Visegrad countries can serve as "advocates" of Ukraine in the European and Atlantic structures, taking into consideration the similarity of historical destiny and geographic proximity. On the other hand, Ukraine hopes, that the Four will help in implementing internal reforms. And even if the positions of individual member states towards Ukraine are different, as a union they really can contribute to the successful transformation of the country.

All four members of the Visegrad Four have sad memories about relations with Russia as the legal successor of the USSR. Taking that into account, it would seem, that their sympathy in today's conflict must be on the side of Ukraine as another victim of Russian aggression, and that they would lobby Ukrainian interests within the European institutions. However, in practice things are not that simple. Each of the V4 countries in this situation remembers about its complex set of social, political and economic interests, and the fear of a repetition of the Russian aggression does not always prevail.

Of course, Poland takes the most loyal position to Ukraine. This is due to not only good relations between states (although they are sure to take place), but also to the Polish leadership ambitions in Eastern European sub-region. Since joining the EU this country wants to gain weight in the union, that would be equivalent to recognized leaders, like France and Germany. However, unlike the "veterans" of the EU, Poland is a frontier country and its ability to influence the sub-region is also defined through the ability to ensure stability on its own borders [9]. That is why Poland together with Sweden came up with an idea of the Eastern Partnership in 2008.

Since 2013, the situation in Ukraine is without doubt the greatest threat to security in the region. Even before the war with Russia, Poland has made every effort to resolve the political crisis peacefully, from the Koks-Kwasniewski mission to Donald Tusk mediation at signing an agreement between the Ukrainian authorities and the opposition in the most difficult days of February 2014 [9]. After the invasion of Russian troops in the Crimea and further aggression in the Donbass region threat to Poland only increased, since it is unknown, which country will be the next victim of aggression [12]. Therefore Poland and Baltic States were the most consistent supporters of the anti-Russian sanctions. It was not stopped even by the possibility of economic losses. For example, in the summer of 2014 Russia suspended import of Polish vegetables and fruit, which, according to experts, estimated at one billion Euros annually [2]. In this situation, Poland believes it possible to sacrifice immediate profits for the sake of long-term security. The same reason causes the consistent support of Ukraine on its path to European integration — in EU orbit Ukraine has more chances to become a predictable partner that does not bear threat to Poland, while after becoming Russian satellite Ukraine may serve as a springboard for an attack, both on the Polish interests and, in the worst scenario, on Polish territory.

The Czech position on a Ukrainian situation is more moderate and cautious. On one hand, the Czech Republic has consistently supported the desire of the Ukrainian people to provide democratic transformations, especially paying attention to the repeated violations of human rights. When pro-European forces came to power as a result of Euromaidan events, Czech Republic welcomed that and promised its full assistance with the reforms in the country. Like all EU countries, the Czech Republic joined the anti-Russian sanctions. Its readiness to treat Russia as a potential threat is evidenced by the fact, that at a summit in Newport it agreed to provide the NATO Response Force with soldiers and 150 transport helicopters. Moreover, even before the summit, the Czech government decided to increase defense spending from 1.1 to 1.4 percent [6].

On the other hand, the economic interaction between Russia and the Czech Republic is very close in all sectors, from tourism to energy trading, and Czechs are not ready to risk it for the sake of Ukraine. According to President Zeman, there is civil war in Ukraine, and although Russia is present in the conflict, there is no real evidence that the Russian army is one of the warring parties. That is why he believes the EU response to be inadequate to real level of threat — he thinks that only under conditions of full invasion, like the one that took place in Czechoslovakia in 1968, it would be necessary to apply sanctions and NATO forces, up to the full-scale military operation. Although Czechs were outraged by such statements of their president, who is known for closeness to the Kremlin elite, they cannot deny that sanctions have a negative impact on the Czech economy. According to Bohuslav Sobotka, Prime Minister, the Czech Republic can not afford to lose the Russian market, because this loss will be irreparable. Russia, on the other hand, can still replace products of Czech plants by Chinese goods. In this case, even when conflict ends, the Czech Republic will not be able to resume their former positions in the Russian economy, since its goods will not be competitive compared to the Chinese [6].

Slovakia follows similar behavior patterns. Even the leaders of the country have no consensus on the behavior regarding Ukraine-Russia conflict. President Kiska has no doubt that Russian behavior is a threat in the region, and believes that the reaction of the Western powers must be appropriate. In particular, at the NATO summit in Newport Kiska stated that Slovakia intends to increase its presence in the command of NATO and offered the Alliance the possibility to use Slovak infrastructure for their exercise. In addition, he said Slovakia, following the example of the Czech Republic, is going to increase the defense budget by half a percent to 2020 [6].

However, Prime Minister Fico does not share the determination of the President regarding this conflict. According to him, the struggle of geopolitical interests of the US and Russia is unfolding, and risking the Slovak economy to support one or

the other makes no sense. Slovakia supported the anti-Russian sanctions, but almost immediately expressed a desire to review them. According to Fico, the sanctions have proved to be counterproductive, because the confrontation continues. It would be much better to cancel the sanctions as a gesture of good will, thus encouraging Russia to open and intensive dialogue [8]. However, one cannot claim that the position Fico is one hundred percent pro-Russian. Slovakia was the first source of reverse gas supplies to Ukraine through gas pipeline "Vojany-Uzhgorod", thus reducing Ukraine's dependence on Russian gas (despite the fact that the dependence of the Slovak Republic on Russian gas is also significant) [6]. More likely, the Slovak Prime Minister, as well as his Czech counterpart, wants to primarily serve the economic interests of his country. Economic ties between Slovakia and Russia are even closer than the Czech-Russian and anti-Russian sanctions have affected key sectors of the Slovak economy, from industrial dual-use goods and banking sector to agriculture, that suffers from Russian sanctions in response [8].

Among four countries of the V4 Hungary is the least friendly towards Ukraine. Even before the war with Russia relations between countries were strained, because Hungary never lost an opportunity to remind about problematic issues in bilateral relations, namely concerning the situation of the Hungarian minority in Ukraine. The Hungarian government has repeatedly stated the alleged violation of political and cultural rights of 150 thousand Hungarians who live in Transcarpathia (in reality, region has a whole system of Hungarian cultural and educational institutions, publishing houses, mass media and public associations, including those sponsored by the state budget of Ukraine). In addition, the Hungarians are widely represented in local authorities [15, 4–5]. Nevertheless, the Hungarian power still insists on the need of greater autonomy for Hungarian minority. The last statement of that kind was made by Hungarian Prime Minister Viktor Orban in May 2014, just during the escalation of the conflict in Eastern Ukraine. Orban said that the Hungarian minority should have full autonomy within a federal Ukraine [11].

As the federalization of Ukraine was one of the main requirements of the Russian authorities at that time, this statement caused a wave of outrage in the Ukrainian society, and, to say the least, bewilderment in Europe, that tried to create a semblance of unity of positions regarding the Russian-Ukrainian conflict. In fact, the Orban's policy towards Ukraine fully meets the general idea of his foreign policy. Since he has been in office, Orban consistently builds a close alliance with Russia, apparently considering it to be more important for Hungary than membership in the European Union. Thus, although the country has supported anti-Russian sanctions in 2014, Orban hastened to declare their ineffectiveness and futility, and continued to receive huge loans from Russia (for example, in February this year, Russia gave Hungary over 10 billion Euros for the construction of two power units of NPP "Paks") and use favourable terms of contracts, particularly in the field of energy supply [14].

In fact, today Hungary is probably the biggest "friend" of Russia in the whole Europe. If the Czech Republic and Slovakia are calling for dialogue with Russia on purely pragmatic reasons, Russian-Hungarian relations share extremely strong ideological component. Orban, like Putin, likes talking about the decline of Western civilization and the futility of democratic principles of state building. His ideal is the "illiberal" state, in which it is possible to concede democratic freedoms for the sake of national economic interests [8]. So, in terms of Orban, the conflict between Ukraine and Russia is nothing more than a Western desire to keep Russia from development and prosperity, a fear of competition from her in the future. So long as he and his party "Fidesz" remain in power in Hungary, Ukraine should not expect support from it.

So, as it seems, Ukraine by no means should consider Visegrad Four for a "group of friends". Since these countries are not linked by any formal documents that would contain the obligation have a common political line, they can not influence the foreign policies of each other. Even if Poland continues to find it necessary to defend Ukrainian interests, it does not have enough leverages to persuade member states to do the same, if they do not see benefit for themselves in this situation.

However, if we view the Visegrad Group as the union and not simply a set of neighboring countries, we can see many prospects for Ukraine to cooperate with it. Of course, it is now inappropriate to talk about the full-scale enlargement of the group. For more than twenty years of V4 existence this idea sounded repeatedly, with Slovenia and Austria being the most likely candidates. However, current members believe that the enlargement will make cooperation within the group difficult, because in this case more points of view are to be taken into consideration [13]. For interactions with partners in the EU and Eastern Partnership formula V4+ has been applied successfully for quite a long time. It allows to cooperate in certain areas without violating the balance within the Visegrad Group. It seems that Ukraine can benefit the most from coordinating the efforts in this format.

One of the priorities of such coordination is ensuring the energy security of Ukraine. Due to the conflict with Russia, Ukraine risks losing daily to import from the East, or to be forced through blackmail to yield its own interests for the sake of sufficient energy supplies. A solution to that problem is the gradual reduction of dependence on Russian gas through increasing rates of reverse gas supplies from Europe, primarily the Visegrad Group countries. Deliveries of gas from European neighbors to Ukraine began in November 2012. At a conference in Kyiv in 2013 top managers of the V4 countries' gas transporting systems discussed the possibility of combining their regional gas market with Ukrainian by creating the network of interconnectors, and the project of Eastern European hub at the basis of Western Ukrainian underground gas storage facilities [17]. These projects were not implemented, but the pace of reverse gas supplies to Ukraine increased every year, acquiring special importance in February 2014.

According to the Ukrainian State Statistics Committee, during the entire period of existence of reverse gas supplies Visegrad countries (primarily through Poland, Slovakia and Hungary) imported to Ukraine about 6 billon cubic meters of gas, of Slovakia gave more than a third. In 2014 the amount of reverse gas supplies from Europe totaled over 2 billion cubic meters, thus ensuring 12.7 % of Ukrainian consumption [17]. Certainly, the V4 countries are not always reliable — for example, last fall Hungary stopped reverse gas from its territory to Ukraine, most likely because of the Gazprom pressure, however, restoring them after a while [1]. But now the problem of dependence on Russian gas remains one of the most important for Ukraine, and to solve it, energy cooperation with the Visegrad countries should gain momentum.

Another promising project of the V4 that Ukraine is about to join, is the Visegrad Battlegroup, which is to be brought on standby in 2016. Ukraine's participation in this unit was assumed prior to the Russian-Ukrainian conflict — as stated in the official documents, "to become a strategic success, the battlegroup experience needs to be seized upon to open the door for more permanent forms of collaboration in the region" [3]. When the conflict started, Visegrad Four confirmed Ukraine's participation in the group in Bratislava Declaration of 9 December 2014. Activities of the Battlegroup involve joint military exercises, coordinated defense procurement and joint defense development of member countries [5]. Although the group is intended to cease to exist in June 2016, its creators hope that this project will be the "flagship" of the future coordination of defense efforts in the region. For Ukraine participation in the group provides a chance of experience exchange with NATO countries' armies, which in turn should help to reform its own army and its adaptation to more progressive Western standards.

Finally, considerable progress was achieved in cooperation of Ukraine with the International Visegrad Fund. Over the years, the institution became the intermediary between the Visegrad group and third countries in the field of cultural cooperation and exchange, science, education and cross-border interactions. Every year, the Ukrainian citizens are provided grants for developing projects in these areas. In addition, last year the fund started providing medium-term grants to citizens of Eastern Partnership to support reforms, political association and economic integration with the EU, strengthening institutional capacity, promoting civil society and the overall transformation of the state [7].

Conclusions

More than twenty years ago, Poland, Hungary and the former Czechoslovakia agreed to work together in tackling the consequences of their socialist past and modernizing their political and economic systems, and established a Visegrad format for that purpose. Even reaching its primary goal in 2004, namely joining the EU and NATO, the group did not split, but rather continued to operate with the times. Today Visegrad Four is a successful example of coordination of efforts and viewpoints within a given sub-region, with the areas of the interaction being very diverse, from political cooperation up to the cultural and scientific exchange.

Taking into account the positive experience of the Visegrad Group, Ukraine is eager to cooperate with all its members in this difficult time, when the success of its foreign and domestic policy determines the existence of Ukraine as a state. However, one must remember that this cooperation can take place in two different ways. On the one hand, it comes to bilateral relations of the Ukraine and each member of the group, on the other hand — the relationship with the association itself. And although Ukraine is trying to give equivalent consideration to both areas, it appears that their prospects are not the same.

From all countries of V4 Poland is so far the biggest Ukrainian partner. To support Ukraine, Poland is even ready to partly concede of its own economic interests, as the Polish economy is largely dependent on exports to Russia. This is due to the fact that Poland believes the Russian interference in Crimea and Donbass to be threat to its own security, and would do anything to stop Russia from further attempts to change the balance of power on the continent in its favor. Czech Republic and Slovakia, in turn, took a more cautious stance. Although they find the Russian position towards Ukraine unacceptable and supported appropriate sanctions of the EU, these states are not ready to concede their well established economic relations with Russia. For this reason the leaders of the Czech Republic and Slovakia regularly call for the abolition or at least review of sanctions, and dialogue and compromise with Russia, which, in turn, is not in the interests of Ukraine, for it believes the preservation and extension of sanctions to be a primary necessity. As for Hungary, it is most attached to Russia of all four states, not only for economic, but for ideological reasons — rejection of Western values, desire to build an alternative to "liberal" state system and so on [8].

Thus, at the level of bilateral relations Ukraine today should not hope for wide support from Visegrad countries. To change the situation in its favor, Ukraine must become a reliable and necessary partner — more necessary than Russia, which still has a significant presence in the region. However, in relations with the Visegrad Four as a group Ukraine has many more opportunities. In the V4 format in December 2014 these countries agreed to help Ukraine in implementing internal reforms — Poland in public administration, Slovakia — in energy policy, the Czech Republic — in matters of civil society, education and the media, and Hungary — in restructuring of the economy and development of small and medium businesses [11]. And although mechanisms of this assistance are still not clear, Ukraine has joined the considerable number of Visegrad initiatives, the most important of which seem to be related to its energy security. More joint projects still exist only on paper, but they can be useful for Ukraine as well. Therefore, the cooperation with the Visegrad Four is an important vector in Ukraine's foreign policy and reduce rates of this partnership seems to be unacceptable.

References:

1. Buckley Neil. Hungary halts flow of gas to Ukraine. (2014, 26 September). Financial Times.//[Electronic resource]. – Available from: http://www.ft.com/cms/s/0/7c5d2bf0–4552–11e4-ab86–00144feabdc0.html#axzz3pO0xmrS5
2. Daigle Brian. Will outside conflict hurt Poland's economic growth? (2014, October). Global Risk Insights.//[Electronic resource]. – Available from: http://globalriskinsights.com/2014/10/will-outside-conflict-hurt-poland-economic-growth/
3. DAV4 II Report: From battlegroup to permanent structures. (2013, 18 November). Central European Policy Institute.//[Electronic resource]. – Available from: http://www.cepolicy.org/publications/dav4-ii-report-battlegroup-permanent-structures
4. Declaration of the Budapest V4+ Energy Security Summit. (2010, 24 February).//[Electronic resource]. – Available from: http://www.visegradgroup.eu/2010/declaration-of-the
5. Former Soviet satellites sign joint military pact. (2014, 18 March). Agence France-Presse.//[Electronic resource]. – Available from: http://www.defencetalk.com/former-soviet-satellites-sign-joint-military-pact-59053/
6. Gniazdowski Mateusz, Groszkowski Jakub, Sadecki Andrzej. A Visegrad cacophony over the conflict between Russia and Ukraine. (2014, 10 September). Ośrodek Studiów Wschodnichim. Marka Karpia.//[Electronic resource]. – Available from: http://www.osw.waw.pl/en/publikacje/analyses/2014–09–10/a-visegrad-cacophony-over-conflict-between-russia-and-ukraine
7. International Visegrad Fund Announces Call For Proposals. (2014, 28 August). Ministry of Foreign Affairs of Ukraine.//[Electronic resource]. – Available from: http://mfa.gov.ua/en/press-center/notes/2768-mizhnarodnij-vishegradsykij-fond-ogoloshuje-konkurs-grantiv
8. Kołtuniak Łukasz. Can Visegrad Survive the Ukrainian Crisis? (2014, 1 October). New Eastern Europe.//[Electronic resource]. – Available from: http://www.neweasterneurope.eu/interviews/1344-can-visegrad-survive-the-ukrainian-crisis
9. Lowe Christian. In Ukraine, Poland comes of age as an EU power broker. (2014, February 24). Reuters.//[Electronic resource]. – Available from: http://uk.reuters.com/article/2014/02/24/uk-ukraine-crisis-poland-idUKBREA1N1BY20140224
10. President of Ukraine has held a meeting with the Visegrad Group delegation. (2014, 16 December.) President of Ukraine official website.//[Electronic resource]. – Available from: http://www.president.gov.ua/en/news/prezident-ukrayini-proviv-zustrich-z-delegaciyeyu-vishegrads-34386
11. Romanyshyn Iulian. More than just partners: What does Ukraine want from the Visegrad Group? (2015, 20 April). Visegrad Revue.//[Electronic resource]. – Available from: http://visegradrevue.eu/more-than-just-partners-what-does-ukraine-want-from-the-visegrad-group/
12. Smith Oli. Poland civilians take up arms as Russia threat is branded country's "Greatest Crisis". (2015, 2 June). Express.//[Electronic resource]. – Available from: http://www.express.co.uk/news/world/581653/Poland-s-greatest-crisis-Russia-threat-sparks-surge-civilians-arms
13. Strážay Tomáš. Visegrad — Arrival, Survival, Revival. (2011). Visegrad Group.//[Electronic resource]. – Available from: http://www.visegradgroup.eu/documents/bibliography/visegradarrival-survival-120628#_%5B11%5D
14. Than Krisztina. Special Report: Inside Hungary's $10.8 billion nuclear deal with Russia. (2015, 30 March). Reuters.//[Electronic resource]. – Available from: http://www.reuters.com/article/2015/03/30/us-russia-europe-hungary-specialreport-idUSKBN0MQ0MP20150330
15. Tóth Mihály. Hungarian National Minority of Ukraine: Legal and Practical Aspects of Realisation of Minority Rights. ACTA UNIV. SAPIENTIAE, Legal Studies, 1, 1 (2012) 143–148.
16. Visegrad Declaration 1991. (1991, 15 February). Visegrad Group.//[Electronic resource]. – Available from: http://www.visegradgroup.eu/documents/visegrad-declarations/visegrad-declaration-110412
17. Єрьоменко Алла, Уніговський Леонід. Диверсифікація поставок газу: чи підтримає Європа українсько-польський проект? (2014, 21 November). Дзеркало тижня.//[Electronic resource]. – Available from: http://gazeta.dt.ua/energy_market/diversifikaciya-postavok-gazu-chi-pidtrimaye-yevropa-ukrayinsko-polskiy-proekt-_.html

Section 11. Psychology

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Psychological accompaniment of professional training of students

Abstract: Psychological accompaniment of professional training of students — a new direction in psychological science and practice. It is based on the humanization of relationships in society that need to be revised, the revaluation of all components of the educational process. In this case, the basic meaning of upbringing and education process of high school is the development of students. Precisely the development of students should be a measure of the quality of high school teachers' work throughout the education system. Formation of professional qualities, knowledge and skills of the teacher and the student is the basis of the pedagogical process.

Keywords: activity, motives, psychology, work, extrinsic negative motivation.

Introduction

An analysis of the literature allowed us to determine that today in the science there are two relatives within the meaning of the term "psycho-pedagogical accompaniment" and "psycho-pedagogical support" (some authors identify separately the concept of "pedagogical support", "psychological support", "psychological accompaniment", "pedagogical accompaniment").

Foreign psychologists and educators paid attention to problems of psychological support. A special contribution to the development of this concept have A. Bayard, Robert Burns, etc. [1, 16–17]. They maintained that any person has the possibility for a positive and constructive development that the source and the internal forces of personal growth are inside of a person, not outside. Since the investigations of R. Burns, support in terms of education is not divided into psychological and pedagogical.

In modern Russian science pedagogical support has found its development in the works of Bozovic L. I., Mitina G. V. and others.

The concept of «pedagogical support» was introduced in the modern domestic pedagogy by O. S. Gazman [2, 19]. Further development of this concept was obtained in works of N. B. Krylova, considered it as helping children to solve their problems in terms of the institution, successful socialization [3, 23].

The concept of «pedagogical support» from the O. S. Gazman — is the process of working together with the teacher to determine their own interests, goals, capabilities and solutions to problems (overcoming obstacles) hindering the student in the way of its development with the preservation of human dignity and self-achievement of the desired results in education, self-education, communication, lifestyle.

"Psychological support" is considered in the works of A. A. Bodalev — as a condition for creating a friendly psychological climate, A. G. Asmolov — as a assist to child in its development, O. S. Gazman — as a support of a child in individual development, self-realization, A. V. Mudrik — as a help in the social upbringing.

N. B. Krylova allocates pedagogical (problem solving of studying and education), psychological (problems of internal

growth and identification) and moral (the solution of moral conflicts) types of support and links it with cooperation processes: sympathy, empathy, cooperation, which help the person on the path of self-development. Thus, were combined psychological and educational components of the maintenance process [4, 35].

Theoretical Part

Almost in all the works we studied special stress lays on the education and studying of various groups in childhood and adolescence. The problem of psychological and pedagogical accompaniment of development of the individual is presented as a system of teacher professional activity aimed at creating the conditions for successful learning and psychological development of the individual and as a basis for interaction between the subjects of education and training in dealing with problems associated with the process of education.

We are close to the approach proposed by E. F. Zeer [5, 34]. The term "psychological support", he understands the whole process of research, formation, development and professional growth of the individual correction.

Under *the psychological accompaniment of the professional training of high school students,* we understand *a continuous process of learning, formation and improvement of the professional activity of the teacher and students, carried out by the subjects of pedagogical process in situations of interaction.*

The purpose of psychological accompaniment of the professional training of students of high school — is to help students to fully realize their abilities, knowledge and skills to achieve success in professional and educational activities.

The process of psychological accompaniment of the professional training of students of high school can be estimated on the basis of criteria and indicators. After reviewing the proposed literary sources, in the research, we isolated generally accepted criteria: gnostic, activity, motivation is most accurately reflect, in our opinion, the specificity of the process.

Gnostic criterion determined by the level of knowledge of the teacher, the student: knowledge of the essence of the pedagogical process of high school, its specificity; knowledge of psychological and pedagogical features of the committer; knowledge of methods, forms and technologies of pedagogical activity; knowledge of teaching skills providing success in the professional work of the teacher.

The activity criterion is determined by the level of skills that are available to teachers, students: the ability to exercise in practice the pedagogical skills to ensure success in the work; ability to carry out in practice the psychological and pedagogical requirements for teaching activities; reflection of activities, their qualities and skills.

Motivational criterion is determined by the importance of public awareness of the educational activities, personal interest in educational activities, the desire to realize themselves in it.

During the study, we found it necessary to consider the characteristics of pedagogical high school, affecting the effectiveness of educational activities, and the possibility of psychological and pedagogical accompaniment of professional training of the student — teacher.

The Practical Part of the Research

Among the features we highlight common to all universities, to influence them is not always possible due to objective factors, and to take into account the need for teaching and private universities, which we influenced during his studies [6, 33].

In our opinion, the common features for high schools are:

– Low material support of teachers and universities;

– Frequent changes of directions of development of higher education due to the difficult political and economic situation in the country as a whole;

– Short-term teacher communication with students;

– Repeatability of teaching;

– Acmeological and andragogical features (different age, work experience, a different level of pedagogical knowledge and skills, especially adult education, etc.).

Specific features for the pedagogical universities are:

– Specifics of personnel recruitment of teachers (lack of teachers of psycho-pedagogical training, skills in the field of "human-human" motivation to improve the psycho-pedagogical training);

– The lack of teachers' desire and interest in improving educational component of their professional activities;

– The absence of well-functioning system of diagnostics of pedagogical skills, abilities and motivation to teaching;

– The inability of the teacher to improve their pedagogical skills and develop the teaching abilities;

– Insufficient number of allocated hours for self-study teacher.

