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Section 1. Biology

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Distribution of land snail on the vertical zones and biotope species *Pseudonapaeus* Fergana, Chatkal and Kurama mountain range

Abstract: The landscape-biotopical distribution of land mollusks of *Pseudonapaeus* genus on the Fergana, Chatkal and Kurama mountain ranges. In the article malocofauna and number of mollusks on the biotopes of the Fergana, Chatkal and Kurama mountain ranges is studied, facts of the landscape-biotopical distribution of land mollusks species of the *Pseudonapaeus* genus are given. The article studied malocofauna and density of habitats for terrestrial mollusks in the Fergana, Chatkal, Kurama Range, provides data landscape and biotope distribution of terrestrial mollusks species *Pseudonapaeus*.

Keywords: plants, genus, mollusks, ranges, desert, hill, mountain, pasture, xerophilic-ephemeral, Subalpine zone.

The study of landscape and biotope distribution of species *Pseudonapaeus* undoubtedly important for practice, as most species of this genus are an important link in the transmission of parasitic diseases of agricultural, fishery and animal pests of cultivated vegetable plants. Interest in the study of terrestrial mollusks is increasing every year, where the development of animal husbandry and agriculture. The distribution of land mollusks of vertical zones and habitats listed in the ranks of [1; 2; 3; 4]. However, over the last 20–25 years have been published series of papers [5; 6] malocofauna of Central Asia, in which representatives of the *Pseudonapaeus* added another 10 new species for science. In addition, the brought a number of amendments relating mainly detail the geographical distribution of individual species of this genus. Above, the data gave rise studying landscape and biotope distribution of terrestrial mollusks species *Pseudonapaeus*.

Materials and methods. The material for the study is based on the author's fees for the 2011–2012. Held in Fergana, Chatkal and Kurama Mountain Range. In addition, the processed collection of terrestrial mollusks, stored in museums of Gulistan and Samarkand University. When carrying out the following shall apply a uniform methodology to compare the fauna of the individual ranges and areas. The examination took the belt from the bottom up the slopes to the upper chord, in each surveyed all habitats. To identify the number of species was carried out quantitative account of an area of 1 m².

Results and discussion. As we know, in the lives of terrestrial mollusks vegetation plays an important role. The vegetation is mainly a source of supply for all terrestrial mollusks. In addition, the plant cover is the main habitat where shellfish spend most of the time. Therefore, distribution of land snail species *Pseudonapaeus* studied against the background of plant communities. According to research K. Z. Zakirova [7], we are interested in the area can be traced to the following high-altitude landscape zone: desert, hill, mountain, pasture.

High-altitude belt – desert. Located at an altitude of 450–600 m. above sea level. Most of the territory is used for irrigated agriculture: orchards, vegetable gardens, plantations of alfalfa. In desert zone malocofauna studied in the following habitats: along irrigation ditches among grass; the reeds and wet meadows; gardens, orchards and plantations of alfalfa, among sagebrush – suffrutescent plants. We

found that, in the belt desert found 6 species of terrestrial mollusks. However, representatives of the genus *Pseudonapaeus* were found.

High-altitude belt – Hill. Located at an altitude of 600–1200 m. above sea level. It occupies the slopes of different exposures with light brown calcareous soils of different textures, from melkozemestyh to strongly erode rocky.

The belt hill malocofauna studied in the following habitats: along rivers among the grasses, dwarf shrubs among under stones, on the banks of Sai on open places.

At times in the biotope hills among dwarf shrubs found under stones. *Pseudonapaeus chodschindicus*, whose population density is 5–7 specimens per 1 m². The belt hills all found 9 species of terrestrial molluscs, of which 1 species belongs to the genus *Pseudonapaeus*.

High-altitude belt – Mountain. Located at an altitude of 1300–3200 m. above sea level. It is characterized by a significant midland terrain with steep slopes and narrow gorges.

The belt tau studied habitats: under stones among xerophilic-ephemeral vegetation on the slopes among the trees and shrubs in various scree and Saclay, overgrown with grass along streams, in