We offer a model of psychological services in the high school. Solution of the task of expert preparation in a particular professional field is impossible without an complex system of psychological support, which, in turn, requires an educational institution a clear organizational structure dedicated to this activity.

The concept of our model of psychological services at the university involves the creation of an organizational model of the psychological support of the educational process, which will be able to respond adequately to the needs of the educational environment of the university.

The complexity of the tasks facing the created psychological service requires an appropriate status. The most optimal, we consider the following variant of psychological service — a university-wide structural unit of a Center of psychological support for students and teachers.

The main objective of the Centre — Facilitate the implementation of the humanistic goals of higher education, full personal and professional development of students in the educational process, the preservation of mental health, psychological support and assistance to all subjects of the educational process.

The main tasks of the Center are:

– Identification and classification of psychological problems of students, their causes and ways and means to resolve them;

– Psychological support of younger students to adapt to the educational and professional activities in a new social environment and information;

– Assist students in determining their capabilities, on the basis of abilities, interests, health status;

– Formation of students' ability to self-determination and self-development, learning motivation;

– Prevention and overcoming of deviations in the social and psychological health and personal development of students;

– Creation of the office of psychological relief and correction;

– Development of legal documents of psychological services in higher education;

– Psychological support to teachers in order to prevent burnout and motivation of teaching.

Domestic and foreign authors note the high level of neuropsychiatric disorders among students. The leading place in the structure of nervous and mental disease of students belongs to neuroses. Neurosis arises on the basis of mental conflict, which is the result of interaction of psycho-traumatic information with personality characteristics on the background of lack of protective mechanisms. Neurosis is regarded as a disease of unmet needs [7, 18].

As a social and psychological factors that cause emotional stress and lead to the emergence of neurotic disorders, it can be called deadaptation of student in the beginning of training and professional work in the new educational and social environment.

Conclusion

One of the characteristics that provide psychological security environment in the field of vocational education is the presence of special conditions, not only professional, but also personal development of students. All the more urgent in the area of activity of psychological services at the present stage is to ensure the psychological health of the student's personality, which is the basis, the foundation on which will be built a process of professional development.

The main content of practice for the psychological service becomes psycho hygienic ensure of the educational process. It is necessary to register and prevent major traumatic factors of student life in the period of adaptation to the conditions of training on younger courses, psycho-correctional work with students, the lack of integration in the new environment, consultative and diagnostic assistance in conflict situations throughout the training period.

This work provides invaluable practical material for improving the learning process through the timely prediction of actual problems in preparing students for today's rapidly changing socio-economic situation of the society [8, 77].

Creation of effective organizational form of psychological services in a particular institution is impossible without improving the normative legal base governing its activities.

We have also presented the organizational and pedagogical model of psycho-pedagogical accompaniment of professional activity of a young school teacher; analyzes the implementation of this process; shows the trend in relation to the teaching activities in teachers who participated in the experiment of our study.

We have developed the content traditionally distinguished by researchers who make up the organizational and pedagogical model: objectives, functions, forms, methods, means, content of the activity onto experiment stages and performance criteria.

Under the psychological accompaniment of professional activity of school teachers meant a continuous process of learning, formation and improvement of the professional work of the school, teacher carried out by the subjects of the pedagogical process in situations of interaction.

References:

1. Lekerova G.J. Features of Motives' Manifestation of Professional Development and Personal Characteristics of Future Teachers.//Life Science Journal. – 2014. – 11 (ls).
2. Lekerova G.J. Features of the organization and conduct of professional orientation to teaching profession in the field of education.//The Psychology of learning Moscow. – 2007. – № 9. – P. 100–109.
3. Lekerova G.J. Psychological and pedagogical bases of active teaching methods.//Life Science Journal. – 2014. – 11 (bs).
4. Join Joan and 20,350,855 other researchers on Academia.edu//[Electronic resource]. – Available from: http://bham.academia.edu/JoanDuda.
5. Alshuler A.S,. Tabor D., Ms.Intire. Teaching achievement motivation. – Middletown, Conn., In 1970.
6. Bandura A. Self-efficacy: Toward a unifying theory of behavior change.//Psychological Review. – 1977. – P. 191–215.
7. Bandura A. Self-efficacy. The exercise of control. – New-York: Freeman and Co., 1997.
8. Csikszentmihalyi M. Beyond boredom and anxiety. – San-Francisco: Jossey-Bass, 1975.

Section 12. Regional studies and socio-economic geography

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Social tourism in Russia

Abstract: Social tourism is one of the most important types of tourism in the system of tourism industry, and a serious impulse is needed for its development and getting attention of the state and business to it. Currently the means of federal and regional budgets decrease by sanatorium treatment of citizens entitled to benefits from year to year. Development of social tourism is absolutely necessary, economically justified and profitable. At current reproduction of human resources is important for social and economic development of territories.

Keywords: tourism, types of tourism, social tourism, Krasnodar Region.

According to the Russian legislation social tourism is the tourism which in whole or partly is carried out at the expense of budgetary funds, means of the state non-budgetary funds (including the funds allocated within the state social help), and also means of employers, thus the state in the order established by the Government of the Russian Federation provides to separate categories of the Russian tourists social benefits. Forms and methods of social tourism are shown at establishment of reduced transport rates for air and other transport for youth, preferential price-lists for placement for certain categories of tourists. Though "social tourism" exists more than 60 years and is well developed in some countries, its definitions still are differently interpreted in different countries.

In the western sources the definition of social tourism was given for the first time in 1957 by W. Hunziker: "A group of relationships and phenomena in tourism leading to participation in processes of travel of the poor or otherwise restrained elements of society" [2]. For A. Haulat social tourism is determined by the fact that its individual and collective purposes coincide with the concept of modern society on implementation of all measures for ensuring more justice, nobility and satisfaction with life for all inhabitants [4]. Newer definition of social tourism was given by the International Social Tourism Organization as follows: "a set of relationship and phenomena arising from participation in tourism, in particular participations of groups of persons, who have low income. This participation is carried out at the expense of initiatives of exclusively social orientation". This vision of social tourism leads to new accent in definition of its essence. It is social and more moral aspect. As the market of tourism isn't able to provide a product that will suit everybody, interference is necessary to make tourism available to everybody. The latest and fuller definition of social tourism was proposed by L. Minnaert, G. Miller and R. Maytland. They consider that: "social tourism is a tourism with more moral value for the hosting or staying participants of tourist exchange". This definition represents social tourism more from the moral angle [7].

There are also other visions of the nature of social tourism based on "the right of travel". According to conclusions of the Declaration of the world conference on tourism in Manila (1990) "Social tourism is the purpose to which society has to aspire in interests of less wealthy citizens when using their right to rest" [3].

J. Hockland offers the following definition of social tourism: "The concept of «social tourism» means that all citizens, irrespective of the economic or social situation, must have the opportunity to go on holiday. From such point of view vacation travel have to be considered as any other human rights, social loss of which has to be offset by the state for general welfare" [5].

The economic and social committee of the European Union considers that social tourism is organized in some countries by associations, cooperatives and labour unions and intended for providing access to travel to the greatest number of people, in particular from vulnerable segments of the population, and gives the definition of social tourism as follows: "Each person has a right to rest on a daily, weekly and annual basis, and the right for free time that allows people to develop each aspect of their personality and their social integration. The right for

tourism is concrete expression of this general law, and social tourism is a tool for achievement of universal available remedy for realization of this right" [4]. Among the Soviet and Russian authors there are different views on definition of social tourism as well. The very first definition was formulated by V. I. Azar, V. N. Akishin and M. B. Birzhakov: "Social tourism is the kind of tourism subsidized from the funds allocated for social needs for creation of conditions for travel to school students, youth, pensioners, veterans of war and labour, and other citizens to whom the state, state and non-state funds, and other charitable organizations give social support" [1].

In our opinion, this definition is the fullest, though it reflects only the financial part. Also there are various definitions of social tourism in bills of the Russian Federation. In the Law "On Bases of Tourist Activity in the Russian Federation" adopted by the State Duma on October 4, 1996 social tourism is defined as "the travel subsidized from the funds allocated by the state for social needs". Such definition is incomplete as it is unclear for whose account social tours will be financed [6].

Russian and Soviet authors appear to have a tendency to impose responsibility for financing of social tourism on the state. It also differs them from the European authors, thus there are definitions given by scientists from Brazil who also consider that development of social tourism is a prerogative of the state. We will provide the comparative analysis of definitions by several criteria, see table 1.

Table 1. – Comparative analysis of definitions of social tourism

Author	Object	Subject	Financing source
V. Hanziker	Not determined	Disadvantaged	Not determined
International Social Tourism Organization (ISTO)	Organizations of social orientation	Disadvantaged	Not determined
L. Minnaert, R. Maytland, G. Miller	Host party	Host party	Not determined
Economic and social committee of the European Union	Not determined	All citizens	Not determined
V. I. Azar, V. N. Akishin, M. B. Birzhakov	State, state and non-state funds and other charitable organizations	Pupils, students, pensioners, veterans of war and labour and others	State, state and non-state funds and other charitable organizations
J. Hockland	State	All citizens	State
Law «On Bases of Tourist Activity in the Russian Federation»	Not determined	Not determined	State
The draft of the Federal law «On social tourism» of the Russian State Duma Committee on tourism and sport	Not determined	Vulnerable citizens	Not determined
The draft of the Federal Law of the Russian Federation «On social tourism» of the Russian association of social tourism and the Moscow center of Academy of tourism	Not determined	Citizens of the Russian Federation	State and others
I. O. Serdobolskaya	Not determined	All citizens	Not determined
M. Almeyda	State	Individual	State

In other words, social tourism is any kind of tourism expenses on which are in whole or in part paid to the tourist from the financial sources intended on social needs.

In the Krasnodar Region development of social tourism for rendering social support, when using a constitutional right of citizens on rest, is carried out within the regional target program of tourism development and has priority value. The Law of the Krasnodar Region as of August 01, 2012 No. 2568-KZ "On additional measures of social support of particular categories of citizens" is in force in the region, as well as the Order of the Head of administration of the Krasnodar Region "On granting subsidies (grants) by the administration of the Krasnodar Region for support of socially useful programs of socially oriented non-profit organizations" as of June 11, 2014 is operated.

Social tourism is one of the most important types in the system of tourism industry, and a serious impulse is needed for its development and getting attention of the state and business to it. In this sphere the priority directions are health-related, cultural and educational types of tourism. The solution of problems of development of this sphere is possible to find only by using a set of measures, including by means of modification of the operating legislative, regulatory and legal framework. Certainly, it is strategically possible to follow the development of system of holiday cheques, but there are many issues that can be currently solved.

Currently the means of federal and regional budgets decrease by sanatorium treatment of citizens entitled to benefits from year to year. The absence of effective motivation for employers for payment for the rest of employees also has an impact.

Social tourism has competitive advantages. First of all, its advantage is recoverability. In the Krasnodar Region the costs of the program "Deti u morya (Children by the Sea)" were returned to budgets through salaries, taxes, etc. Restoration of human potential, both children, and adults, is the most important factor of social and economic development.

It also should be noted that a huge number of unique techniques of resort treatment and health care, and also diagnostic and treatment complexes which aren't present in Europe in such volume as in the Russian sanatoria, are expensive now, and, apparently, make the tourist's product heavier, make it non-competitive. In a Russian health resort the medical personnel makes from 30 to 50 % of total number of employees. And in the foreign there is one doctor or a few health workers in sanatorium or even in several hotels.

Development of social tourism is absolutely necessary, economically justified and profitable. At current reproduction of human resources is important for social and economic development of territories.

Economic development of social tourism is promoted not by the existence of separate single infrastructure elements, but by the created purposeful system providing access to good rest for people, that means effective restoration of physical and spiritual forces.

It is expedient to name the following major factors defining the need of development of social tourism:

1. Existence of an essential difference in the income of the population of the country. Attempts of creation of, so-called, middle class aren't yet successful therefore a large number of people can't use the right to rest fully. That means social tourism is necessary as the phenomenon that allows to the citizens to realize their constitutional rights.
2. Tourism development beneficially influences national economy in general. In spite of the fact that social tourism doesn't make the task of receiving profit its aim, even denies it, it can well affect the infrastructure component of regions, promote creation of workplaces.
3. Improvement of an image component of the country can also be referred to the reasons of development of social tourism since besides development of infrastructure the investment appeal of regions increases.
4. Need of patriotic education of youth. On condition of a constant and sustainable development of social tourism, tourist services become available to all segments of the population that is important for young people, who must know, love and be proud of the country.
5. An orientation of social tourism on the solution of a number of social tasks: granting the non-material benefits; formation of educational and cultural level of the population; reduction of a material inequality; decrease in social and psychological intensity in society; education of dignified members of society.

In modern Russia the development of social tourism is so far possible only by means of state regulation. Still in our country there is no legal document regulating the mechanism of subsidizing the means, provided on social needs under the law, by the state. There are no standards regulating the issue of when, where, who from the tourists and on what types of travel can get financial support.

Tourism can be characterized as social orientation of the purposes of development of modern society today. In modern conditions the Soviet model of social tourism is impracticable. Innovative approaches, models, directions, mechanisms and concrete measures for the solution of problems of social tourism in the country are required for restoration of social tourism. It is necessary to look for ways of use of financial mechanisms of encouragement of the employers who are sponsors of social tourist programs or compensating to the workers part of costs of tourist services in the territory of the Russian Federation. In every possible way it is necessary to encourage any initiative of support of programs of social tourism from business community. It is important to achieve increase of availability of tourist services to the least socially protected groups of the population and pupils.

Development of social tourism could promote the solution of a very actual social task — overcoming the increasing distinctions in a standard of living of various segments of the population of the country.

Section 13. Technical sciences

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Operating mode of the stabilizer of current on active and inductive loading

Abstract: the scheme of the three-phase stabilizer of current allowing to receive the three-phase stabilized current in loading irrespective of change in the set limits of resistance of loading and the power supply is investigated.

Keywords: magnet, ferroresonance, tiristor, current stabilizer, volt-ampere characteristic, active and inductive loading, linear inductance, Larionov's scheme, semiconductor rectifier.

The majority of branches of electrical equipment, electrophysics, electrothermie, galvanotechnics, needs automatic maintenance constancy of current at simultaneous change of tension of three-phase food and the consumer's resistance [1].

Such tasks successfully decides with application magnetic, the ferrorezonansnykh and thyristor stabilizers of current. I have these devices difficult electric circuits and a form of a curve of the stabilized current of not sinusoidal. A form of a curve of the stabilized current use filters of the highest harmonicas to improvement.

In Power supply chair Tashkent State Technical University inductance-capacitor devices with a ferrorezonansny contour which possess property to stabilize current to loading at broad change of three-phase entrance tension and resistance of loading are developed.

In this work the three-phase scheme of the ferrorezonansny stabilizer of current having a sinusoidal form of a curve of the stabilized current is theoretically and experimentally investigated.

In fig.1. the schematic diagram of the offered three-phase ferrorezonansny stabilizer of the current consisting from three parallel ferrorezonansny contours included linear inductance and the condenser which is switched on in parallel to this contour and collected according to the scheme of a triangle is shown, and tops of this triangle is connected to a three-phase network through active and inductive loading.

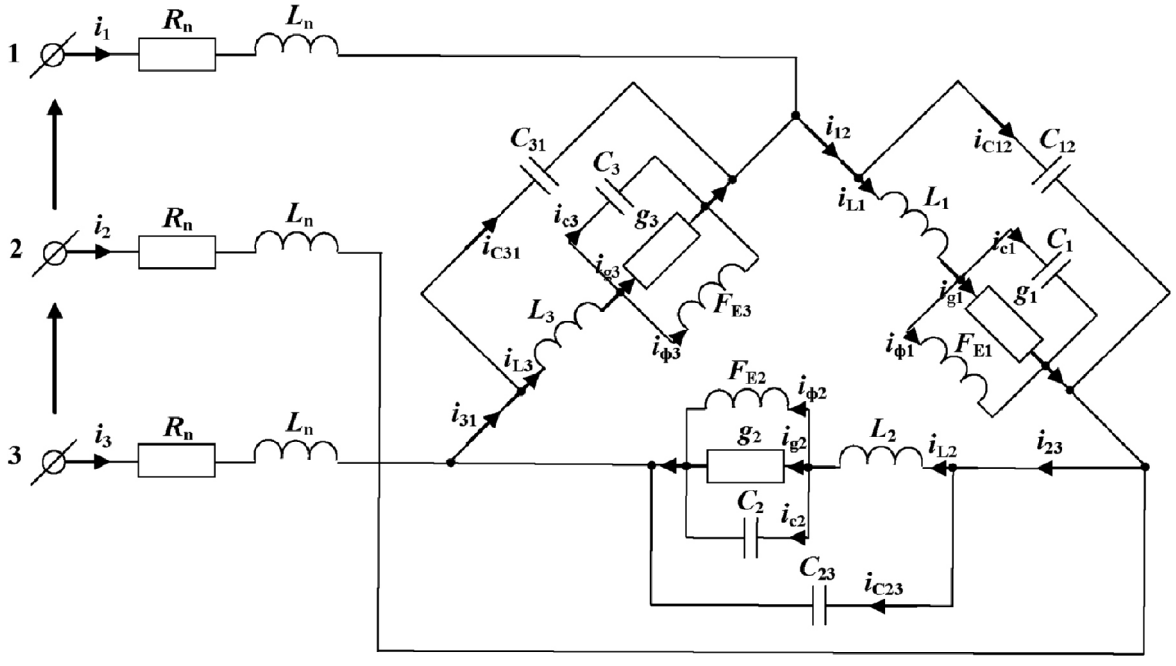

Fig. 1. Equivalent circuit of the three-phase ferrorezonansny stabilizer of current

The analysis of volt-ampere characteristics of separate sites of a chain showed that the parallel ferrorezonansny contour included consistently with linear inductance has "*S*" — the figurative characteristic with a wide zone of negative site [2].

As showed experimental supervision, linear currents of i_1, i_2, i_3 remain stable in the wide range of change of entrance tension and resistance of loading when the negative site of "*S*" – the figurative characteristic of a ferrorezonansny branch is compensated by the rectilinear characteristic of C_{12}, C_{23} and C_{13} condensers.

Three-phase loading is connected consistently to the current stabilizer.

For the analysis of the load mode we accept the following assumptions:

1. The dynamic curve of magnetization of a ferromagnetic element is approximated by a power function of a look $iw = \kappa\Phi^7$ [3];
2. Losses on a hysteresis, vortex currents and active resistance are considered by constant conductivity of *g*;
3. Streams of dispersion are neglected and streams in linear elements aren't considered.

We enter the following designations:

- $U = U_m \sin(\omega t + \psi_u)$ — impressed voltage;
- $L_1 = L_2 = L_3 = L$ — the linear inductance which is consistently connected to a parallel ferrorezonansny contour;
- $C_1 = C_2 = C_3 = C$ — the condenser which is switched on in parallel to a ferromagnetic element;
- $C_{12} = C_{23} = C_{31} = C'$ — the condenser which is switched on in parallel to a ferrorezonansny contour, switched on consistently with linear inductance;
- i_{C31}; i_{C12}; i_{C13} — currents proceeding through C_{31} condensers; C_{23} and C_{12};
- i_{12}; i_{31}; i_{23} — the currents proceeding at triangle tops;
- i_1; i_2; i_3 — linear currents corresponding in phases 1, 2, 3;
- $i_{g1} = i_{g2} = i_{g3} = i_g$ — the current proceeding through conductivity of *g*;
- $i_{\phi 1} = i_{\phi 2} = i_{\phi 3} = i_\phi$ — the current proceeding on a winding of a ferromagnetic element;
- $\Phi_1 = \Phi_2 = \Phi_3 = \Phi$ — magnetic flux in the core of a ferromagnetic element;
- $w_1 = w_2 = w_3 = w$ — number of rounds of windings of a ferromagnetic element.

The electric chain of the considered three-phase ferrorezonansny stabilizer of current for active and inductive loading is described by the following equations:

$$U_{12} = \frac{d\Phi_1}{dt} w_1 + L_1 \frac{di_{L1}}{dt} + i_1 R_H + L_H \frac{di_1}{dt} - i_2 R_H - L_H \frac{di_2}{dt}, \quad (1)$$

$$U_{23} = \frac{d\Phi_2}{dt} w_2 + L_2 \frac{di_{L2}}{dt} + i_2 R_H + L_H \frac{di_2}{dt} - i_3 R_H - L_H \frac{di_3}{dt}, \quad (2)$$

$$U_{31} = \frac{d\Phi_3}{dt} w_3 + L_3 \frac{di_{L3}}{dt} + i_3 R_H + L_H \frac{di_3}{dt} - i_1 R_H - L_H \frac{di_1}{dt}, \quad (3)$$

$$i_1 = i_{12} - i_{13};\ i_2 = i_{23} - i_{12};\ i_3 = i_{31} - i_{23}. \quad (4)$$

Here,

$$\left.\begin{aligned} & i = i_{C1} + i_g + i_\phi \\ & i_{C1} = C_1 w \frac{d^2\Phi}{dt^2};\ i_g = gw\frac{d\Phi}{dt};\ i_\phi = \frac{K}{w}\Phi^7 \end{aligned}\right\}. \quad (5)$$

(1)– (3) we will solve the equations by method of the accounting of the main harmonica of a magnetic flux [3].

Let's say that:

$$\Phi = \Phi_m \sin\omega t. \quad (6)$$

When,

$$\left.\begin{aligned} & U_{12} = U_m \sin(\omega t + \psi_u), \\ & U_{23} = U_m \sin(\omega t + \psi_u - 120^0), \\ & U_{31} = U_m \sin(\omega t + \psi_u + 120^0). \end{aligned}\right\} \quad (7)$$

$$\Phi = \Phi_m^7 \cdot \left(\frac{35}{64}\sin\omega t - \frac{21}{64}\sin 3\omega t + \frac{7}{64}\sin 5\omega t - \frac{1}{64}\sin 7\omega t\right). \quad (8)$$

Considering (6)– (8) entering basic sizes after reduction (1) to a dimensionless look we will receive:

$$\begin{aligned} Y_{m12}^2 = & \left[3X_m \cdot (X_m^6 - 1)\cdot(\mu - \beta) - 3\mu\gamma X_m - \delta X_m \cdot (\eta - \varepsilon)\right]^2 + \\ & + \left[X_m \cdot (X_m^6 - 1 + \xi) + 3\delta X_m \cdot (\mu - \beta) - \right. \\ & \left. - 3\eta X_m \cdot (X_m^6 - 1) + 3\varepsilon X_m \cdot (X_m^6 - 1) - 3\gamma\varepsilon X_m\right]^2; \end{aligned} \quad (9)$$

$$tg\psi_u = \frac{X_m \cdot (X_m^6 - 1 + \xi) + 3\delta X_m \cdot (\mu - \beta) - 3\eta X_m \cdot (X_m^6 - 1) + 3\varepsilon X_m \cdot (X_m^6 - 1) - 3\gamma\varepsilon X_m}{3X_m \cdot (X_m^6 - 1)\cdot(\mu - \beta) - 3\mu\gamma X_m - \delta X_m - 3\delta X_m \cdot (\eta - \varepsilon)}. \quad (10)$$

The currents proceeding on contours:

$$\begin{aligned} i_{12} = & C_1 w_1 \frac{d\Phi^2}{dt^2} + \frac{K}{w_1}\Phi_1^7 + w_1 g_1 \frac{d\Phi_1}{dt} + C_{12} w_1 \frac{d^2\Phi_1}{dt} + \\ & + L_1 C_1 w C_{12} \frac{d^4\Phi_1}{dt} + L_1 g w C_{12} \frac{d^3\Phi_1}{dt^3} + L_1 K \frac{C_{12}}{w_1} \cdot \frac{d^2(\Phi_1)^7}{dt^2}; \end{aligned} \quad (11)$$

$$\begin{aligned} i_{23} = & L_2 C_2 w_2 C_{23} \frac{d^4\Phi_2}{dt^4} + L_2 g_2 w_2 C_{23} \frac{d^3\Phi_2}{dt^3} + C_{23} w_2 \frac{d^2\Phi_2}{dt^2} + \\ & + \frac{L_2 K C_{23}}{w_2} \cdot \frac{d^2(\Phi_2^7)}{dt^2} + C_2 w_2 \frac{d^2\Phi_2}{dt^2} + w_2 g_2 \frac{d\Phi_2}{dt} + \frac{K}{w_2}\Phi_2^7; \end{aligned} \quad (12)$$

$$\begin{aligned} i_{31} = & L_3 C_3 w_3 C_{13} \frac{d^4\Phi_3}{dt^4} + L_3 g_3 w_3 C_{31} \frac{d^3\Phi_3}{dt^3} + \\ & + C_{31} w_3 \frac{d^2\Phi_3}{dt^2} + \frac{L_3 K C_{31}}{w_3} \cdot \frac{d^2(\Phi_3^7)}{dt^2} + \\ & + C_3 w_3 \frac{d^2\Phi_3}{dt^2} + w_3 g_3 \frac{d\Phi_3}{dt} + \frac{K}{w_3}\Phi_3^7. \end{aligned} \quad (13)$$

Input basic sizes after reduction (11) to a dimensionless look were received:

$$Z_m = \left[-\frac{3}{2}\beta X_m \cdot (X_m^6 - 1) + \frac{3}{2} X_m (X_m^6 - 1) - \frac{3}{2}\gamma X_m + \frac{\sqrt{3}}{2}\delta X_m \cdot (1-\beta) \right]^2 +$$
$$+ \left[\frac{3}{2}\delta X_m \cdot (1-\beta) - \frac{\sqrt{3}}{2} X_m \cdot (X_m^6 - 1) + \frac{\sqrt{3}}{2}\beta X_m \cdot (X_m^6 - 1) + \frac{\sqrt{3}}{2}\gamma X_m \right]^2; \quad (14)$$

$$tg\psi_i = \frac{\frac{3}{2}\delta X_m \cdot (1-\beta) - \frac{\sqrt{3}}{2} X_m \cdot (X_m^6 - 1) + \frac{\sqrt{3}}{2}\beta X_m \cdot (X_m^6 - 1) + \frac{\sqrt{3}}{2}\gamma X_m}{-\frac{3}{2}\beta X_m \cdot (X_m^6 - 1) + \frac{3}{2} X_m \cdot (X_m^6 - 1) - \frac{3}{2}\gamma X_m + \frac{\sqrt{3}}{2}\delta X_m \cdot (1-\beta)}; \quad (15)$$

where,

$$\xi = \frac{1}{L\omega^2 wC\Phi_\delta};\ \delta = \frac{g}{\omega C};\ \Phi_\delta = \sqrt[6]{\frac{64 w^2 \omega^2 C}{35K}};\ U_\delta = LCw\omega^3 \Phi_\delta;$$
$$\gamma = \frac{C'}{C};\ \beta = R_H \omega C';\ \mu = \frac{R_H}{\omega L};\ \eta = L_H \omega' C';\ \varepsilon = \frac{L_H}{L}.$$

For the basic size $\boldsymbol{\Phi_\delta}$ the value of a stream corresponding to a resonant point of a ferrorezonansny contour is accepted. From (9), having set by various $\boldsymbol{X_m}$ values, it is easy to construct the $\boldsymbol{y_m = f(X_m)}$.

On the basis of dependences (9), (10), (14) and (15) we will construct the main characteristics of a chain in relative units for various values of active and inductive loading at change of entrance tension and resistance of loading. From the analysis of the received curves it is visible that currents of $\boldsymbol{i_1}$, $\boldsymbol{i_2}$ and $\boldsymbol{i_3}$ in a wide limit of change of tension of a network remain stable.

In fig. 2. are submitted:

• theoretical (**1** — $\boldsymbol{i_{l1}}$ at $\boldsymbol{R_H = 20}$ Ohms, $\boldsymbol{L_H = 0.12}$ Hz) and

• experimental (**2** — $\boldsymbol{i_{l1}}$ at $\boldsymbol{R_H = 20}$ Ohms, $\boldsymbol{L_H = 0.12}$ Hz) adjusting characteristics.

The studied skilled stabilizer of current having the following parameters:

- $\boldsymbol{C_1 = C_2 = C_3 = 40}$ (mkF);
- $\boldsymbol{L_1 = L_2 = L_3 = 0.32}$ (Hz);
- $\boldsymbol{g = 1.21 * 10^{-3}}$ (1/Ohm);
- $\boldsymbol{K = 6400 * 10^8}$;
- $\boldsymbol{C_{12} = C_{23} = C_{31} = 20}$ (mkF);
- $\boldsymbol{f = 0.32}$ (Hz);
- $\boldsymbol{\xi = 0.88}$;
- $\boldsymbol{\delta = 0.88}$;
- $\boldsymbol{U_\delta = 380}$ (V);
- $\boldsymbol{I_\delta = 2.3}$ (A).

Introduction to the scheme at the exit of the device of the coordinating transformer and semiconductor rectifiers connected according to Larionov's (fig. 3) scheme allows to receive the stable straightened current at the exit. Three-phase the ferrorezonansny stabilizer of current with rectifiers can be used for receiving stable current for galvanic electrolysis shops.

In the presence of the alternating current main three-phase the ferrorezonansny stabilizer of current with rectifiers it can be used for receiving stable current for charging of batteries charging stations.

In such devices tension necessary for charging will be automatically established, depending on requirement, without installation of special control devices.

Thus, three-phase the ferrorezonansny stabilizer of current it is possible to consider as tension source converter in a current source, not containing moving parts and contacts working beyond all bounds long. These the device can be built practically on any current.

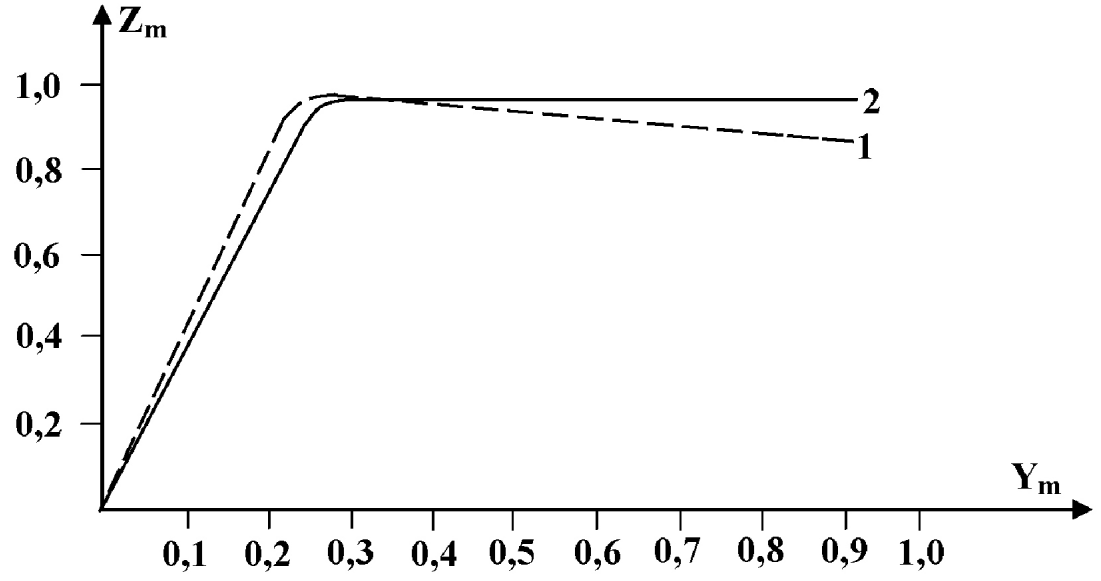

Fig. 2. Adjusting characteristics of TFST for one phase:
1 — the theoretical; 2 — the experimental

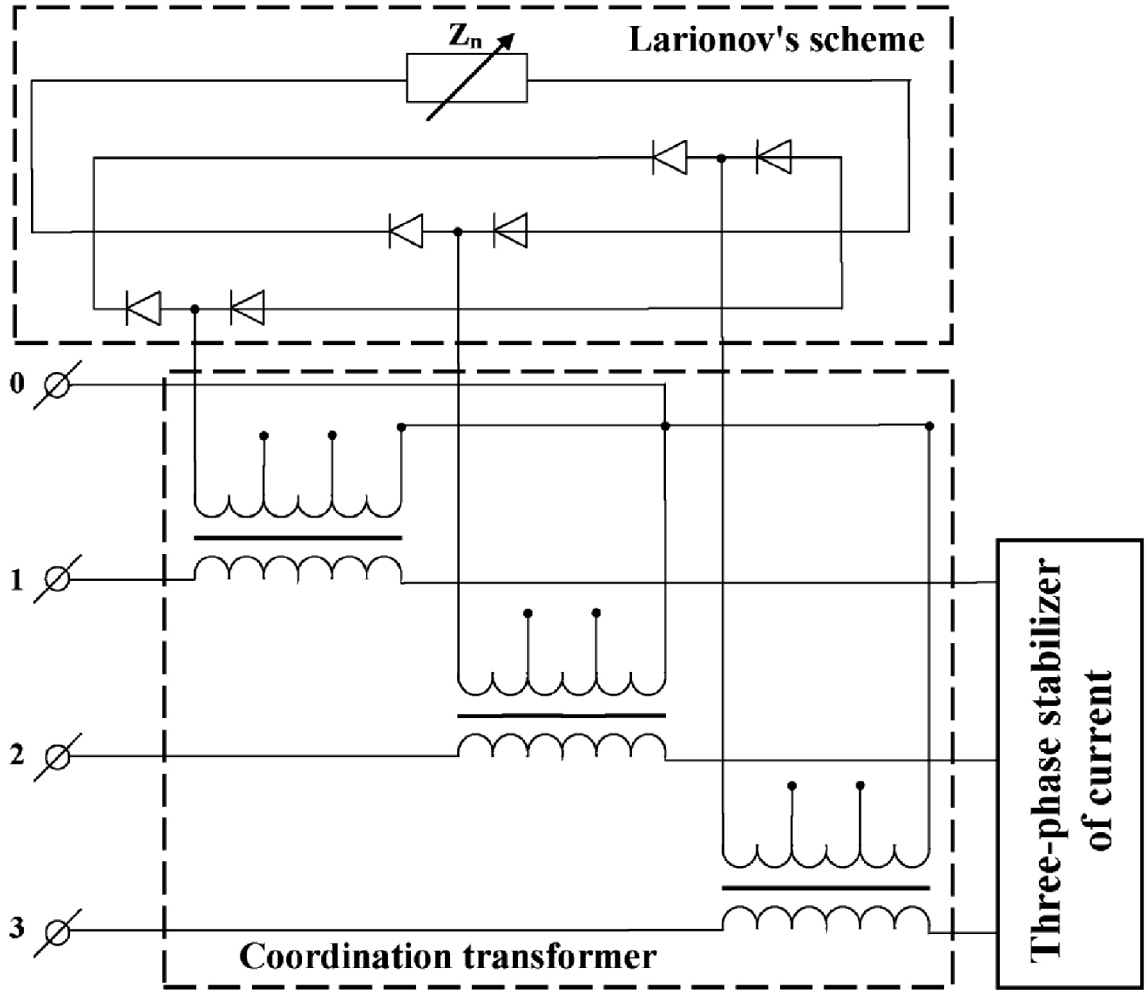

Fig. 3. Scheme of connection of the vypryamitelny bridge to three-phase device of stabilization of current

References:

1. Milyakh A. N., Volkov I. V. Systems of invariable current on the basis of inductance-capacitor converters. – Kiev: Naukova thought, 1974.
2. Kadyrov T. M., Rasulov A. N. The Ferrorezonansny stabilizer of current with a sinusoidal form of a curve of current. – Automatic equipment and telemechanics, 1977. – № 11.
3. Bessonov L. A. Nonlinear electric chains. – M.: The higher school, 1964.
4. Milyakh A. N., Shidlovsky A. K., Kuznetsov V. G. Schemes of balancing of single-phase loadings in three-phase chains. – Kiev: Naukova thought, 1973.

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Research of the stabilizer of current taking into account the highest harmonicas in systems of power supply

Abstract: the method of slowly changing amplitudes investigated the ferrorezonansny stabilizer of current allowing to support steadily current in loading at change of size both entrance tension, and loading resistance. Thus in calculations the highest harmonicas containing in the power supply and in the core of a ferromagnetic element are considered.

Keywords: autonomous inverter, converters of frequency, ferrorezonansny stabilizer of current, nonlinear inductance, the highest harmonicas, ferromagnetic element.

The increasing distribution of system of invariable current, the dual standard system of invariable tension, are promoted by need for it for such areas as an electrothermie, the electric drive, electrotechnology, pulse power industry, computer facilities, system of power supply [1; 2].

For example, use of this system in galvanotechnics gives the chance to increase labor productivity and quality of products, to reduce its prime cost in comparison with system of invariable tension. In this regard there is a problem of creation of more perfect, highly reliable, economic and universal electrotechnical devices transforming system of invariable tension to system of invariable current. Realization of system of invariable current is possible by means of various technical devices, for example, of the ferrorezonansny stabilizer of current.

With a wide circulation of independent inverters and converters of frequency in power supply systems of various objects where the system of invariable current is also necessary, there was actual a creation of autonomous sources of current. Such sources find application in systems of railway automatic equipment, power supply of cable communication lines, in measuring and computer facilities, etc. Collaboration of the independent inverter and ferrorezonansny stabilizer of current allows to create an autonomous source of current, thus the rectangular shape of a curve of output tension of the inverter causes a number of features of the mode which should be considered at calculation of the ferrorezonansny stabilizer of current [3].

On the basis of the stated we investigate the ferrorezonansny stabilizer of current which equivalent circuit is given in fig.1. taking into account the highest harmonicas of the power supply and induction of the core of a ferromagnetic element for R_n=0 case.

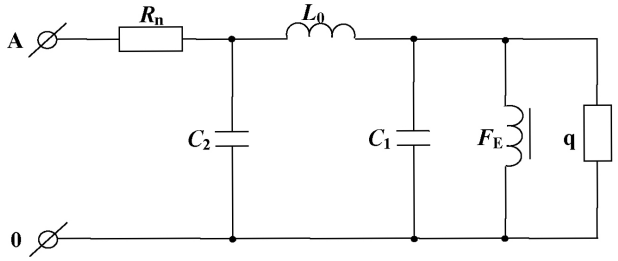

Fig. 1. Schematic diagram of the ferrorezonansny stabilizer of current

For simplification of the analysis of a chain we will accept assumptions:

- we approximate a curve of magnetization of a nonlinear element in the form of $i = K\Psi^3$;
- we neglect streams of dispersion and we don't consider loss in capacity;
- we will present a nonlinear ferromagnetic element the equivalent circuit consisting of nonlinear inductance connected in parallel and constant active conductivity which considers losses in the core.

For the considered chain ratios are fair:

$$U = L_0 \frac{dI_1}{dt} + \frac{d\psi}{dt}, \quad (1)$$

$$U = \frac{1}{C_2}\int i_2 dt, \quad (2)$$

$$i = i_1 + i_2, \quad (3)$$

$$i_1 = C_1 \frac{d^2\Psi}{dt^3} + g\frac{d\Psi}{dt} + K\Psi^3, \quad (4)$$

here, i_1 and i_2 — the current proceeding on windings of linear inductance and via the C_2 condenser.

Taking into account (4) equation (1) will assume an air:

$$U = L_0 C_1 \frac{d^3\Psi}{dt^3} + L_0 K \frac{d\Psi^3}{dt} + L_0 g \frac{d^2\Psi}{dt^2} + \frac{d\Psi}{dt}. \quad (5)$$

Entering replacement of variables:

$$\tau = \omega t;\ X = \frac{\Psi}{\Psi_б};\ Y = \frac{U}{U_б},$$

and having set up them in the equation (5), we will receive:

$$Y = \frac{d^3X}{d\tau^3} + \beta\frac{d^2X}{d\tau^2} + \frac{dX^3}{d\tau} + \alpha\frac{dX}{d\tau},$$

here designations are accepted:

$$\beta = \frac{g}{C_1\omega};\ \alpha = \frac{1}{\omega^2 L_0 C_1};\ U_б = L_0 C_1 \omega^3 \Psi_б;\ \Psi_б = \sqrt{\frac{\omega^2 C_1}{K}}.$$

Integration of the equation (5) brings to:

$$\int Y d\tau = \frac{d^2X}{d\tau^2} + \beta\frac{dX}{d\tau} + X^3 + \alpha X + A. \quad (6)$$

We look for the decision (6):

$$X = X_{1m}\sin\tau + X_{3m}\sin 3\tau. \quad (7)$$

If the feeding tension has a rectangular shape,

$$Y = \frac{4}{\pi}Y_m \sin(\tau+\phi) + \frac{4}{3\pi}Y_m \sin(3\tau+\phi). \quad (8)$$

As $\boldsymbol{X(\tau)}$ — slowly changing function of time, under the terms of a method of slowly changing amplitudes we can write down:

$$X >> \frac{dX}{d\tau};\ \frac{dX}{d\tau} >> \frac{d^2X}{d\tau^2},$$

taking into account it:

$$\frac{dX}{d\tau} = X_{1m}\cos\tau + 3X_{3m}\cos 3\tau, \quad (9)$$

$$\frac{d^2X}{d\tau^2} = 2\frac{dX_{1m}}{d\tau}\cos\tau - X_{1m}\sin\tau + 6\frac{dX_{3m}}{d\tau}\cos\tau - 9X_{3m}\sin 3\tau, \quad (10)$$

$$X^3 = \frac{3}{4}X_{1m}^3\sin\tau - \frac{1}{4}X_{1m}^3\sin 3\tau + \frac{3}{2}X_{1m}^2X_{3m}\sin 3\tau - \\ -\frac{3}{4}X_{1m}^2X_{3m}\sin\tau + \frac{3}{2}X_{3m}^2X_{1m}\sin\tau + \frac{3}{4}X_{3m}^3\sin 3\tau, \quad (11)$$

$$\int Y d\tau = -\frac{4}{\pi}Y_m\cos(\tau+\phi) - \frac{4}{9\pi}Y_m\cos(3\tau+\phi) + A_1. \quad (12)$$

Having substituted (19)–(12) in (6) and having grouped coefficients before identical trigonometrical functions, we will receive systems of the algebraic equations:

$$\left.\begin{aligned} &\frac{3}{4}X_{1m}^3 - X_{1m} - \frac{3}{4}X_{1m}^2X_{3m} + \frac{3}{2}X_{3m}^2X_{1m} + \alpha X_{1m} = \frac{4}{\pi}Y_m\sin\phi, \\ &\beta X_{1m} = -\frac{4}{\pi}Y_m\cos\phi. \end{aligned}\right\} \quad (13)$$

$$\left.\begin{aligned} &-9X_{3m} - \frac{1}{4}X_{1m}^3 + \frac{3}{2}X_{1m}^2X_{3m} + \frac{3}{4}X_{3m}^3 + \alpha X_{3m} = \frac{4}{9\pi}Y_m\sin\phi, \\ &3\beta X_{3m} = -\frac{4}{9\pi}Y_m\cos\phi. \end{aligned}\right\} \quad (14)$$

Their decision concerning $\boldsymbol{X_{1m}}$ and $\boldsymbol{X_{3m}}$ represents a complex challenge, however if to assume that $\boldsymbol{X_{3m}/X_{1m} << 1}$. that (13) and (14) can be given the following look:

$$\left.\begin{aligned} &\left(\frac{3}{4}X_{1m}^3 - X_{1m} - \frac{3}{4}X_{1m}^2X_{3m} + \alpha X_{1m}\right)^2 + (\beta X_{1m})^2 = \left(\frac{4}{\pi}Y_m\right)^2, \\ &81\cdot\left[\left(-9X_{3m} - \frac{1}{4}X_{1m}^3 + \frac{3}{2}X_{1m}^2X_{3m} + \alpha X_{3m}\right)^2 + (3\beta X_{3m})^2\right] = \left(\frac{4}{\pi}Y_m\right)^2. \end{aligned}\right\} \quad (15)$$

If to consider that $\boldsymbol{X^2_{3m}}$ values and p are negligible, from (15) amplitude of the third harmonica will be defined so:

$$X_{3m} = \frac{\frac{1}{81}X_{1m}^2(\alpha-1)^2 + \frac{1}{54}X_{1m}^4(\alpha-1) - \frac{1}{81}X_{1m}^6}{X_{1m}^3\cdot(9{,}3-\alpha) - \frac{53}{72}X_{1m}^5}. \quad (16)$$

We will calculate the established decision (6) from (13) and (14):

$$Y = \sqrt{\left(\begin{aligned} &-X_{1m} + \frac{1}{2}X_{1m}^3 + \frac{3}{4}X_{1m}^2X_{3m} + \frac{3}{2}X_{3m}^2X_{1m} + \\ &+\alpha X_{1m} + \alpha X_{3m} - 9X_{3m} + \frac{3}{4}X_{3m}^3 \end{aligned}\right)^2 + \left[\beta\cdot(X_{1m} + 3X_{3m})\right]^2} = \frac{40}{9\pi}. \quad (17)$$

For determination of dependence of $\boldsymbol{i = f(\Psi)}$ it is necessary to find i_2 from (1) and (2):

$$i_2 = C_2L_0\frac{d^2i_1}{dt^2} + C_2\frac{d^2\Psi}{dt^2}. \quad (18)$$

The current proceeding on a chain, we will define from expression (3) taking into account (4) and (18):

$$i = C_1C_2L_0\frac{d^4\Psi}{dt^4} + C_2L_0g\frac{d^3\Psi}{dt^3} + (C_1+C_2)\cdot\frac{d^2\Psi}{dt^2} + \\ +g\frac{d\Psi}{dt} + C_2L_0K\frac{d^2\Psi^3}{dt^2} + K\Psi. \quad (19)$$

Entering replacement of variables:

$$X = \frac{\Psi}{\Psi_б};\ Z = \frac{i}{i_б};\ \tau = \omega t.$$

We have:

$$Z = \frac{d^2X}{d\tau^2} + \beta\frac{d^3X}{d\tau^3} + \rho\frac{d^2X}{d\tau^2} + \beta\alpha_1\frac{dX}{d\tau} + \frac{d^2X^3}{d\tau^2} + \alpha_1X^3, \quad (20)$$

here designations are accepted:

$$\rho = \alpha + \alpha_1;\ \alpha_1 = \frac{1}{C_2L_0\omega^2};\ i_б = C_1C_2L_0\omega\Psi_б.$$

We will define derivatives from X taking into account that X (τ) — slowly changing function of time:

$$\frac{d^3X}{d\tau^3} = 3\frac{d^2X_{1m}}{d\tau^2}\cos\tau - 3\frac{dX_{1m}}{d\tau}\sin\tau - X_{1m}\cos\tau + \\ +9\frac{d^2X_{3m}}{d\tau^2}\cos\tau - 27\frac{dX_{3m}}{d\tau}\sin 3\tau - 27X_{3m}\cos 3\tau, \quad (21)$$

$$\frac{d^4X}{d\tau^4} = 4\frac{d^3X_{1m}}{d\tau^3}\cos\tau - 6\frac{d^2X_{1m}}{d\tau^2}\sin\tau - \frac{dX_{1m}}{d\tau}\cos\tau + \\ +X_{1m}\sin\tau + 12\frac{d^3X_{3m}}{d\tau^3}\cos 3\tau - 54\frac{d^2X_{3m}}{d\tau^2}\sin 3\tau - \\ -78\frac{dX_{3m}}{d\tau}\cos 3\tau + 51X_{3m}\sin 3\tau, \quad (22)$$

$$\frac{d^2X^3}{d\tau^2} = \frac{9}{2}\frac{dX_{1m}^2}{d\tau}\cos\tau - \frac{3}{4}X_{1m}^3\sin\tau - \frac{9}{2}\frac{dX_{1m}^2}{d\tau}\cos 3\tau + \\ +\frac{9}{4}X_{1m}^3\sin 3\tau + 15X_{3m}\frac{dX_{1m}}{d\tau}\cos 3\tau + \frac{15}{2}X_{1m}^2\frac{dX_{3m}}{d\tau}\cos 3\tau - \\ -9X_{1m}^2X_{3m}\sin 3\tau - \frac{3}{2}X_{3m}\frac{dX_{1m}}{d\tau}\sin\tau - \frac{3}{2}X_{1m}^2\frac{dX_{3m}}{d\tau}\cos\tau - \\ -\frac{3}{2}X_{3m}\frac{dX_{1m}}{d\tau}\cos\tau + \frac{3}{4}X_{1m}^2X_{3m}\sin\tau + 3X_{3m}^2\frac{dX_{1m}}{d\tau}\cos\tau + \\ +6X_{1m}\frac{dX_{3m}}{d\tau}\cos\tau - -\frac{3}{2}X_{3m}^2X_{1m}\sin\tau + \frac{27}{2}\frac{dX_{3m}^2}{d\tau}\cos 3\tau - \\ -\frac{27}{4}X_{3m}^3\sin 3\tau. \quad (23)$$

Having substituted expressions (9)–(11), (21)–(23) in the equation (20), we will define the maximum $\boldsymbol{Z_m}$ value:

$$Z_m = \sqrt{\left[X_{1m}(1-\rho)+\frac{3}{4}X_{1m}^3(\alpha_1-1)+\frac{3}{4}X_{1m}^2X_{3m}(1-\alpha_1)+\frac{3}{4}X_{3m}^2X_{1m}(\alpha_1-1)\right]^2+\left[X_{1m}\beta(\alpha_1-1)\right]^2+} \\ \sqrt{+\left[X_{3m}(51-9\rho)+X_{1m}^3\left(\frac{9}{4}-\frac{1}{4}\alpha_1\right)+X_{1m}^2X_{3m}\left(\frac{3}{2}\alpha_1-9\right)+\frac{3}{4}X_{3m}^3X_{1m}(\alpha_1-9)\right]^2+\left[X_{3m}\beta^3(\alpha_1-9)\right]^2}. \quad (25)$$

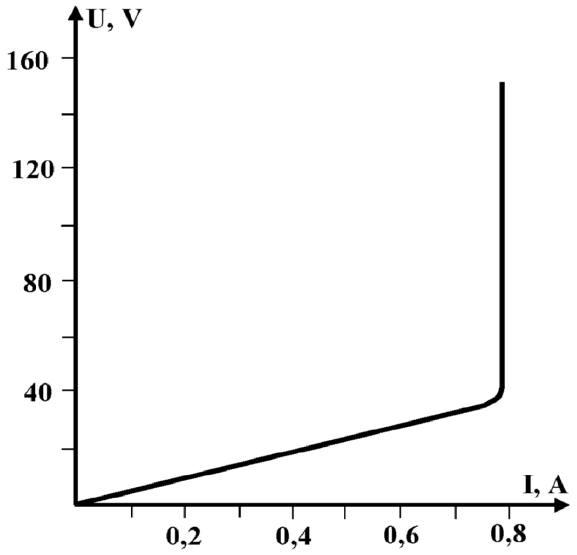

Fig. 2. Volt-ampere characteristic of the ferrorezonansny stabilizer of current

On expressions (17) and (24) in fig. 2. the volt-ampere characteristic of the ferrorezonansny stabilizer of current is constructed; here at certain ratios of parameters of a chain stabilization of current in quite wide range of change of entrance tension is observed.

References:

1. Milyakh A. N., Volkov I. V. Systems of invariable current on the basis of inductance-capacitor converters. – Kiev: Naukova thought, 1974. – P. 216.
2. Gubanov V. V. Power semiconductor converters with output stabilizers. – L.: Energy., 1972. – P. 133.
3. Kadyrov T. M., Alimov H. A. The Analysis of a double-circuit chain taking into account the highest harmonicas. – AN UZSSR, STN. – 1979. – № 3. – P. 17–22.
4. Karimov R.Ch. Research nonlinear dynamic chains with thyristor elements in system of power supply, the collection of materials IV of the International scientific conference "Current Trends Technical Sciences". – Kazan, Oktyabr 2015. – P. 30–33.
5. Karimov R.Ch. Research nonlinear dynamic chains with diode elements in system of power supply, the collection of materials IV of the International scientific conference "Current Trends Technical Sciences". – Kazan, Oktyabr 2015. – P. 33–35.

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On the cleaning of waste water from textile factories using Pistia Stratiotes L.

Abstract: In this article the study of the ecological and biotechnical features of cultivation of the aquatic plant — Pistia Stratiotes L. on the waste water from the weaving factories in the Buchara province. In the composition of the waste water there were not detected the dissolved oxygen; the average values of *BOD 5* and oxidability were 155.4 and 115.1 mg 0_2/l, respectively, the smell was 5 points, the colour — from yellow to brown. In the result of cultivation of Pistia Stratiotes L. in the waste water of the weaving factory the quantity of the dissolved oxygen increased up to 8.0–10.0 mg/l, the quantity of *BOD5* and oxidability decreased up to 14.4 and 21.0 mg 0_2/l, respectively — i. e.,

the complete absorption of the nitric compounds by plants has taken place. During the warm period of the year the efficiency of the waste water cleaning from the organic mineral pollution was about 95–99 % g.

Keywords: biological method, waste water, weaving factory, Pistia Stratiotes L., dissolved oxygen, permanganate oxidability, ammonia, nitrites, nitrates.

Introduction. As it is known that at the winning and spinning factories the industry waste water is formed during the washing of filters of the systems of the air moistening. Besides, the significant amount of sinks which are heavily polluted with mineral and organic admixtures, is formed in the sizing sectors of the winning factories. In total, the amount of the waste water depends on the factory production capacity and type of the produced production.

At the bleaching factories and at the special sectors of the cotton producing plants the polluted (60–80 %) and slightly polluted (20–40 %) waste water is formed. The organic pollutions calculated for 1 t of the produced textile is 35–60 kg. of BOD_5, 90–92 % of which is attributed to the waste water. About 2 % of fiber of the gray cloth is going to the sink.

Materials and methods of investigation. The objects of investigation were the waste waters of the winning factories of Vabkent and Alata of Bukhara province as well as Pistia Stratiotes L. produced at the Institute of botanic of Ac.Sc. of Uzbekistan and waste water. In laboratory conditions it was grown on the mineral nutrition environment of the winning factory in the problem laboratory of biotechnology and at the chair of botanic of the state Bukhara university.

In the industrial conditions the experiments were conducted in the biological ponds of the before mentioned factories.

During the period of cultivation of Pistia stratiotes L. the water temperature varied in the range of 25–35 °C, luminosity was 20–70 thous. lux.

Hydrochemical composition of the waste water (dissolved oxygen, permanganate oxidability, ammonia, nitrites, nitrates and other indices) before and after cultivation of Pistia Stratiotes L. were defined by the techniques developed by Yu. Yu. Lurje (1975, 1980), N. S. Stroganov (1980), Yu. V. Novikova and others (1990) described in the «Manual on the chemical analysis of the surface water» (1977).

The following indices which characterize the water quality are the main ones which are sensitive to the background pollution are as follows: permanganate oxidability (PO) which characterizes the quantity of the lightly oxidizing organic substances, BOD_5 — biochemical oxygen demand which allows to estimate the overall amount of organic compounds which are subjected to the biochemical oxidization during five days; dissolved oxygen O_2, which determines the processes of the self-cleaning of water. The relationship between BOD_5 values will serve as the characteristic index for the assessment of the water quality.

Results of studies and their discussion. Cleaning structures of the construction of the Batkent weaving factory (airtank and biological ponds) are located on the right bank of Emir-Temur collector. Waste water inflows to the airtank, then — to biological bonds and collector. Biological ponds of the throughflow type consist of two sections, each section includes 3 ponds.

In the first series of experiments conducted in 1993–1998 the physical characteristics and chemical composition of the waste water from the general collector and biological ponds of that factory were studied (Table 1).

Table 1. – Characteristics of waste water of the general connecting collector and biological ponds of the Vabkent winning factory (average values of 5 repetitions are given)

Indices	General collector	1-biopond	2-biopond	3-biopond
pH	7.0	7.0	7.0	7.0
Color	slightly yellow	slightly yellow	transparent	transparent
Smell, points	5.0	3.0	2.0	1.0
Dissolved 0_2, mg/l	no	1.7	2.9	3.6
BC1 < 5, mg 0_2/l	155.4	125.1	108.4	78.2
Oxidability, mg O_2/l	115.1	101.0	92.6	70.1
Ammonia, mg/l	10.2	6.1	4.4	4.0
Nitrites, mg/l	0.08.	0.08	0.07	0.04
Nitrates, mg/l	6.1	4.0	3.0	3.5

For the investigation of the dynamics of growth, development and productivity of Pistia Stratiotes L. and of its role in the biological cleaning of the waste water from the organic mineral pollution we conducted the laboratory experiments. In this case the waste water were taken from the general collector before entering the airtank (option 1) and then it was dissolved with the tape water in proportion of 3:1 (option 2) and 1:1 (option 3). After definition of of hydrochemical composition of the initial and dissolved waste water the Pistia Stratiotes L. was grown with the initial biomass density of 150 g/m^2 on the water surface. After 7 days of cultivation the productivity of Pistia Stratiotes L. was — 460 in the 1st option, 420 in the 2nd one and 395 g/m^2 of the 3rd option of the raw biomass. With this, the averaged daily increment of biomass in options 1–3, was 44.3; 38.6 and 35.0 g/m^2, respectively.

Thus, the results of experiments show that the waste water from the winning factory stimulated the growth of Pistia stratiotes L. This means that Pistia Stratiotes L. can be grown on the waste water even without dissolving.

References:

1. Buriev S., Khayitov Y., Rashidov N., Myustafoeva M., Toirov B. Use of the aquatic plants in the water protection biological technologies of Bukhara province.//Ecological problems of the flora and fauna of Bukhara province. – Bukhara. 1997. – P. 14–17.
2. Nikanorov A. M. Hydrochemistry. – L.: Gidrometeoizdat, 1989.
3. Smanova Z. A., Tajimukhamedov H. S., Kasymov A. K. Water analysis. Tutorial methodical aid. – Tashkent: University, 2008.
4. Khayitov Y. K. Bioecological efficiency of cleaning of the waste water from the textile industry and its technology in the cultivation of Pistia straliotes L.//Abstract of thesis of biological science. – Tashkent, 2001. – 19 p.

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Several approaches to the estimation of the components of the consuming part of water balance on irrigation territories

Abstract: In the abstract a series of the up-to-date approaches to the estimation of the components of the consuming part of water balance on irrigation territories are considered on the example of Karshi irrigation region (KarIR) of Uzbekistan.

Keywords: irrigation, irrigated territory, water balance equation, incoming part of the equation, elements of consuming part of the equation, quantitative assessment of the consuming part.

As it is known, during the recent years in Uzbekistan the attention is given to the studies of the irrigated lands hydrology [1–7 and others]. The results of these studies give possibility to make systematization of the existing methods of the quantitative estimation of the component of the water balance of irrigated territories. Taking this in mind, it is concluded that this work considers the issues of assessment of the components of the present water balances of irrigated territories of Kashkadarja oasis.

Regarding the water balance equation of the newly irrigated territory of the studied territory, i. e. Karshi irrigation area (KIrAr), we propose the following:

$$X + У_{п} + У_{КМК} + V_{п} = У_{о} + V_{о} + E_{с} + P + \Delta U + \Delta W + \Delta W_{в} \pm \Delta У. \quad (1)$$

According to the above mentioned water balance equation KIrAr (1), its left part, i. e. atmospheric precipitation (X), surface inflow ($У_{п}$), water inflow along the Karshi main canal ($У_{КМК}$), underground inflow ($V_{п}$) characterizes the incoming part of the water balance. The surface outflow ($V_{о}$), total evaporation ($E_{с}$), water consumed for the industrial and municipal-and-domestic needs (P) are related to the elements of the consuming part of equation (1).

This equation, unlike the equation for the before irrigated zone, also accounts for such additional discharge elements as the moisture resources changes in aeration zone (ΔU), ground water (ΔW) and water reserves in water storages ($\Delta W_{в}$). ± ΔУ characterizes the discrepancy of the water balance equation.

The values of the regeneration flow from the given territory can be taken as the value of the surface outflow ($У_{о}$) out of the KIrAr contours. The ground outflow ($V_{о}$) from the territory is taken into account in the calculation of the underground inflow — as the difference between the inflow and underground water outflow ($V_{п} - V_{о}$) by the data of S. Sh. Mirzaev [3].

The value of the total evaporation ($E_{с}$) from the surface of the studied territory can be estimated as the sum of evaporation values from the irrigated areas ($E_{о}$), from the surfaces of the inner systems of the inner not ploughed areas ($E_{п}$) and from the water surfaces of canals and water storages ($E_{в}$):

$$E_{с} = E_{о} + E_{п} + E_{в}. \quad (2)$$

For the estimation of the evaporation quantity from irrigated areas ($E_{о}$) KaIrAr we analyzed the materials and results of the previous researches of evaporation from the studied region calculated by different authors [1; 2; 4; 5; 9]. Regarding the results of these investigations, the evaporation value of 1090 mm. was taken as the layer of evaporation from the complex irrigated hectare for 1981–2015.

The value of evaporation from the water surface of Talimarjan water storage located on that territory was taken as 1663 mm. In the calculation of the value of evaporation layer the designed indices and regime of this water storage operation were taken for the account.

The change of the ground water resources (ΔU) in KarIR is calculated as follows:

$$\Delta U = m \cdot \Delta H \cdot F, \quad (3)$$

where: m — factor of water compatibility of different grounds taken to be 0.34 for the territory of KarIR; ΔH — change of the ground water level taken to be:

$$\Delta H = H_i - H_{i+1}, \quad (4)$$

where: H_i — average value of the area-averaged ground water level in the beginning of the designed period; H_{i+1} — the same in the beginning of the next period; F — total area of the 1st turn of KarIR development which equals 266 thous. he. Average area-weighted ground water level is determined by the maps of the depth of ground water level. For this the maps of the depth of ground water level for 1965, 1974 and 1979, i. e. — for different stages of Karshi steppe development, mapped by the specialists of the Central Asian Planning Institute for Water and Cotton [3; 7] were used.

Average area-weighted ground water level for KarIR during the next years (1990, 2000, 2005, 2010, 2015) were determined using the materials of the Kashkadarja province administration for the water and agriculture economy. It should be noted that during the recent years the number of wells and frequency of observations of ground water level there was decreased substantially which affected the accuracy of the expected results.

The above mentioned results made it possible to draw the chronological graph for the variation of depth of the ground water level in KarIR (Fig. 1). In the drawing of this graph it was assumed that the rise of ground water level is smooth. This graph, i. e., $H_{cp} = f(T)$ curve was used for calculation of the average weighted ground water level (H_i) of the investigated territory.

Analysis of the initial materials has shown that maximum values of the moisture resources changes in aeration zone (ΔU) accorded to the initial period of development of KarIR, i. e., in relation to the intensive rise of the ground water level in the result of the irrigation of this territory.

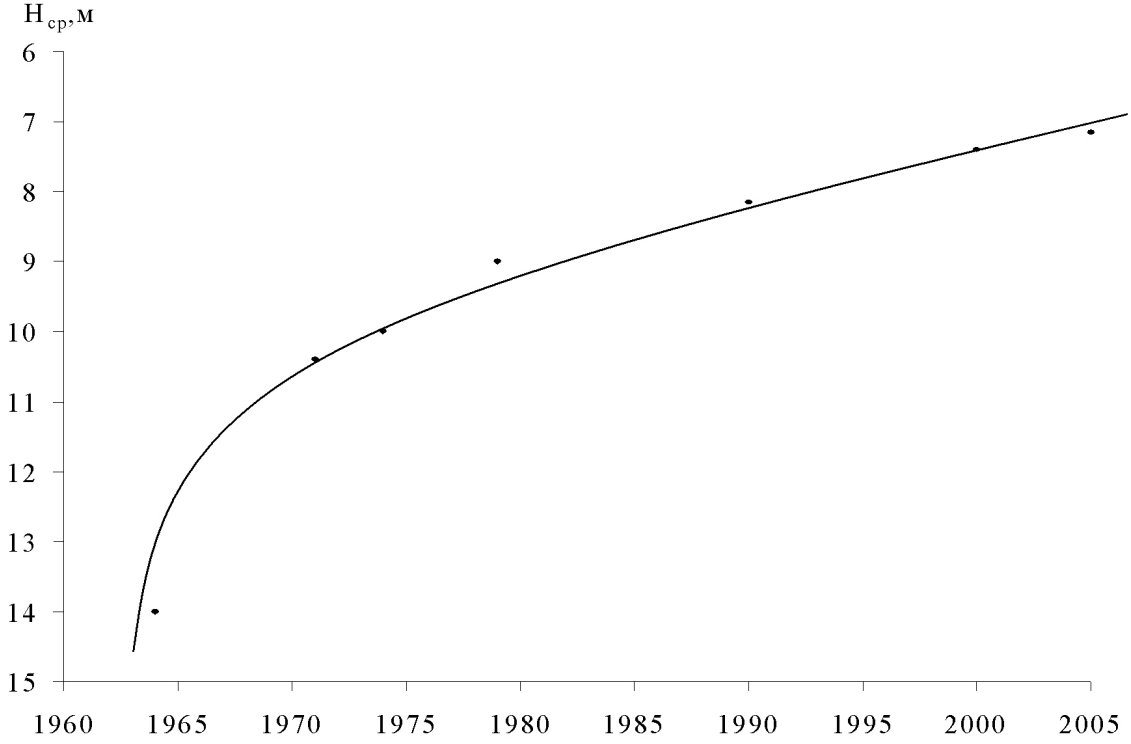

Fig. 1. Annual change of the area-averaged ground water level (Hcp) in KarIR

Estimation of the amount of water used for the moisture accumulation in the soil grounds in aeration zone (ΔW) was made as follows:

$$\Delta W = (H_i - НКП) \cdot \alpha_1 - \alpha_2) \cdot \Delta F_o, \quad (5)$$

where: H_i — is the initial average area-weighted ground water level; НКП — height of capillary rise; α_1 — initial (voluminal) humidity of the non-irrigated soils in the layer from the upper border of capillary rise to the original ground; α_2 — value of the voluminal humidity with which the down movement of moisture in the same layer starts after beginning of irrigation; ΔF_o — irrigated area increment for designed period — in our case — for the designed year.

It should be taken into account that the initial values of the average area-weighted values of ground water level (H_i) are known. Using the experience of the former researches [6] we can make the conclusion that the height of capillary rise for the studied territory is taken as 3.5 m. As it is known, the difference ($\alpha_1 - \alpha_2$) presents the increment of the humidity value in the unit of the soil volume in the beginning of irrigation. F. E. Rubinova and M. I. Getker [5] proposed that its value equals 0.06. The values of the irrigated area increment (ΔF_o) for the designed period are calculated using the initial materials of Kashkadarja province administration for the water and agriculture economy.

The values of the equation (5) components calculated in the above mentioned order, made it possible to calculate the value of the moisture reserves changes in aeration zone (ΔW) for the designed period, i. e. — for a year. The value of ΔW

characterizes the water quantity which can be absorbed by the soil grounds during the development of virgin lands with the deep initial ground water level.

It should be pointed out that the appropriateness of this approach to determination of the water quantity used for accumulation in the ground soils ($\Delta U + \Delta W$) was proved by F. E. Rubinova and M. I. Getker [5] earlier. They calculated this quantity by two independent techniques, i. e., by the water balance equation and by separate calculation of ΔU and ΔW values. As it is asserted in [6], the results of both methods of ΔU and ΔW values calculation are comparable, which testifies to the absence of significant errors of our method used for the calculation of the water balance elements.

In the result of change of the ground water reserves and water accumulation in soil grounds in aeration zone of the investigated territory during the first ten years according to the designed five-year periods (1971–1975 and 1976–1980), 184 and 198 mln. m^3/year of water was used respectively, which comprises 9.9 % of the water intake from Amudarja river via Karshi main canal. We calculated that these values were 5.7 % and 2.6 % during the designed five-year periods, i. e., 1981–1985 and 2001– 2006. These digits give the reason to prove that the flow losses for watering the soil grounds on KarIR territory are decreasing from year to year.

The results of investigation carried out by F. E. Rubinova and M. I. Getker [6] on the example of Hunger Steppe can be used for comparison. Their data show that during the development of this territory 15 % of the taken river flow was used for watering of the soil grounds. In Karshi Steppe the ground water level did not reach the depth mark of drainage system yet, that is why the process of water accumulation still continues.

Thus, during 1981–2005 in KarIR the specific losses of the river flow varied from 10.1 to 14.2 thous. m^3/he. Simultaneously, for each hectare of irrigated territory 12.9– 16.1 thous. m^3 was taken from the source. In the result of this, during this period (i. e., from the beginning of 80-s and up to 2005) the value of collector flow varied in the range of 23.9–47.6 m^3/s. In relation to the inflow of the surface water they were 18.5 and 35.4 %, respectively.

References:

1. Иванов Ю. Н. Эмпирический метод расчета месячных сумм испарения с полей хлопчатника.//Тр. САНИИ Госкомгидромета, 1982. – Вып. 89 (170). – С. 23–35.
2. Милькис Б. Е., Муминов Ф. А. Вопросы методики расчета испарения с орошаемых полей.//Тр. САНИГМИ. – 1971. – Вып. 66 (81). – С. 52–61.
3. Мирзаев С. Ш., Бакушева Л. П. Оценка влияния водохозяйственных мероприятий на запасы подземных вод. – Ташкент: Фан, 1979. – 117 с.
4. Побережский Л. Н. Водный баланс зоны аэрации в условиях орошения. – Л.: Гидрометеоиздат, 1977. – 158 с.
5. Рубинова Ф. Э., Геткер М. И. Структура водного баланса и потери речного стока в Ферганской долине и Голодной степи.//Тр. САНИГМИ, 1972. – Вып. 62 (77). – С. 84–90.
6. Рубинова Ф. Э., Геткер М. И. Водный баланс Голодной степи, изменение его структуры под влиянием водохозяйственного строительства в современных условиях и перспективе.//Тр. САРНИГМИ, 1975. – Вып. 23 (104). – С. 29–48.
7. Рубинова Ф. Э., Доронина С. И., Тактаева О. С. Водный баланс орошаемой территории бассейна р. Кашкадарья.//Тр. САРНИГМИ, 1987. – Вып. 125 (206). – С. 68–81.
8. Харченко С. И. Гидрология орошаемых земель. – Л.: Гидрометеоиздат, 1975. – 373 с.
9. Чолпанкулов Э. Д., Гапич Т. А. Величина водопотребления хлопчатника на целинных землях Каршинской степи.//Тр. САНИИРИ, 1981. – Вып. 165. – С. 42–44.
10. Юнусов Г. Х. Структура и аналитическая модель потерь речных вод в бассейне Кашкадарьи.//Проблемы освоения пустынь. – Ашхабад, 2003. – № 1. – С. 7–10.
11. Юнусов Г. Х., Хикматов Ф. Х. Структура потерь речных вод и водный баланс орошаемых территорий. – Ташкент, «Fan va texnologiya», 2013. – 144 с.
12. Dukhovny V., Umarov P., Yakubov H. and Madramooto C. A. Drainage in the Aral Sea Basin.//J. Irrigation and drainage, 2007. – Vol. 56. – P. S91–S100.
13. Mutreja K. N. Applied hydrology. – New Delhi: Tata McGraw – hill publishing company limited, 1986. – 959 p.

Section 14. Physics

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Dynamics of interaction of domain walls in (2+1)-dimensional non-linear sigma-model

Abstract: By numerical simulation the dynamics of interactions of 180-degree Neel type domain walls in (2+1) dimensional O (3) vectorial nonlinear sigma model is investigated. Are obtained numerically: new solutions in the form of domain walls with the rotation of the vector of A3 field in isotopic space; long-range model of interaction of the domain walls; oscillating (bion) model of the bound states of the domain walls.

Keywords: bound state of domain walls — Neel-type domain wall — O (3) vectorial nonlinear sigma-model — long-range interactions of domain walls — dynamics of interaction.

Localized boundaries of magnetic domains (domain walls, topological solitons: kinks, antikinks) are an important element of the magnetic domain structures, primarily in terms of their practical application. Investigation of the properties of magnetic domain walls, attracts the attention of experts of the area due to their possible applications in a variety of modern technological processes, for example, in the spin electronics, while creating productive and reliable reading devices, recording, storing and processing digital data, where used the relationship of magnetization and electric polarization. Dynamics of domain walls is particularly relevant, for example, in the concept of the racetrack memory (magnetic racetrack memory, MRM) [1], based on the use of the spin current to move the domain walls in the limits of the magnetic nanowires.

In this paper we obtained a model of collision of new types of moving Neel type domain walls (with the rotation of the magnetization vector in isotopic space: $\varphi(x,y,t)\neq 0.0$) in (2+1)-dimensional anisotropic O (3) vectorial nonlinear sigma model (VNSM). The Euler-Lagrange equations [2–3] of the studied model take the following form:

$$2\partial_\mu\partial^\mu\theta+\sin 2\theta\left(1-\partial_\mu\varphi\partial^\mu\varphi\right)=0, \qquad (1)$$

$$2\cos\theta\partial_\mu\varphi\partial^\mu\varphi+\sin\theta\partial_\mu\partial^\mu\varphi=0,\ \mu=0,1,\ldots,D,\ D=2,$$

where $\theta(x,y,t)$ and $\varphi(x,y,t)$ are the Euler angles. Recall that equation (1) in the meridian section of the isotopic space ($\varphi(x,y,t)=0$) reduced [2–3] to the sine-Gordon equation of form:

$$2\left(\frac{\partial^2\theta}{\partial t^2}-\frac{\partial^2\theta}{\partial x^2}-\frac{\partial^2\theta}{\partial y^2}\right)=\delta\sin 2\theta.$$

In this paper, based on the given in [4] of the analytical form of the solution in the form of Neel-type domain-wall

$$z(x,y,t)=4arctg\left(e^{B_1\left(\frac{w}{k_1}x-\frac{w}{k_1}x_0\right)+B_2\left(\frac{w}{k_2}y-\frac{w}{k_2}y_0\right)}\right)$$

of the (2+1)-dimensional sine-Gordon equation of form:

$$z_{tt}-k_1^2z_{xx}-k_2^2z_{yy}+w^2\sin z=0,$$

was obtained the numerical model of the domain wall in (2+1)-dimensional O (3) VNSM with rotation vector of A3-field ($\varphi(x,y,t)\neq 0$) in the isotopic space (Fig. 1 abc) in the form:

$$\theta(x,y,t)=2arctg\left(e^{\pm\left[B_1\left(\frac{w}{k_1}x-\frac{w}{k_1}x_0\right)+B_2\left(\frac{w}{k_2}y-\frac{w}{k_2}y_0\right)\right]}\right), \qquad (2)$$

$$\varphi(x,y,t)=\omega\tau.$$

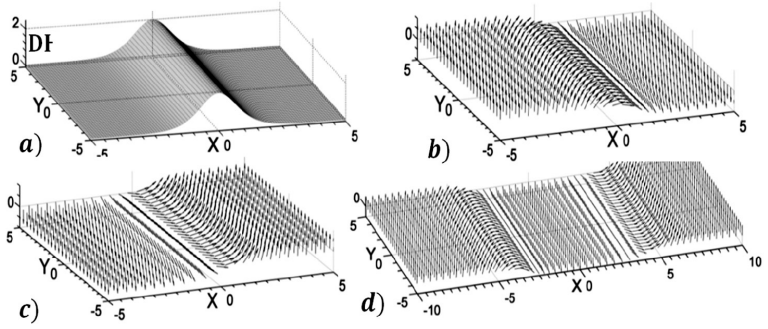

Fig. 1. The numerical model of the domain wall of the form (2) of model (1) with $\omega=0.3$: a) energy density (DH). The dynamics of spins in the isotopic space at $t=0.0$; b) kink; c) antikink; d) field of kink-antikink

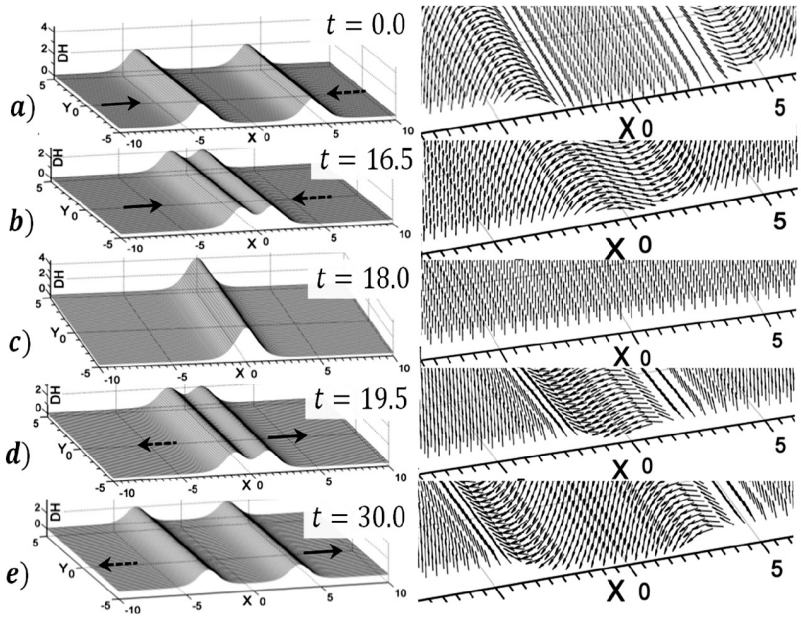

Fig. 2. The numerical model (DH, the dynamics of spins in the isotopic space) of the frontal collision of the domain walls the form (2), $\varphi(x,y,t)=\omega\tau$, $\omega=0.3$, $\upsilon_k(t_0)=\upsilon_{ak}(t_0)\approx 0.1$: a) $t=0.0$; b) $t=16.5$ — interaction; c) $t=18.0$ — association; d) $t=19.5$ — the passage of solitons the resonance zone; e) $t=30.0$. The direction of movement: $\rightarrow$ — kink; $\leftarrow$ — antikink

It is known that the real dynamics of soliton solutions, where fully manifested their specific, particle-like properties can be obtained by carrying out the study of the dynamics of their interactions [5].

In this paper, on the basis of our new dynamical numerical solutions (ris.1d) were developed the models of frontal collision of domain walls — solutions of kink-antikink of the form (2) of the (2+1)-dimensional O (3) VNSM ($\varphi(x,y,t)\neq 0$) (Fig.2).

Fig. 2 shows that when a frontal collision (Fig. 2 abc) topological solitons (2) (a kink-antikink) pass through each other (Fig. 2 de), wherein kink proceeds to the antikink state and vice versa.

Next, we present a model of the long-range domain walls of the form (2) which we have obtained for the (2+1)-dimensional O (3) VNSM. Numerical simulations have shown that at the interaction of the pair of domain walls of the form (2), which differ from each other by the presence of rotation of vector of A3-field in the isotopic space ($\varphi_1(x,y,t)=0$, $\varphi_2(x,y,t)>0$) (Fig. 3 a) appears the long-range effect. Fig. 3 shows an example of manifestation of long-range forces in the simulation of frontal collision domain walls of type (2) of the model (1).

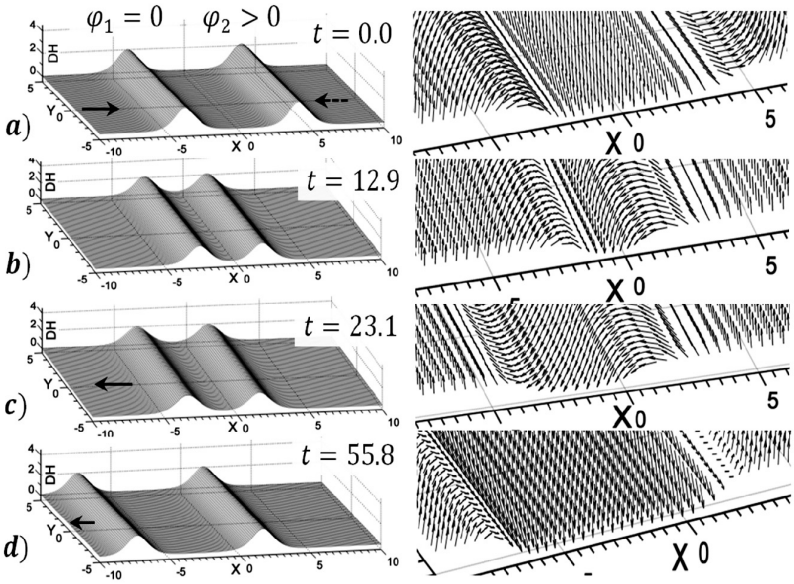

Fig. 3. The numerical model (DH, the dynamics of spins in the isotopic space) of long-range interaction of domain walls form (2), $\varphi_1(x,y,t)=0$, $\varphi_2(x,y,t)=0.3\tau$, $\upsilon_k(t_0)=\upsilon_{ak}(t_0)=0.1$: a) $t=0.0$; b) $t=12.9$: $\upsilon_k\rightarrow 0$, $\upsilon_{ak}\rightarrow 0$; c) $t=23.1$: $\overleftarrow{\upsilon_k}>0$, $\upsilon_{ak}\approx 0$; d) $t=19.5$: $\overleftarrow{\upsilon_k}>0$, $\upsilon_{ak}\approx 0$

At this, the velocity of the domain wall (right) having a spin rotation in isotopic space ($\varphi_2(x,y,t)>0$) is reduced to almost zero ($\upsilon_{\varphi_2}(t\geq 12.9)\to 0$) (Fig. 3 b), a kink (the left side) ($\varphi_2(x,y,t)=0$) after the interaction continues to move in the opposite direction (Fig. 3 cd).

The manifestation of long-range forces in the experiments is shown in Fig. 3 were detected at speeds of domain walls in the interval $\upsilon_k(t_0)=\upsilon_{ak}(t_0)\in(0.0,0.185)$. In between $\upsilon_k(t_0)=\upsilon_{ak}(t_0)\in(0.345,0.86)$ numerical models showed the results described in Fig. 2, i. e. in this case the solitons pass through each other. Qualitatively new results were obtained on the average interval of velocities of colliding domain walls form (2) of the model (1), which are described below.

At movement of domain walls at speeds $\upsilon_k(t_0)=\upsilon_{ak}(t_0)\in(0.186,0.34)$ in model is shown in Fig. 3 were obtained new kinds of solutions of (2+1)-dimensional O (3) VNSM in the form of oscillating interconnec-ted (bion) state of the domain walls (2) (for $\varphi_1(x,y,t)=0$ and $\varphi_2(x,y,t)>0$) (Fig. 4).

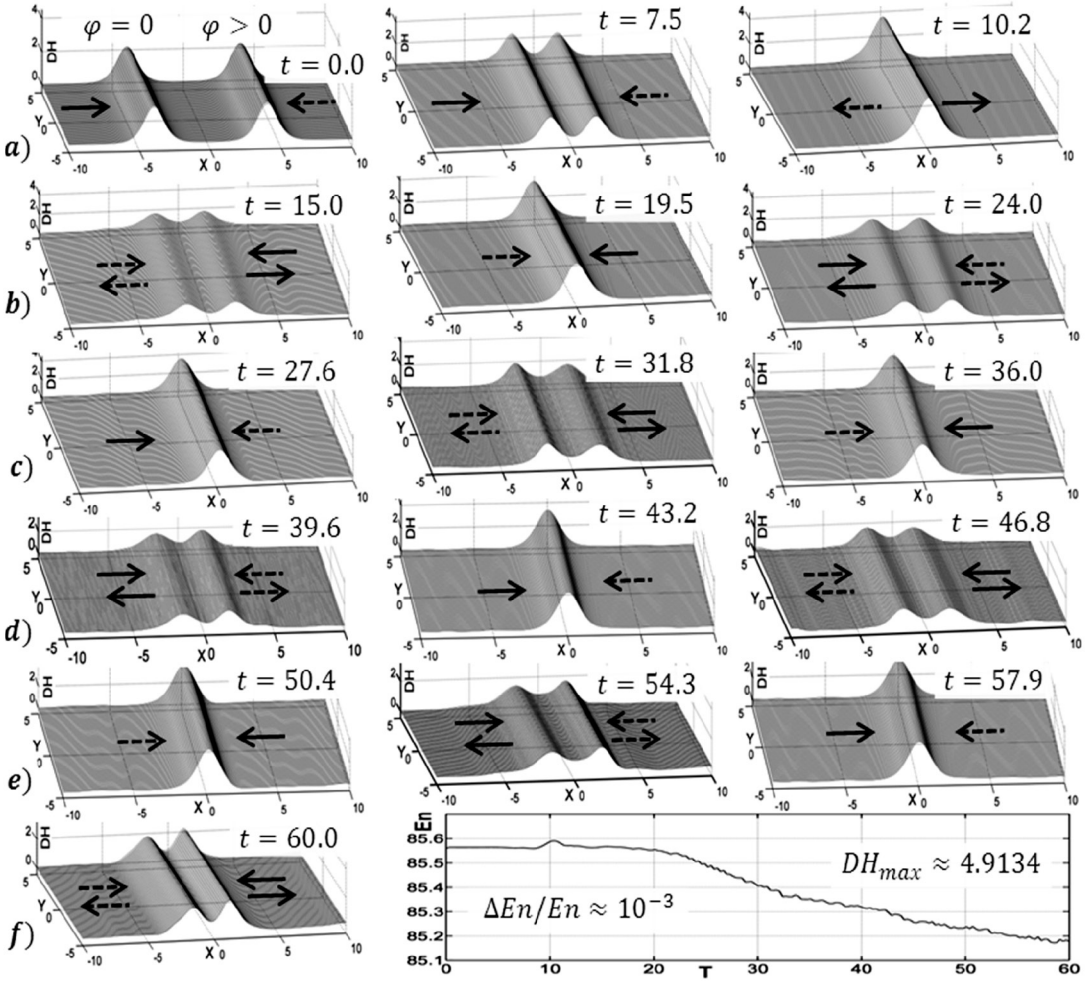

Fig. 4. The numerical model (DH, energy density) of the forming the interconnected (Bion) state of the kink-antikink at the collision of the domain walls form (2) with $\varphi_1(x,y,t)=0$, $\varphi_2(x,y,t)=0.3\tau$, $\upsilon_k(t_0)=\upsilon_{ak}(t_0)\approx 0.29$: a) $t\in[0.0,10.2]$; b) $t\in[15.0,24.0]$; c) $t\in[27.6,36.0]$; d) $t\in[39.6,46.8]$; e) $t\in[50.4,57.9]$; f) $t=60.0$, the integral of energy of system at $t\in[0.0,60.0]$. The direction of movement: $\to$ — kink; $\to$ — antikink

References:

1. Parkin S. S. P., Hayashi M., Thomas L. Magnetic Domain-Wall Racetrack Memory. – Science 320, 2008. – P. 190–194.
2. Muminov Kh. Kh., Shokirov F. Sh. Numerical simulation of new types of topological solitons of O (3) vectorial non-linear sigma-model. – Science, Technology and Higher Education: materials of the III international research and practice conference, v. II. – Westwood, October 16th, 2013./Publishing office Accent Graphics communications. – Westwood, Canada, 2013. – P. 349–357.
3. Muminov Kh. Kh., Shokirov F. Sh. Dynamics of interaction of two-dimensional topological solitons in the O (3) vectorial nonlinear sigma-model. – Reports of Academy of Sciences of the Republic of Tajikistan, 2010. – v. 53, – № 9. – P. 679–684.
4. Johnson S., Suarez P., Biswas A. New Exact Solutions for the Sine-Gordon Equation. – Computational Mathematics and Mathematical Physics, 2012. – v. 52, № 1. – P. 98–104.
5. Mahankov V. G. Solitons and numerical experiment. – Particles & Nuclei, 1983. – v. 14, № 1. – P. 123–180.

Section 15. Chemistry

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The nature of catalytic active centers of ethanol to hydrocarbons conversion reaction over alumina based catalysts

Abstract: The conversion of ethanol to hydrocarbons as a function of the content of electron-acceptor (EA) and surface –OH centers is studied. It was shown that the conversion of ethanol into hydrocarbons over the alumina based catalyst proceeds in two stages and Bronsted and EA centers is assumed as the catalytic active centers of this reaction on the first and next stages, respectively.

Keywords: ethanol, hydrocarbons, alumina based catalysts, electron-acceptor centers, surface OH groups.

Introduction

The conversion of ethanol to hydrocarbons over solid catalysts is one of the most studied reactions in heterogeneous catalysis. The analysis of the available literature shows that the aluminum oxide and its modified with various elements forms can be used as active catalyst for conversion of alcohols to hydrocarbons [1–6]. Despite of intensive research in this direction in the last 20–25 years, mechanism of the nature of the catalytically active sites and mechanism of this reaction are still the subject to debate [1, 4–6].

The aim of this work is the study of the role of EA centers and the surface –OH groups as catalytic active centers for the conversion reaction of ethanol to hydrocarbons over the γ-Al_2O_3 modified with different content (1–5 wt %) of iron and zirconium, by FTIR, UV/VIS and EPR methods in combination with GC/MS analysis of gas phase products of this reaction.

Experimental/methodology

The catalysts were prepared by wet impregnation technique of γ-alumina support with the $ZrOCl_2 \cdot 8H_2O$ and $FeCl_3 \cdot 2H_2O$ solutions. The prepared samples of catalysts were dried at 393 K and then calcined in the presence of flow of purified air at 673 K for six hours. These catalysts are tested in the conversion of ethanol to hydrocarbons at 473–578 K and atmospheric pressure. The contents of EA centers in the samples is determined based on the EPR spectra of adsorbed over catalysts diphenylamine molecules using JES-PE-3X, Jeol spectrometer. FTIR spectra were recorded using a Bruker IR spectrometer ALPHA FTIR. Concentration of the –OH group is determined using UV/VIS and brilliant –green as an indicator using UV/VIS 6850, Jenway spectrometer. The gas-phase products of ethanol conversion has been studied by GC/MS method using Thermo Scientific chromato-mass-spectrometer GC/MS Focus. Element composition on the surface and phase composition of the samples before and after conversion of ethanol are determined by X-ray fluorescence microscopy and X-ray diffraction methods using XGT 7000, Horiba, Japan, microscope and XRD TD 3500, China diffractometer, respectively.

Results and discussion

The reaction products of catalytic conversion of ethanol to hydrocarbons at reaction temperature range from 473 to 578 K are given in the table 1. The hydrocarbons in the gas phase were detected starting from 473 K. It was shown that at the initial stage of the reaction during the first 30–40 min. the yield of the ethylene is increased and then during the next 3 hours the yield of the ethylene decreases and the formation of aliphatic (saturated, unsaturated) and aromatic hydrocarbons are observed.

Table 1. – Gas-phase products of Ethanol Conversion over Al_2O_3 based catalysts at 578 K and atmospheric pressure

Catalyst	Conversion, %	Yield, %:			
		Ethy- lene	Aliphatic hydrocarbons		Aromatic h/c-s
			Saturated	Unsaturated	
1.0 %Zr/Al_2O_3	100	62	15	13	10
3.0 %Zr/Al_2O_3	100	72	5	16	7
0.3 %Fe-1.0 %Zr/Al_2O_3	100	65	18	12	5
1.0 %Fe-1.0 %Zr/Al_2O_3	100	58	21	10	11

In the EPR/FMR spectra for these catalysts two different by nature signals are observed: belong to ferro-/super-paramagnetic FeOx for Fe/γ- Al_2O_3 (or their modified by Zr forms) catalysts with effective g-factor g = 2.14–3.65 and line width ΔH = 110–320 mT and paramagnetic carbon deposits with g = 2.003 and ΔH = 0.5–0.7 mT. The formation of hydrocarbons is accompanied with the appearance of signals at g = 2.14–2.15 and ΔH = 125–131 mT in the EMR spectra. It was established that the active catalyst are characterized with the symmetrical EMR signal, due to super-paramagnetic particles of the size 15–20 nm. At the same time grain size of identified from diffractogram phases of active elements for this catalyst based on Scherrer formula was (35–45 nm). The scanning the surface of the catalyst using X-ray fluorescent microscope shows the noticeable differences in distribution of the active elements (Fe, Zr) in the samples before and after the reaction. Regeneration of catalyst with calcination in air at 673 K during the 2h leads to the initial state of catalyst. In the fig. 2 the X-ray fluorescent spectrum of modified γ-Al_2O_3 samples is given.

In the table 2 the concentration of EA centres as a function of the concentration of Cl- ions in the samples and influence of the concentration of Cl- ions in the samples on the rate of the conversion of ethanol to ethylene are given. As can be seen from this table the concentration of the EA centres and the yield of the ethylene are increased with increasing of the concentration Cl- ions in the samples.

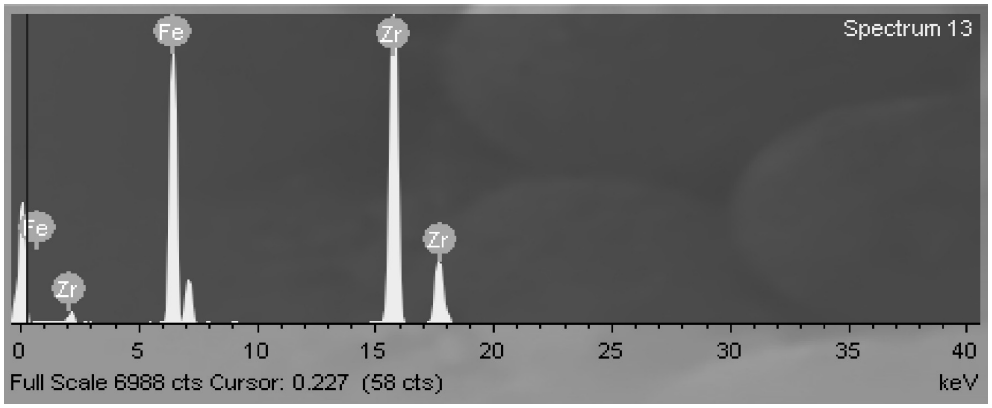


Fig. 1. X-ray fluorescence spectrum of calcined in air at 873 K sample 3%Fe-3%Zr/Al_2O_3

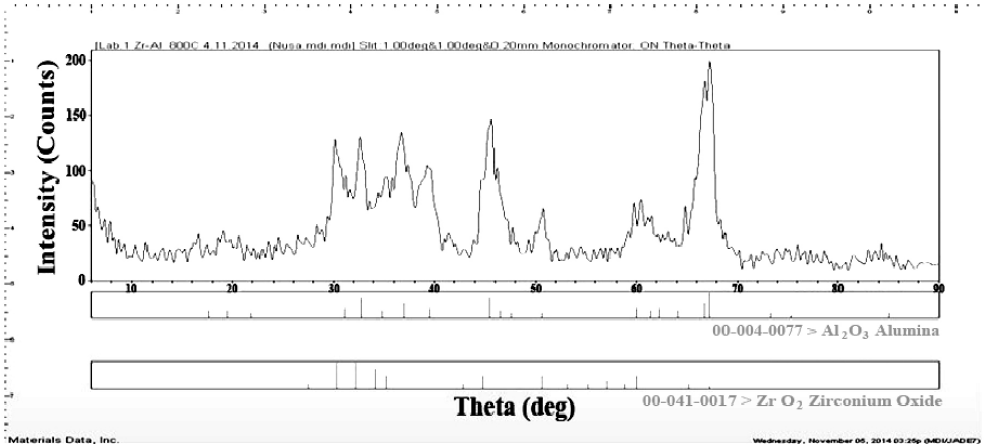
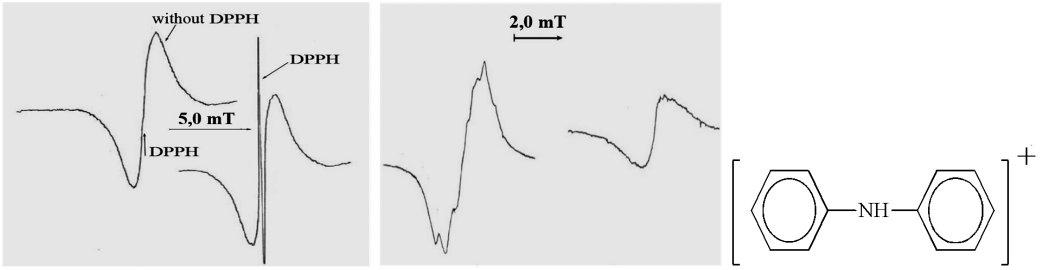


Fig. 2. XRD patterns of calcined in air at 1073 K sample 3%Zr/Al_2O_3

Table 2. – The number (N) of EA and centres and the yield of the formation of ethylene (in mas.%) as a function of the concentration of Cl- ions in the catalyst

	1.0 %Zr/Al_2O_3			
	Cl^- ions in the samples, mas. %			
	–	1	2	4
Yield of ethylene, mas. %	62	67	78	86
Number of EA centres, N x 10^{17} spin/g	4	6,5	5.3	5.5
Number of –OH centers, N x 10^{-3} mmol/g	55	62	78	86
	1.0 %Fe-1,0 %Zr/Al_2O_3			
	Cl^- ions in the samples, mas. %			
	–	1	2	4
Yield of ethylene, mas. %	54	57	58	641
Number of EA centres, N x 10^{17} spin/g	2.8	2.3	2.0	2.0
Number of –OH centers, N x 10^{-3} mmol/g	52	68	72	76

The number of EA and –OH centers is determined on the base of adsorbed diphenylamin EPR spectra and it was shown that the concentration of EA centers increase with increasing of temperature (473–1073 K) for the treated in air samples. The EPR spectra of adsorbed at room temperature diphenylamine are given in the fig. 3.



a) b) c) diphenylamine cation-radical

Fig. 3. EPR spectra of the calcined at 873 K Zr/Al oxide catalyst with adsorbed at room temperature diphenylamine after: a) 0.5; b) 4 hours and c) 2 days

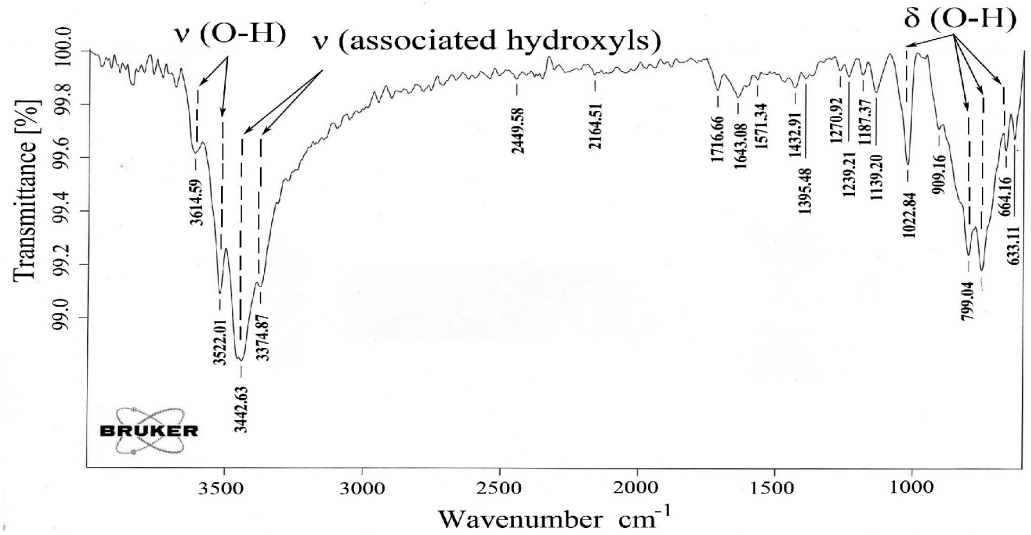


Fig. 4. FTIR spectrum at room temperature of the of Fe, Zr/γ- Al_2O_3 – sample treated at 673 K in air during the 2 hours

Conclusion

Two type — surface –OH groups and EA centers are discussed as active centers for the conversion of ethanol over γ-Al_2O_3 modified with Fe and Zr. It was shown that –OH groups is responsible for the dehydration of ethanol at first and EA centers are responsible for the conversion of ethylene and diethyl-ether into ethane, propane, butane, pentane, hexane — aliphatic hydrocarbons and benzene, toluene and xylene — aromatic hydrocarbons at the next stages of the reaction. t was established that conversion of ethanol to aromatics increases with increasing the content of Zr in the sample and that the active sites necessary for formation of aromatics are the Zr ion based structures, phases ($ZrFeO_3$, ZrO_2) in vicinity with γ-alumina acid sites that facilitate the formation of aromatic compounds. The obtained data show that Zr active sites catalyze the formation of aromatic compounds and FeOx species the cracking reaction.

References:

1. Narayanan C. R., Srinivasan S., Datye A. K., Gorte R., Biaglow A. The effect of alumina structure on surface sites for alcohol dehydration.//J. of Catalysis. – 1992. – V. 138. – P. 659–674.
2. Zaki T. Catalytic dehydration of ethanol using transition metal oxide catalysts.//J. of Colloid and Interface Science. – 2005. – V. 284. – P. 606–613.
3. Doheim M. M., El-Shobaky H. G. Catalytic conversion of ethanol and iso-propanol over ZnO-treated Co_3O_4/Al_2O_3 solids.//Colloids and Surfaces A: Physicochemical and Engineering Aspects. – 2002. – V. 204. – P. 169–174.
4. Zhang X., Wang R., Yang X., Zhang F. Comparison of four catalysts in the catalytic dehydration of ethanol to ethylene.//Microporous and Mesoporous Materials. – 2008. – V. 116. – P. 210–215.
5. Zotov R. A., Molchanov V. V., Goidin V. V., Moroz E. M., Volodin A. M. Developments of method of preparation of the modified aluminiumoxide catalysts and study of their properties.//Kinetics and Catalysis. – 2010. – V. 51, № 1. – P. 149–152.
6. Dossumov K., Churina D. Kh., Ergazieva G. E., Abramov G. V., Telbayeva M. M. Production of olefins from bioethanol. Catalysts, mechanism.//KazNU Bulletin. Chemical series. – 2012. – № 4 (68). – P. 42–49.

Section 16. Economics and management

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Uneven development of Russia regions as economic security factor

Abstract: The article refers to the problem of growing unevenness of regional development as an impartial trait of the modern growing economy, and its impact on the economic security. Some changes in understanding of the economic security are identified, namely, shifting of focus on achievement of the maximum self-sufficiency of a region in the light of a shift in the security enhancement priorities.

Keywords: economic security, region, differentiation of regions.

The economic science has gone a long way in fulfilling its cognitive function to study the territorial zoning problems. Much work has been done towards accumulation of vast knowledge, generalization of knowledge systems that have encompassed the results of research of many Russian and foreign scientists. Each country has developed its own administrative grid system. However, the debate on the issue has not settled down, and amidst the global economic recession only became more relevant. What number can be considered optimal, what are the zoning principles and conditions? These and other questions have not received a comprehensive and substantiated response yet. Based on the results of empirical analysis, modern researchers note that interregional differentiation in Russia goes up when the economic activity concentration increases [1]. After liquidation of administrative command economic system in Russia the shortcomings in the existing territorial division into regions emerged. Contribution of this factor to slowing down of complex development of the center and regions, efficient use of resources, and economic transformation became real [2]. From the cognitive science perspective an important research goal is determination of the parameters of sustainable growth and security of economic agents in the light of new economic and political risks. "Economic security" notion in today's mainstream research is given as an economic system state characterized by sustainable development and ability to withstand the impact factors (mainly negative towards the development goals). The practical aspect of economic security can be viewed as a country population's assessment of its economic situation under the current economic conditions using a number of vital indexes [3]. These researches show steady decline in the economic security of the US citizens over the past 25 years, and acceleration of this process in the past several years. The global financial crisis has amplified similar trends in just about all countries.

Russia, being a part of the global economic system, has suffered the impact of the global economic crisis in full. Regions adapt to the new conditions, each seeking for its own stabilization opportunity [4; 5]. The majority of Russian regions, especially in the European part of the country, are administrative units without a distinct specialization, sufficient resource base, which does not promote creation of the conditions required for complex development and diversification of the economy. At the same time, in the western part of Russia there are cities and regions (Moscow, Saint Petersburg, Moscow region, etc.) capable of showing high rates of economic growth. Interregional differentiation is an objective property of Russian economy, where values of individual indexes (gross domestic product, average salary, production volume etc.) can differ by a substantial margin. Differences in regional socioeconomic development indexes were always there, even during relatively calm periods of Russian history. This is confirmed by numerous Russian scientists based on the results of analysis of economic and social parameters of regional administrative-territorial units in Russia [2; 6; 7]. There is a clear pattern of significant gaps in indexes values and predominance of regions with low values, which cannot be explained just by natural, territorial and climatic conditions.

Comparative analysis of the main socioeconomic indexes gives a consolidated description of the economic situation and identifies the emerging trends. There is a plenty of the indexes (absolute, relative) (number of economically active population, consumer spendings per capita, capital assets involved in the economy, gross regional product (hereinafter — GRP),

balanced results of companies' operations, amount of investments in fixed assets, amount of shipped own-production goods by different areas of the economy, and others). The Russian Federation subjects' interregional comparison method using GRP allows for development of an empirical basis for studying of the regional development problems.

This index is somewhat limited, as its value cannot be used to gain information on the structure of growth sources, production potential and other factors. Generalization and grouping of regions by GRP per capita level will always be subjective and will not disclose the entire depth of economic processes [8]. One group might include regions with different production specialization, output, demographic and other conditions. However, such estimates are not encumbered by excessive mathematic calculations, can be easily summarized and allow to form indicative alerts for administration on the markers' level. Monitoring of indexes is important for evaluation of security of regions and the country. Determination of the socioeconomic development unevenness limits, which can be followed by an uncontrollable crisis is a special interest from the scientific and practical perspectives carriers. Since 1998 over 75 % of Russian regions were in the zone below 100 % of average Russian level. The 40–80 % area covered over 55 % of all regions.

On the one hand, these indexes reflect apparent problems in the Russian economy, development of market-based economic conditions, on the other — demonstrate segregation of the regions. Fledging period of market type Russian economy (until 2007–2008) is characterized by a growing number of regions with ailing economy, but relatively stable growth. A specific feature of that period was the fact that the number of regions with 40–60 % of average Russian GRP level per capita has increased by 25 % since 1998 and reached 50 %. This can be interpreted as increase in the number of economically weak regions. The number of regions with gross regional product per capita level significantly higher (by factor of 2 and more) than average Russian level has decreased. Number of the regions where GRP per capita level differs from average Russian value insignificantly has not changed (about 20–25 %) [9].

By 2009 the zone with 40 to 80 % of average Russian GDP per capita included about 65 % of the regions with simultaneous decrease in the number of regions with high GRP per capita indexes. Their share has dropped from 55 to 20 %, while the number of "poor" (underdeveloped) regions has increased. In our opinion, this is mainly explained by delayed impact of the global crisis and its penetration into deeper economic layers. Interesting to note that in 2012 we observe the opposite trend — number of the regions with average indexes experienced insignificant decrease, while share of the regions exceeding average Russian GRP increased from 20 to 35 % while the number of underdeveloped regions decreased. Analysis of such phenomenon is a separate scientific task that requires detailed review of the regions' economic structure, demographic issues, multifactor situation analysis.

High GRP per capita level exceeding Russia's average value is registered in the Central Federal district (Moscow, Moscow region), North-Western (Saint Petersburg, Leningrad region), Ural, Far Eastern Federal districts. Raw materials oriented regions with high industrial export-oriented potential (Tyumen region, Tatarstan, Komi Republic) also demonstrate high value of this index. Economically weak regions of the Southern Federal circuit (Republics of Kalmykia, Adygea), North-Caucasian Federal circuit (Stavropol Territory, Ingushetia, Kabardino-Balkar Republic etc.) fall behind the average Russian GDP per capita level (22–44 %). Index methods widely applied in evaluation of dynamics of different processes are also used in economic security monitoring [10].

The growing number of studies dedicated to the economic security and development unevenness problems confirm the acknowledgement of objectivity of interrelation of these economic processes and need for pooling of efforts of scientists from all countries. Complex studies of the security problems are conducted in USA, where one of the aspects is analysis of regions' (states') differentiation by ESI (Economic Security Index). This index is used by the researches as one of the economic situation indexes that show its irregularity from the security perspective. Scientists name key demographic and economic properties of states, such as population differentiation by the income level, education, unemployment percentage and others, as the main reasons of unevenness [11]. Unevenness of the regions' development in its own is not an exclusive economic trait that requires maximum smoothing, but under the systematic global economic crisis conditions this trait is related to instability of development, which in turn defines the limits beyond which destruction of the economic structure becomes possible. This relation is stable and objective, substantiating the need for its scientific study as a property of modern economic systems. Therefore the search for a possibility to manage development and unevenness parameters turns into a practical research objective.

References:

1. Kolomak E. Uneven Spatial Development in Russia: Explanations of New Economic Geography.//Voprosy Economiki. – 2013. – no. 2. – P. 132–150.
2. Kistanov V. V. Association of Regions of Russia (Benefits for Management and Entrepreneurship. The Reform of Territorial Structure. – Moscow: Ltd Economics Publ., 2007. – 151 p.
3. Hacker Jacob S. , Huber Gregory A. , Rehm Philipp, Schlesinger Mark, Valletta Rob. Economic Security at Risk: Finding From The Economic Security Index. The Rockefeller Foundation. – July 2010.
4. Kopein V. V. Economic security and energy: finding the best value.//Journal of Russian Entrepreneurship. – 2015. – no. 2 (272). – P. 309–320.

5. Kopein V. V., Filimonova E. A. Economy and politics: what comes first for the economic security of the State?//European science review, ISSN 2310–5577. «East West» Association for Advanced Studies and Higher Education GmbH. – Vienna. 5–6 (May-June), 2014. – P. 200–203.
6. Kopein V. V., Filimonova E. A. Structural Transformation of the Economy of the Region and its Financial Security (for example, Kemerovo Region). – Novosibirsk: Siberian Branch RAS Publ., 2008. – 384 p.
7. Economic safety of Russia: General course. Tutorial. Ed. V. K. Senchagov. – Moscow: Delo Publ., 2005. – 896 p.
8. Filimonova E. A. The problems of economic security methodology in the conditions of economic crisis.//Journal of Russian Entrepreneurship. – 2015. – vol. 16, no. 13. – P. 1949–1964. doi: 10.18334/rp.16.13.495.
9. Kopein V. V., Filimonova E. A., Kopein A. V. Regional factor in economic security.//Journal of Russian Entrepreneurship. – 2014. – no. 14 (260). – P. 13–25. doi: http://dx.doi.org/10.18334/rp.15.14.983.
10. Kopein V. V. Modern problems of monitoring food security.//Food Processing: Techniques and Technology. – 2014 – no. 4. – P. 158–163.
11. Hacker Jacob S., Huber Gregory A., Nichols Austin, Rehm Philipp, Craig Stuart. Economic Insecurity Across the American States: new state estimates from the economic security index. Economic Security Index, The Rockefeller Foundation. – June, 2012.//[Electronic resource]. – Available from: http://economicsecurityindex.org (Dates Views 10.07.2014).

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Mathematical model and algorithms for reasonable power saving management systems

Abstract: The paper deals with models and algorithms for the management information systems of power consumption modes.It shows the problem of the most effective interventions choice aimed at reducing energy consumption given limited funds. It is proposed to use the voltage drop in the power-supply system of industrial enterprise as one of the possible ways of energy saving.

Keywords: management, model, algorithm, power consumption, information systems.

Introduction

The importance of technical, organizational and management energy saving measures, which define and control a highly complex set of administrative decisions in the power system of industrial enterprise is determined by the necessity to consider the complex of production, economical and administrative requirements. On the one hand, there is an increase in energy intensity in industry (46 %), metallurgy, machinery, tools and molds, other production — expansion of the products nomenclature, the dynamic change of the daily and annual load in the industrial enterprise work. On the other hand, there isa large deterioration of the industrial enterprise power system equipment that leads to significant losses of electricity, which is unacceptable for industrial enterprise in modern conditions (up to 13.5 % of total energy resources production) [1].

A perspective approach of the enterprise internal capabilities activation is to increase the efficiency of the management

system atthe industrial enterprise power system. The overall objective of the industrial enterprise power system management includes the task of electricity consumption reduction, which can be achieved by choosing the optimal level of voltage reduction at the industrial enterprise power system. However, the voltage reduction is accompanied by the manifestation of various negative consequences. First of all, it is the performance drop of technological equipment with a subsequent decrease in enterprise profit, which may lead to negative economic and social effects [2].

The industrial enterprise management is basically distributed [3]. This means that a single task is divided into multiple sub-tasks with their own local objective functions (the subtask of value and resources volume management, the subtask of specific investment per unit of output determining, the subtask of energy consumption optimization, the consolidated task of coordination, etc.). The basis for the breakdown into subtasks is a formalized multilevel description of the industrial enterprise structure in the form of conceptual, informational or structural-functional representation. This integration of the industrial enterprise power system information representation in the overall structure of the industrial enterprise will allow the location and the impact intensity of the voltage level change for typical nodes to be determined [10].

Results and Discussion

First of all, the solution to this problem is complicated by the following factors:

1. A large number of levels and voltage control points in a multilevel industrial enterprises electricity supply system structure with irregular bonds [4].
2. The output volume and electricity consumption amount changing over time.
3. The voltage change during the year due to the non-uniformity of energy consumption in different time periods [5].
4. Temporary change of cost price, products price and resources of the industrial enterprise in the market economy conditions [6].

The automated dispatch control systems are designed to generate the managerial decisions in power systems during their exploitation. However, the specificity of the industrial enterprise, which consists in the electricity consumption for output production, is practically not taken into account in this class of automated information management system, as the energy system is responsible for the production, transmission and distribution of electricity. The main task of the automated information management system for industrial enterprise is to ensure the output production cycle and the optimization issues of electricity at the industrial enterprise [7, 11].

The automated dispatch control systems («Parus», «ElectriCS 3D», «ElectriCS ADT», «Elsna»), applied in the industrial enterprise power systems, show that they are aimed at the design and exploitation of electrical equipment and electrical networks [8]. Their models and algorithms don't take into account the negative effect associated with the productivity reduction of technological equipment at lower voltage level, which in turn preventsthe control of the energy saving measures and calculate the required operating mode with reasonable energy saving effect.

Developing the mathematical model the following technical, economic principles and assumptions adopted in practice were taken into account:

- positive, negative effects of voltage reduction are compared in the same (monetary) units;
- the total final effect is defined as the maximum difference between the positive and negative effects when the voltage level changes within certain limits;
- the final effect in one regulation embodiment doesn't depend on the other options.

Comparing with existing mathematical models, our mathematical model allows to calculate the following values (part of the developed mathematical model is shown below):

- the section, workshop or enterprise productivity reduction expressed in units of the products;
- enterprise cost savings defined as the payment for electricity consumed decrease;
- losses due to the output volume reduction in monetary terms.

$$\Delta P = f_1(U_*) = \begin{cases} \Delta P_n = \dfrac{6U_f^2}{R}\cdot(1-U_*) - \text{for resistance furnaces,} \\ P = \alpha\left(r_1 + r_n / s\right) + k_x^2 P_{\mu nom}, \\ \Delta P = \left(1 - P_{*АД}\right) P_{ном} - \text{for asynchronous motors;} \end{cases} \quad (1)$$

$$\Delta P = f_2(U_*) = \begin{cases} P_* = 1.6U_* - 0.6 - \text{for incandescent lamps,} \\ P_* = 2.2124U_* - 1.1871 - \text{for high pressure mercury lamps,} \\ P_* = 2.4978U_* - 1.4939 - \text{ for low-pressure mercury lamps,} \\ \Delta P = (1 - P_*) P_{nom}; \end{cases} \quad (2)$$

where U_f — the electric network phase voltage; R– the heating element resistance; $P_* = P/P_{nom}$, $Q_* = Q/Q_{nom}$ — active, reactive powers; $P_{\mu\ nom}$, $Q_{\mu\ nom}$ — the nominal active and reactive power values of asynchronous motor during the transition to magnetizing circuit; s — the current value of the motor slip; r_1 — the stator winding resistance of the asynchronous motor; r_n — the intermediate value equal to $A_1 r_2'$; $k_x = 0_0 + 0_1 k_U + a_2 k_U^2$; $U_* = k_U = U/U_{nom}$ — the voltage in relative units.

The static characteristics used in the electricity consumption reduction assessment have the following relationship for almost all electrical receivers: with a decrease in the voltage level the power consumption of both active and reactive power reduces [12]. In general, the decrease in consumption of active ΔP and reactive power ΔQ of electrical receivers under consideration was calculated based on the use of the static characteristics and was expressed in general by the equations $\Delta P = \varphi_1(\Delta U)$, $\Delta Q = \varphi_2(\Delta U)$, where φ_1, φ_2 — polynomials of first, second and higher orders.

To calculate the resulting positive component of the objective function at lower voltage levels in the industrial enterprises electricity supply system the E function is applied:

$$E = \Delta P tc + I_1. \quad (3)$$

The reduction of the voltage nominal value also creates the negative effect: the light levels drop and the associated decrease in productivity, the technological installations power reduction, etc. The function Z is introduced to calculate the resulting negative component of the objective function at lower voltage levels at the industrial enterprises electricity supply system:

$$Z = \Delta QR \cdot k + I_2. \quad (4)$$

The found values E and Z are used to find the objective function F:

$$F = E - Z \quad (5)$$

The maximum positive effect is defined as the maximum of the objective function $F(\Delta U)$ in the interval of voltage deviations from the nominal value $[-\Delta U; U_{nom}]$.

Productivity change is defined by the following expression:

$$\mu = \frac{QR'}{QR} = \frac{1}{1 - k' + k'/q}, \quad (6)$$

where QR — the machine productivity at U_{nom}; QR' — the machine productivity at $U \neq U_{nom}$, $q = n'/n$; n — the rotation frequency of the main drive at U_{nom}; n' — the rotation frequency of the main drive at $U \neq U_{nom}$.

The decrease in products ΔK produced by the enterprise, expressed in monetary terms, will have the following meanings:

$$\Delta K = \sum_{i=1}^{m} k_{0i} N_i \left(\sum_{i=1}^{S} q r_i k_{Fi} \left(1 - \sum_{i=1}^{S} \frac{1}{1 - k_i' + \frac{k_i' + U_*^2 (1 - k_i s_{ni})}{U_*^2 - k_i s_{ni}}}\right)\right), \quad (7)$$

where k_{0i} — the i — type unit cost; k_i — the load factor of the i-th engine; s_{ni} — nominal slip of the i-th engine; N_i — the number of i-type products, manufactured over the time period T at the nominal work conditions; m — the number of products types produced in the guilt; N_i' — the number of i-type products, manufactured for the same period of time T at the reduced voltage value in the workshop electrical network.

Based on this mathematical model, algorithms have been developed to determine the application points of managerial influence in the industrial enterprises electricity supply system (Fig. 1), the stability regions definition of making the optimal decision (Fig. 2).

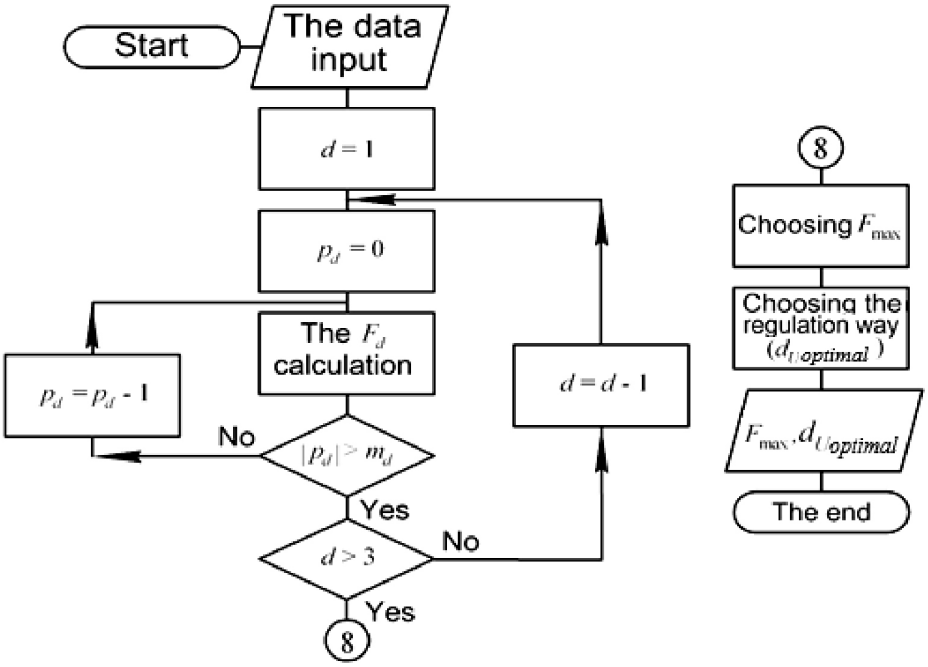

Fig. 1. Algorithm for the application points determining of the managerial influence at the industrial enterprises electricity supply system where d — number of ways to regulate; p_d — the current voltage level regulation step; m_d — the number of voltage level regulation steps

The algorithm (Fig. 1) in contrast to known allows defining the nodes in the hierarchical structure of the industrial enterprises electricity supply system, which should be applied to the impactsofthe voltage level management.The novelty of this algorithm is determined by the original procedure of calculating the F_d values which depends on the location and voltage regulation step.When the enterprise works there is a change of parameters, which were on the basis of objective function calculating, which leads to the necessity to find outthe change interval parameters of the

objective function, in which the found value ΔU remains the optimal.

For this, the following search methods of finding the stability of the solution may be used: the solutions sensitivity analysis, the method of parametric programming and the phase plane method [9]. The first two methods require the expression of the objective function as an analytic function of its parameters; the objective function is given by means of calculation, resulting for the stability regions finding the method of phase plane was applied.

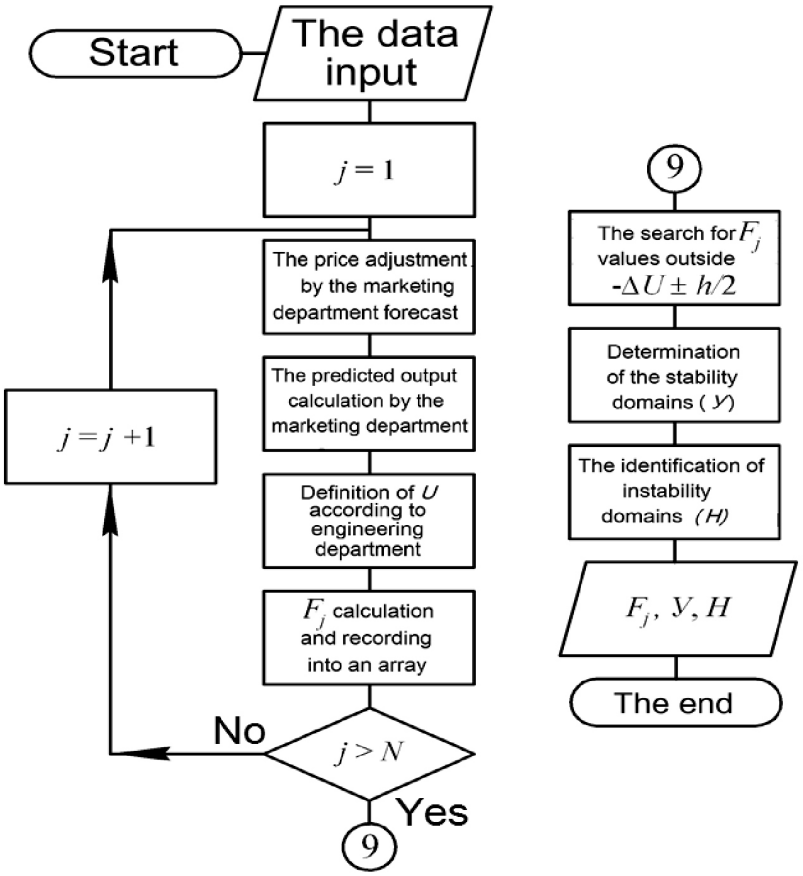

Fig. 2. Algorithm for optimal decision stability regions determining, where j — months number; N — the number of months; h — the discrete step of regulation ΔU; F_j — the objective months function value j

Algorithm (Fig. 2) in contrast to the known allows to determine the stability regions of a decision based on the phase plane when the initial data changes.

Conclusion

The decision remains stable if the representative points don't extend beyond a half of the voltage level regulation interval h as the voltage level regulation is in steps.

The objective function values were calculated on the basis of voltagevalues determining both in the industrial enterprises electricity supply system circuit nodes, and consumers alike after the regulation (decrease) of voltage and power consumed by the electrical receivers on this or that level, that is calculation of the industrial enterprises electricity supply system working modes.

The objective function values (5) were calculated for one of the Kursk city plant having a typical industrial enterprises electricity supply systemstructure for most industrial enterprises inRussia, per month and per year for the whole enterprise (Fig. 3) depending on the voltage reduction magnitude.In calculations of the enterprise the voltage level regulation on workshop substations and supply transformers substation were regarded.

In Fig. 3, the curve 1 shows the dependence of the objective function F from the voltage reduction regulating only on the supply transformer substation, the curve 2 — for joint regulation at both supply transformer substation and workshop substations, and the curve 3 — the regulation on the guild transformer substations. The second voltage level regulation way has been selected as the maximum value of the objective function has been received.

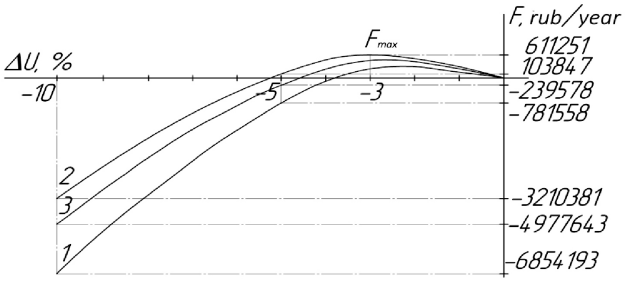

Fig. 3. The F changes graphs depending on the place of voltage regulation for the enterprise as a whole

References:

1. Voropay N. I., Ivanova E. J., Trufanova V. I., Sheveleva G. I. The problems of electric power industry development, methods and mechanisms of their resolving in market conditions. – Moscow, 2007.
2. Horoshilov N. V. Model and algorithms for the modes management information system of the industrial enterprises electricity consumption. In: the dissertation for the degree of technical sciences candidate. – Kursk: KurskSTU, 2007.
3. Melentyev L. A. The uncertainty factor in making of optimal solutions in large energysystems. – Irkutsk, 1974.
4. Horoshilov N. V. The problems of the management information system development by the industrial enterprise energy consumption.//Telecommunications. – 2007: 46–47.
5. Horoshilov N. V., Biryulin V. I., Larin O. M. The use of cyclic decision tree. – Kursk, 2006.
6. Volobrinsky S. D., Kayal G. M., Klein P. N. The electrical loads of industrial enterprises. – Leningrad, 1971.
7. Golovkin B. N., Pirogov V. N., Startsev A. P. The electricity consumption forecast of industrial enterprise in an unstable economy.//Industrial Energy. – 1996.
8. Abdikeyev N. M. The Intelligent Systems designing in the economy. – Moscow, 2004.
9. Biryulin V. I., Larin O. M., Horoshilov N. V., Gorlov A. N. Analysis of some issues that arises when expert energy management systems for industrial plants are being created. – Kursk, 2011.
10. Smirechov G. N., Sorokin A. A., Telnov Y. F. Economic information systems designing.//Finance and Statistics. – 2001.
11. Biryulin V. I., Larin O. M., Horoshilov N. V., Gorlov A. N. The prospects for energysaving in lighting systems.//Energy security and energy efficiency. – (33): 11–13.
12. Ignatieff A. V., Maksimtsev M. The investigation of control systems. – Moscow, 2001.

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Ecologizing parameters of the world economy

Abstract: The article investigated the essence and parameters of the world economy ecologization. Its impact on the development of international economic relations is determined.

Keywords: ecologization, ecologizing parameters, ecology, environmental component of the global community, environmental management, international ecologically-oriented institutes.

The functioning of the world economic space goes under the influence of varied factors which have both positive and negative meanings for its development. First of all, it presupposes that intensification of integration processes, globalization, transnationalization, expanding of the structure and dynamics of international economic relations by promoting the development of interstate cooperation simultaneously enhance the environmental burden on the environment. Environmental concerns are one of the key contradictions of the modern world. The increase of pressure on the environment leads to aggravation of environmental situation globally, causes the loss of natural reproductive capacity and ultimately leads to the ecological crisis that is irreversible changes in ecological system and disorder in natural balance.

The concept of ecology has very ancient roots. Even a primitive man without a scientific understanding of ecological processes in the practice that was directly tied to natural processes, understood the need to protect the most valuable objects for being living. In the period when the below mentioned public forms of development were existing, individual elements of ecological knowledge were being improved in the framework of other sciences. The period from the mid-19th to mid-20th century was characterized by intensive development and research of bioecology and global geographic processes. It was during this period in 1866–1868 that German scientist Haeckel launched the term "ecology". He was the first who singled out the part of biology which investigated the interaction of living organisms with the ecological environment.

Equally important for the development of ecology was also the doctrine about the noosphere, the study of which was started by famous Ukrainian scientist V. I. Vernadskyi. He first defined the person with economic activity as a geological force of planetary size and showed that human impact on the environment is not less strong than the global natural processes. This stage also acquired environmental perspective, as it actualized the need to solve specific regional and local problems of pollution, deforestation, destruction of agricultural fields, etc.

Further development and awareness of the environmental component of the global community functioning has been continuing so far. The defining features of its functioning include the development of an idea about the global natural and anthropogenic processes and the inability to solve

environmental problems by individual countries; the search of efficient resources utilization methods and the reduce of pollution levels and other negative impacts by implementing economic methods of environmental management; the forming of regional and global monitoring systems for the environment; the establishing of international ecologically-oriented institutes, the holding of international scientific conferences, the making of global human development strategies, taking into account environmental aspects [6, 543].

At the same time there is a growing need to identify the parameters of ecologising the economic activity in the global economic space. There are different approaches in scientific literature to define the essence of this term. Thus, according to L. G. Mel'nyk, ecologisation is a purposeful process of transformating the economy, aimed at reducing the impact of integral production processes and consumption at rate of gross national product per unit [2, 234–235]. According to L. E. Kupinets, ecologisation is a result of the environmental policies being implemented whose goals, objectives and rate depend on the social environment and on the economic and ecological state of the environment [1, 127]. Several researchers closely connect ecologisation with the need to introduce new technology, new forms of production, with the improvement of technological processes, which should ensure the principle of ecological balance non-violation. Taking into account an economic component of this process it is important to distinguish the following mechanisms of ecologisation. First, a liberal one, aimed mainly at overcoming the negative environmental consequences of social production, but not the causes of environmental strains. Second, a stimulating mechanism, whose main task is to promote increased production through the development and introduction of new technologies. Third, a rigid mechanism, based on the use of administrative and market instruments, leading to establish a sustainable, energy-efficient use of natural resources.

Ecologisation of the world economy impartially requires to combine efforts of international community and to develop a common program of actions in this direction. In this regard it should be noted, firstly, about the adoption of the resolution "Economic development and environmental protection" in 1962 at the UN General Assembly and about an international conference held in 1972 in Stockholm under the auspices of the UNO, that was dedicated to human impact on the environment. The result was the conclusion to find new common solutions for global environmental problems and environmental management and the establishment of common international environmental standards.

Secondly, in 1987 the UN General Assembly approved the document "Our Common Future", which provided backgrounds for the concept of sustainable development and the directions of economic growth taking into account ecological restrictions. Third, there was the UN Conference on Environment and Development in Rio de Janeiro in 1992, which approved the principles of international cooperation in the program "XXI century Agenda". They provide that sustainable development can be the only direction leading out of the ecological crisis.

Also, a significant importance refers to an adoption of the Yohannesburg Declaration on Sustainable Development at the World Summit in 2002 [3] and to the international UN Conference on Sustainable Development Rio + 20 in 2012 [4]. The most important documents to take into account as for parameters ecologising the world economy should also include the Montreal Protocol in 1987, suggesting a decrease in the world production of CFCs and the Kyoto Protocol of 1997, aimed at reducing carbon emissions and at setting obligatory quantitative indicators regarding emissions of such gases by the developed countries with the determination of individual quotas for the reducing emissions. It is crucial to ecologisation because in 2050, as predicted by UNEP, it is expected all countries of the world to increase their production by 4 times as a whole, while to increase the emission of carbon dioxide by 2.5 times.

Impact of the ecologisation on the world economy is varied with an existence of different controversial directions concerning the contradictions between economic policy and the sustainable development. It should be noted that countries where there is no stringent environmental standards, have advantages in the global market and influence on states with stringent environmental obligations, demanding the mitigation within the development of international trade. But within the competition between the industrialized countries and the developing ones it is difficult to maintain higher social and environmental standards which are lower in the developing countries. In addition, free trade leads to greater geographical separation of production benefits from environmental production costs associated with the increasing influx of resources.

Among the parameters of ecologising the world economy the following positive should be distinguished. First, economic growth due to expansion of export-import relations in the world market promotes the release of additional financial resources to protect the environment and contributes to increased income and environmental awareness of population. Second, the development of international economic relations and trade in particular, promotes environmentally friendly products and resource-saving technologies, which are important for all parties participating in this process. Third, under the conditions when environmental expenditures are included into the prices of commodities, international trade with them spurs the concept of sustainable development [5, 342–343]. These contradictions require an implementation of the approach in which all countries would have tried this type of development that would unite the interests of industry with the interests of protecting and improving the ecological value of the resource base and ensure a high standard of living. First of all, this approach requires the rational nature management, which means implementation of legislation, control over the compliance with environmental safety, ensuring effective and comprehensive measures for environmental protection, natural resource management; achieving the coherence between countries of the world in the field of environment, their use of the sustainable development concept.

In general, the concept of sustainable development should be seen as a strategy for solving the problems of protection and restoration of the environment and ensuring a high standard of living around the world. At the same time it is impossible to achieve the necessary ecologisation level for the proper functioning of society without the development of common areas of environmental policy in economic relations. Worsening of the global environment problem about protecting from negative impacts caused by the development of economic relations in particular, leads to the need to develop measures aimed not only at protecting the environment of a particular country, but also to protect environmental assets used by mankind, such as ozone layer and climate system. To achieve its goals in this field the developed countries and the developing states use the system of ecological trade measures, success of which largely depends on the amount of funds that can be allocated for this purpose. In highly developed countries a share of environmental expenditures in the GDP typically ranges from 1 to 1.5 %. Totally the annual turnover in the market of environmental technologies is now almost $1 trillion dollars and continues to grow. There has been increasing the number of companies which produce purification facilities, environmental equipment, alternative energy, and provide the monitoring and environmental assessment. Thus, the global demand continues to evolve towards the ecologisation which, in our opinion, is impartial and logical process.

In this regard it should be noted that achievement of these goals to ensure environmental parameters of the world economy development requires the implementation of the following measures: the international harmonization of national environmental standards and ecological norms; joint development and implementation of interstate programs and projects in the field of natural resources management; application of the general incentive ecological principles, and international sanctions for violation of environmental laws.

References:

1. Купинец Л. Е. Экологизация продовольственного комплекса: теория, методология, механизмы: [монография]/Л. Е. Купинец. – Одесса: ИПРЭЭИ НАН Украины, 2010. – 712 с.
2. Мельник Л. Г. Екологічна економіка: підручник. [3-тє вид., випр. і допов.]/Л. Г. Мельник – Суми: ВТД "Університетська книга", 2006. – 367 с.
3. План выполнения решений Всемирной встречи на высшем уровне по устойчивому развитию.//[Електронный ресурс]. – Режим доступу: http://www.un.org/ru/events/pastevents/pdf/plan_wssd.pdf.
4. Рио+20. Конференция Организации Объединенных Наций по устойчивому развитию. Рио-де-Жанейро, Бразилия, 20–22 июня 2012 г.//[Электронный ресурс]. – Режим доступа: www.un.org/ru/sustainablefuture/brochure.pdf.
5. Daly H. Ecological economics: Principles and applications/H. Daly, J. Farley. – N. Y., 2010. – 544 p.
6. Ehrlich P. Ecoscience: Population. Resourses. Environment./Paul R. Ehrlich, Anne H. Ehrlich, John P. Holdren. – San Francisco: W. H. Freeman and company, 1977. – 1052 p.

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Features of strategy formation of bank's customer relationship management

Abstract: The article is concerned with the algorithm of marketing strategy choice for the bank. The author tested methods of strategy choosing, that is based on the evaluation of dynamic possibilities of the bank as compared with the market. The advantages and disadvantages of this approach are analyzed.

Keywords: bank, strategy, customer relationship marketing.

An active development of relationship marketing and its directions has become one of the most significant trends in recent years [1; 2; 4]. The primary objective of the new approach is becoming the establishment long-term relationships with customers. This in its turn requires adaptation of the banks' marketing system to the new requirements of the market and consumers. There is a definition requirement of the principle of marketing strategy choice of that takes into account the possibility of the bank and the challenges that it has set itself.

In modern literature and researches, a considerable attention is paid to separate tools for attracting customers and retaining them. At the same time, in our opinion, not enough attention is paid to the selection the algorithm of marketing complex. So, Smirnov V. P., Ganzha K. A. [6] in their works considered the factors that should be viewed while the strategy formation, nonetheless the issue does not disclose how exactly should be considered these factors while a marketing strategy choosing. In the work of Monireh S. [5] the difference

between the marketing strategies of different types of banks is confirmed and identified.

Is therefore an object of our work is to determine the algorithm of marketing strategy choice for commercial banks.

With increasing competition and market saturation the number of new customers, which the company can attract, is significantly reduced. Therefore, the major source of generating income is becoming the sale of goods and the current customers services, in other words, to retain them. Thus, the concept of marketing relationships assumes the use of strategy that is aimed to loyal customers' formation. The specialists of this field point out that between the definitions the customer retention and their loyalty, there is a significant difference [3]. It is possible to retain the customers through the discounts programs and regular actions. The formation of real customer's loyalty requires a significant investment in service organization.

If the functional strategies are the elements of the overall marketing strategy, of its direction, then the business strategies cover a variety of options for interaction with the market. Therefore it is logical that the question arises, what kind of strategy the bank should implement for getting a steady state on the market and to have the opportunity to engineer the conditions for its growth. Such scholars as Karmeli A., Zott K., Chupandina E. E., Smith S. V., Popova I. M., Shaehov Y. were involved in solving the given task. At the heart of the developed approach by them, there is the comparative characteristic of organization's dynamic capabilities as compared to the development of the market (Figure1).

According to the algorithm, that is reflected in Fig. 1, we'll try this technique to select in the example of the bank's strategy of «Ukreximbank».

In order to assess the market dynamics we use the index of relative concentration of capital. It determines the percentage of banks, which account for 80 % of the assets of the market (Table. 1).

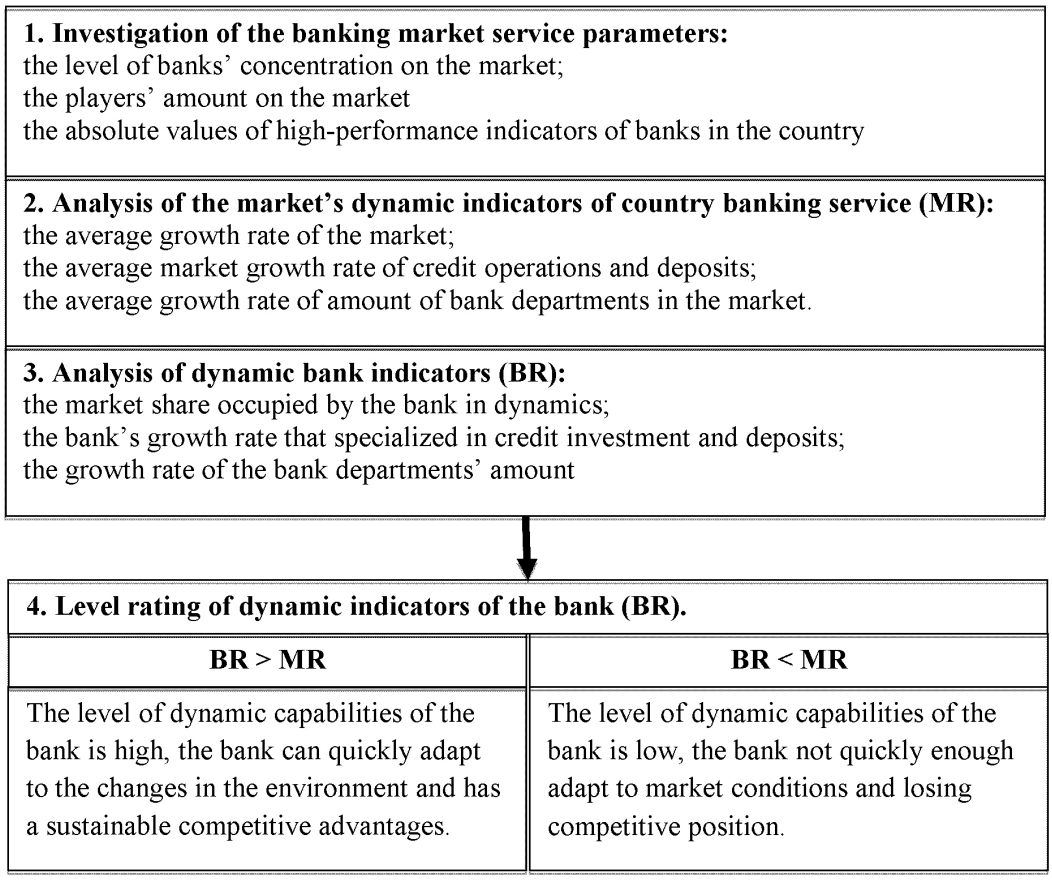

Fig. 1. Analysis's algorithm of dynamic capabilities of bank

Table 1. – Level analysis of market concentration of bank service in Ukraine for the period 2008–2015 (as of 01.01)

№	Indicators	2008	2009	2010	2011	2012	2013	2014	2015
1	Bank amount	175	184	182	176	176	176	180	163
2	Earning assets, bln. UAH	599.4	926.1	880.3	942.1	1 054.3	1 127.2	1 278.1	1 316.9
3	Banks amount, which own 80 % of assets	32	36	29	31	33	34	32	23
4	Coefficient of relative concentration, %	18.3	19.6	15.9	17.6	18.8	19.3	17.8	14.1

In Table 1, the decline of the relative concentration is well-marked in the post-crisis period (2009–2010 and 2014–2015). The interesting feature of the Ukrainian banking market is increasing of bank amount in period of 2008–2010 which is not typical for the world market. Low-quality interbank management and banking supervision by NBU, the artificial distortion of data reporting has led to an increase in amount of unstable banks in the period 2014–2015. Despite this, the asset size of the banking system at the beginning of 2015 rose to 1 316.9 billion. UAH, for this purpose it should be noted also the presence of high inflation. It can be argued that there is a significant reallocation of funds from small banks to large, so 80 % of banking system assets was distributed among 23 of the 163 institutions. Thus, as of end the period under consideration the banking system of Ukraine is characterized by a decrease in the number of players, increasing the level of concentration and therefore a decrease in competition.

The most well known indicator is Herfindahl-Hirschman's Index, assesses the concentration level and monopolization of the market. Thus, the capital concentration is not a competition equivalent, the existence of barriers to entry and exit in the market leads to a high concentration of capital in a few institutions, and vice versa. This indicator is a key in the Antitrust Law in USA, which aims to prevent the monopolization of the market [7]. Therefore, we consider it appropriate to analyze the concentration state of banking capital on this indicator in the dynamics, in Ukraine.

Coefficient of Herfindahl-Hirschman shows what place and share is occupied by the institutions, whose share is negligible.

$$HHI = \sum_{i=1}^{n} S_i^2 . \quad (1)$$

Figure 2 shows the dynamics of the Herfindahl-Hirschman index for assets and in the context of the customers' type (individuals and legal entities) and the product (deposits and credits).

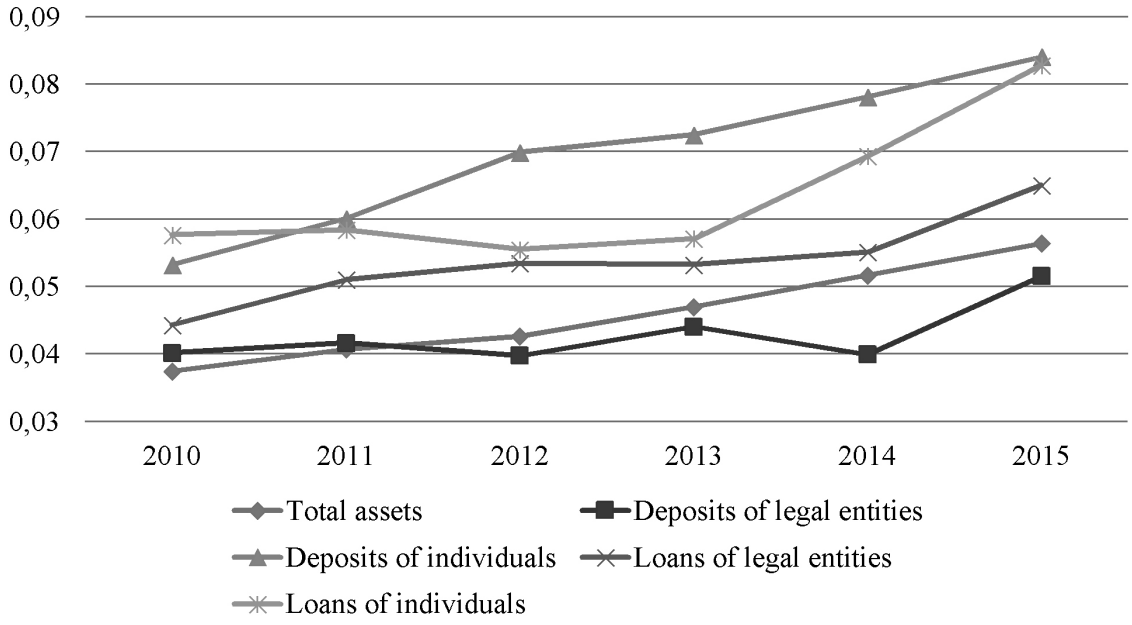

Fig. 2. Dynamics of Herfindahl-Hirschman's indices for the period 2010–2015 (bln. UAH)

Figure 2 indicates the stable growth of the capital concentration in the banking market. The highest concentration is observed for the funds of individuals. However the market of banking services in Ukraine still refers to the low concentration, which once again confirms the conclusions of the high level of competition in this market.

Level evaluation of the dynamic capabilities of bank's involves comparison of indicators in dynamics of the bank's market data.

Table 2 presents the analysis of growth indicators of the market and the bank «Ukreximbank» for the period 2009–2015.

Table 2. – Level evaluation of market concentration of banking service in Ukraine for period 2010–2015

№	Indicators	2010	2011	2012	2013	2014	2015	Tp
1	Assets of market, bln. UAH	880.3	942.1	1 054.3	1 127.2	1 278.1	1 316.9	1.084
2	Loans of market, bln. UAH	723.1	746.4	808.2	694.4	799.2	873.6	1.039
3	Deposits of market, bln. UAH	472.8	598.1	712.2	791.0	922.7	989.4	1.159
4	Amount of bank stores	16339	15898	16220	15808	15436	13359	0.961
5	Assets of «Ukreximbank», bln. UAH	57.2	73.2	75.1	87.9	94.3	126.0	1.171
6	Loans of «Ukreximbank», bln. UAH	48.3	52.1	52.7	40.4	42.3	52.1	1.015
7	Deposits of «Ukreximbank», bln. UAH	26.7	38.4	42.5	67.0	61.0	90.9	1.278
8	Bank stores of «Ukreximbank»	122	122	126	125	123	120	0.997

Data of Table. 2 indicate that for the five-year the period an average annual growth rate of assets, deposits and credit investments exceeded 100 %. This should take into account that indicators could rise due to the increase exchange rates and inflation. Average annual growth in assets and deposits of «Ukreximbank» higher than those of the market, which indicates the presence of competitive advantages and the right strategy. But credit investments grow with the lower rate as compared to the market, which may be due to a moderate policy of the bank crediting individuals and legal entities, or the presence of more profitable credit products in the market.

In Figure 3 it is reflected the asset's dynamics of the market and the bank «Ukreximbank» for the period 2011–2015.

As is seen in Figure 3, the dynamics of growth of assets «Ukreximbank» opposite dynamics of the market. During the period 2014–2015, the growth rate of its assets was significantly 133.6 %, while the market grew by only 3 %. Table. 3 shows a summary of the results of the analysis of the level of dynamic capabilities «Ukreximbank».

Tables 2 and 3 show that the bank «Ukreximbank» has the strengths that allows it maintain a steady growth of indicators.

Fig. 4 is a graphical representation of dynamic capabilities of the bank compared to the market and recommended strategy.

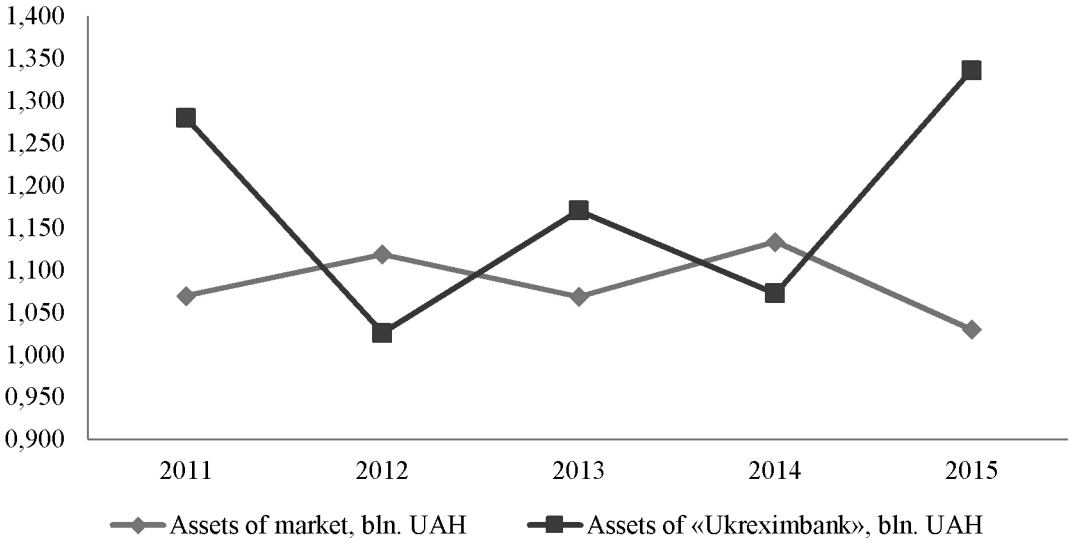

Fig. 3. The growth rate dynamics of the banking market's assets and the bank «Ukreximbank» for the period 2011–2015

Table 3. – Level analysis of dynamic capabilities of «Ukreximbank»

Indicators	Dynamic of market (BR > MR)	Dynamic of bank (BR)	Dynamic capabilities
Assets	1.084	1.171	MR < BR
Loans	1.039	1.015	MR > BR
Deposits	1.159	1.278	MR < BR
Bank stores	0.961	0.997	MR < BR

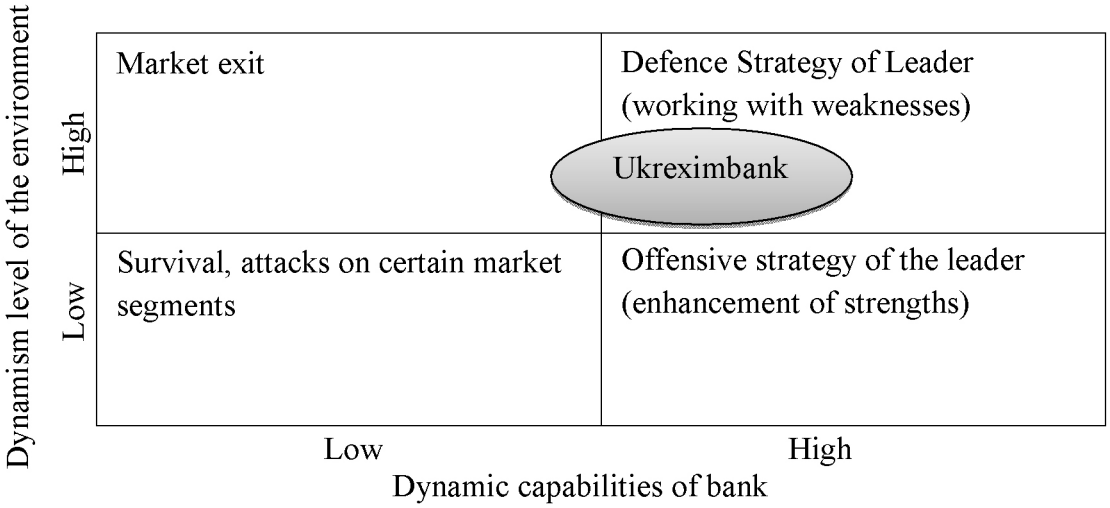

Fig. 4. Choice of strategy based on the estimates of the parameters of complexity and dynamism of the environment and the dynamic capabilities of banks

As is reflected in Figure 4, the bank is recommended to take a defensive strategy — to work with its weaknesses. The banks that have already taken a strong position in their markets, can stick basically defensive strategies that enable them to retain positions gained. The volume and type of action needed for retaining situation will vary depending on degree of tension and nature of competition, which the bank will face. If a bank has a dominant position in the market, it may have a superior of cost through economies of scale, or to their experience, which can be used as a basis for protection by selectively reducing the cost of products. Alternatively, is possible to create obstacles to penetration, provide, where possible, protection of its knowledge and retention of key specialists.

Given technique have several advantages: ease of analysis, the availability of source data, the comparative characteristic of the market, evaluation of market position. The disadvantage is the possibility of contact with the bank in zone, where one of two strategies can be chosen, which can have opposing recommendations technique does not account for the internal ability of banks and quality characteristics. From our point of view, such an approach should be used as the basic method and positions' assessment of the market. For selecting a narrower strategy it is necessary to include the internal factors into the technique that evaluate the possibility of the bank development.

References:

1. Gronroos C. From marketing mix to relationship marketing: Towards a paradigm shift in marketing.//Marketing Decisions. – 1994. – Vol. 32 (2). – P. 4–32.
2. Gummesson E. The new marketing – developing long-term interactive relationships.//Long Range Planning. – 1987. – Vol. 20 (4). – P. 10–20.
3. Hooley G.J., Saunders J.A., Piercy N.F. Marketing strategy and competitive positioning. – Harlow: Pearson Education Limited, 2005. – 800 p.
4. Payne A. Advances in Relationship Marketing. – London: Kogan Page, 1995. – 354 p.
5. Monireh S. Differences in marketing strategies of various types of banks.//Journal of Economic Regulation. – 2015. – Vol. 1 (6). – P. 120–128.
6. Smirnov V.P., Ganzha K.A. Strategic planning in a commercial bank. 2014.//[Electronic resource] – Available from: http://ekonomika.snauka.ru/2014/05/5235
7. Ivanchenko O.V., Semernikova Y.A. The concept of relationship marketing in the activities of small businesses.//Concept. – 2015. – Vol. S24. – P. 1–7.

Section 17. Science of law

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The securalism of the Consitution and the President of the Albanian Republic

Abstract: The 88/3 article of the republic of Albania constitution where is mentioned the sentence: "God help me", or left at the willpower of the president of the republic, which represents the state unity, contradicts with the 18 and 10 article of the constitution, and also with the 14th article of European Convention oo Human Rights. The 18th article of our convention and the 14th article of ECHR are articles dhe talk about the discrimination, but in the contrary, the 88th article contradicts those articles, furthermore, affects the state form securalism, with the sentence specified at the constitution "God help me". We are talking about the notion of legal rate in space and on time. This constitutional rate should be removed because it discriminates the atheist, or individuals, groups, who don't trust in GOD. The convention of the Republic of Kosova don't have this definitions of god name. Albania has a homogenous different composition being a state in transition. This provision discriminates directly on indirectly groups or individuals, national of foreign. The removal of this sentence will make the Albanian Constitution safer and better for the future, and also, will protect better the groups of individuals from the discrimination, "If you think or not in god, or like a presentation of the name GOD". The time and space reason, dictates the removal of this constitutional rate or its amendment, whether in Albania we have different religious beliefs like Catholic Faith, Orthodox Faith, Muslim Faith, atheist or heather, and also, when the democratic internal transition is accompanied with the external influences like the religious radicalism (part of global developments of a society, specially required for the state of rights).

Keywords: Securalism, Constitution, Religious belief, Philosophic faith, President, God, Discrimination.

HEAD 1. The 88th, 18th and 10th articles of the Albanian Republic constitution are sustained at the research and the hypothesis research.

The research question: Are the president of Albania and the constitution secular? The main purpose of this study like an essay form, is to highlight and avoid problems that become obstacles for the development of legal relationships, the rights and fundamental freedom of the individual, which has a direct impact on social relationships, for the operation of the STATE OF RIGHTS and the individual welfare that are regulated by those rates, based also in the contradictory theory of different philosopher like Spinosa, Groci, Ruso etc [1; 8; 9; 10].

HEAD 2. The 88th article, point 3, the penultimate and the last paragraph of the Republic of Albania Constitution, after the oath procedures, must ad also: "GOD HELP ME". In the Republic of Albania there is no official religion. Does the point 2 of the 10th article, "The state is neutral on the matters of faith and conscience and guarantees them freedom of expression in public life" contradicts the 18th article for the descrimination and also the 14th article of European Convention Of Human Rights [2, a. 4] and the Convention against Discrimination, article 3? [3, a. 3].

Does the president oath affect directly of constitution securalism?

Does the president oath "god help me" present in reality the nation unity regarding the constitution?

The religion right (mystical divine) is not predicted like a resource of the right regarding our constitution, and the mention of GOD name, furthermore, the president oath like the HEAD OF STATE who presents nation unity, affect the nonneutrality of the constitution and make it non secular of the atheist people who don't trust in god, and also, it conflicts the 18th article where is written about discrimination. **Is there any possibity or reason to feel discriminated an atheist or other identity groups (*always in realtion with space and time reason*)?**

The ethnic data must be a cause of ethnic prejudices, where on these sensitive character datas are included political beliefs, religion, religious belief or other philosophic beliefs [4; 16]which has to be protected by the law number 9887, 10th of March 2008 for personal datas protection [5].

But another question is: Does the word GOD and God Help me (defined on the constitution) make a contitutional problem?

Actually, the 89th article of the Albanian Constitute, says that the President cant hold any other public duty and also

cant be member of a party. By the way, like a contitutional obligation he submit the party card, by resigning from any political phylosophy, for being member of a neutral phylosophy.

But is possible to be the same thing for the name GOD, to be part of this kind of philosophy, for the fact that the president presents the state unity?

I think so! He could resign also from the faith like a religious philosophy (formally), exercised like part of a public institution, like the President is, not like a private relationship, because this right is given at him by the 24th article of the contitution [6, a. 24]. Part of the popullation we can find individuals or individual groups, atheits, heathers, or we can find also other people who name god with other terms like: ALLAH, JEHOVA, or others, who don't trust at GOD. The widest concensus formulation on legal doctrine, defines a national minority like a numerical smaller group, in comparison with the other part of the popullation of a state, in an non dominant, the member of which, even being part of this state, has different ethnical characteristics, religious beliefs, or even different linguistic characteristics from the other part of the society. Maybe, in one way, impliciltly, this presents a kind of feeling solidarity related the cultural safe, the safe of the traditions, religion, or language [7]. In the Republic of KOSOVA nowhere is mentioned the name GOD. In other states, like United States of America, the name GOD exists on the constitution. So there are different treatments, rates, of articles that change by the constitutions of a state. I think, that in a nearly future, this topic is going to be part of a wide debate in USA, related with the identity crisis that is going on global order [8; 538].

HEAD 3 (CONCLUSIONS). The 88th article of the Albanian Republic Constitution, in the point 3 of the penultimate and the last paragraph, must be removed the sentence "God help me" because it contradicts the 10th and 18th articles of the constitution, affecting the securalism of the constitution. Also, is contradicts the European Convention of Human Rights, 14th article. It can me replaced with: "I swear on the Albanian Constitution" etc etc, which sanction better the securalism term, and also, highlight the constitution form and the secural state too.

On the 10th article could be changes too. By the way, it has to be "In the Republic of Albania there is no official religion, because the Albanian Republic is a secural state" [9; 1231. 5]. In support of this, are other constitutions like Kosovo's Constitution article 8, the Turkish Constitution article 2 and the French one, article 1.

References:

1. Omari Luan. Parime dhe institucione tw sw drejtws publike. Elena Gjika. – Tiranw, 1993.
2. European Convention in Human Rights.
3. Framework Convention for the Protection of National Minorities.
4. Constitutional Court Decision nr. 52, date 01.12.2001.
5. Law nr. 9887, date 10.03.2008 for "Protection of personal data".
6. Constitution of the Republic of Albania.
7. Capotorti Francesco. Special Rapporteur of the United Nations Sub-Commission on Prevention of Discrimination and Protection of Minorities.
8. Huntington Samuel. The clash of civilisations and the remaking of world order. – Simon & Schuster, 1998.
9. Albanian Academy of Sciences, the institute of literature and language "Today's Albanian Dictionary", Toena, second edition. – Tiranw, 2002.
10. The Albanian Republic Constitution.
11. The Kosova Constitution.
12. French Constitution.
13. Turkish Constitution.
14. [Electronic resource]. – Available from: htpp://www.kosovaconstitution.com
15. [Electronic resource]. – Available from: htpp://www.wordpress.com

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Adoption in ancient times

Abstract: Since in ancient times, in all human cultures, children transfered from biological parents to parents that want them to create family, for political alliances, for inheritance, for a future marriage, or to care for elderly parents. The practice of adoption was fairly common in different places and periods. Adoption is mention on Bible and Quran. Greeks, Romans, Egyptians and Babylonians had adoption systems.

Keywords: adoption, ancient times, Roman law, ancient Mesopotamia.

Introduction

The adoption of children has been practiced throughout the history of mankind with its legal, social, and ethical implications [1, 1]. Adoption — legally taking an individual born to others as one's own child — dates back to ancient times, though the practice has changed significantly over time and is not common to all cultures [2, 1]. The death of parents from famine, disease, age, and war, all contributed to the possibility that a child would suddenly be left parentless [3; 4]. The connection between adoption and infertility is a modern phenomenon. Nowadays, adoption is closely tied with orphan children.

We will look at who in ancient times would do adoptions and why.

Roman Law

The Roman term was adoptio. Adoptio comprehended *adoptio* and *adrogatio*. Adrogatio was the act of adopting an adult as *son homo sui juris* that was not in the power of his parent; or was himself a *paterfamilias*. Both, adoptio and adrogatio gave the adopted person the same rights and responsibilities as a birth child of their adopter, legally entitled to inherit and to carry on the family name. In the Roman law and culture of the first century A. D., an affluent but childless adult who wanted an heir, would adopt a post-pubescent male, often a slave, to be his son [4, 25]. Children of the ruling class had a different function in society and therefore had a different lifestyle [5]. Children played an important role in the life of the Roman family; they were under the absolute possession and control of the father [6, 6]. The legal authorities to effect adoption were magistrate (magistratus), the praetor, or a governor (praeses) in the provinces.

Adoptions in ancient times were conducted in different ways than we do now, and not always in the interests of children. In Rome, the adoptee was usually an adult male. Adoption was practiced as a means of securing an heir, with a focus on the interests of the adults; the emperor Trajan, for example, adopted Hadrian, who succeeded him as emperor in 117 [7, 2]. Octavius, called Augustus once he became emperor, was the adopted heir of Julius Caesar (posthumously adopted) through the process of adrogatio. He was Caesars's nephew. This adoption gave Octavius the possibility to have all the political support he needed to become the first Emperor of Rome. Like Octavian, there were a lot of other boys adopted almost always for political reasons. A lot of Roman emperors like Tiberius, Caligula, Nero, Antoninus Pius, Marcus Aurelius (161–180), Hadrian (117–138), and Trajan (98–117), were adopted.

Why did so many Roman emperors adopt their successors?

The lack of natural heirs was the main reason why all these emperors were all adopted. Only some of emperors were related by blood with his prodecessor. As Susan Treggiari notes in the *Oxford Classical Dictionary* (4th Edition, 2012):

"Adoption of adult men was a convenient recourse for childless aristocrats and for emperors in need of successors".

Adoption of girls, was less common.

The Romans had a technique at their disposal — the adoption of adult men — that enabled the different ideologies of succession to coexist for hundreds of years [8].

A Roman citizen entered another family and came under their protection. Firstly, only men could adopt because of their *paterfamilias* status. This changed later (2nd century AD), and women were allowed to adopt also. The Roman relation of parent and child arose either from a lawful marriage or from adoption [9, 15–16].

The Codex Justinianus states: *"… when a filiusfamilias is given in adoption by his natural father to a stranger, the power of the natural father is not dissolved; no right passes to the adoptive father, nor is the adopted son in his power, although we allow such son the right of succession to his adoptive father dying intestate. But if a natural father should give his son in adoption, not to a stranger, but to the son's maternal grandfather; or, supposing the natural father has been emancipated, if he gives the son in adoption to the son's paternal grandfather, or to the son's maternal great-grandfather, in this case, as the rights of nature and adoption concur in the same person, the power of the adoptive father, knit by natural ties and strengthened by the legal bond of adoption, is preserved undiminished, so that the adopted son is not only in the family, but in the power of his adoptive father".*

For slaves, adoption was one of few ways to come into the patria potestas.

Ancient Mesopotamia

The number of orphan or abandoned children was high in ancient Mesopotamia. The ancient Mesopotamians wrote laws and set social customs and traditions to protect the rights

and interest of both the adopters and adoptees alike [1, 1]. The most common form of adoption was that of a newborn. Adults could become part of another family by their own will, called *"arrogation"* [10, 131].

The reasons they adopted children were similar with those today. Childless couples adopted orphan or abandoned children to give them protection and family. But, not only childless couples adopted children, also couples with their own sons and daughters could adopt a son or a daughter, who had the same rights as biological children, even the inheritance rights. Slaves could be adopted too.

Contract for Adoption, c. 2000 B. C.

ARAD-ISKHARA, son of Ibni-Shamash, has adopted Ibni-Shamash. On the day when Arad-Iskhara to Ibni-Shamash, his father, shall say, "You are not my father", he shall bind him with a chain and sell him for money. When Ibni-Shamash to Arad-Iskhara, his son, shall say, "You are not my son", he shall depart from house and household goods; but a son shall he remain and inherit with his sons [11].

If in ancient Mesopotamia the family property was based not on land, but rather on a workshop, men without sons would be looking not only for an heir to their property but rather a successor in their workshop [12, 185].

Adoption was realized through a written contract between the adopter and the natural parents or guardian of the adopted child [1, 6]. Sometimes adoption contract consisted in teaching the craft to adoptive child by adoptive father. If the teaching failed the child had to return to his biological family.

Adoption laws were different from place to place, "Laws of Eshnunna", the "Law Code of Hammurabi", and the "Middle Assyrian Law" and Nuzi Contracts. Adoption in general was allowed for women and men too. A woman could adopt a boy or a girl as her heir and she or he would take care of her mother in her old age. She had the right to permit her daughter to marry or to work as a prostitute [10, 132].

A different option is to give a girl *ana kalluti*, by taking a female as a daughter-in-law the adopter promises to marry her to a son or a slave — slaves were also regarded as members of the family [13, 121].

We see differences between motivation to adopt in ancient Rome and in ancient Mesopotamia. Only in more recent times has the process come to focus on the interests of children [14, 59–61].

In recent times adoption has become an international phenomenon that tests both precepts about universal human rights and the interface of different legal customs and systems [15, 1].

References:

1. Dr. Robert Paulissian. Adoption in Ancient Assyria and Babylonia.
2. Pereboom Maarten. The European Union and International Adoption, Salisbury University, Center for Adoption Policy.
3. Baina David King. Adoption in New Testament Times, New Testament Adoption. – Liberty University, 2005.
4. Lincoln Andrew T. Word Biblical Commentary: Ephesians. Ed. Ralph P. Martin. – Word Books: Dallas, 1990. – Vol. 42.
5. Sarah Julien Quodlibet Journal: Volume 5, Number 2–3. – July 2003.
6. [Electronic resource]. – Available from: htpp://www.pbc.org/dp/dorman/romans/rom35.html (11/10/2001).
7. Howard Altstein and Rita J. Simon. Introduction to Altstein and Simon, eds., Intercountry Adoption: A Multinational Perspective. – NewYork: Praeger, 1991.
8. Peppard Michael, Assistant Professor of Theology, Fordham University, December 2012.//[Electronic resource]. – Available from: http://www.bibleinterp.com/articles/pep368014.shtml.
9. Smith William, D. C.L., LL. D.: A Dictionary of Greek and Roman Antiquities. – John Murray, London, 1875.
10. Daily Life in Ancient Mesopotamia, von Karen Rhea Nemet-Nejat Greenwood Press Westport, Connecticut. – London, 1998.
11. [Electronic resource]. – Available from: https://legacy.fordham.edu/halsall/ancient/mesopotamia-contracts.asp dt. (02.10.2015).
12. Huebner Sabiner. The family in Roman Egypt, A comparative approach to intergenerational solidarity and conflict. – Cambridge University Press, 2013.
13. Jeanette c. Fincke. Adoption of Women at Nuzi, Leiden, the Netherlands.
14. Jack Goody. Adoption in Cross-Cultural Perspective. – Comparative Studies in Society and History, January, 1969.
15. Pereboom Maarten. The European Union and International Adoption. – Salisbury University, Center for Adoption Policy.

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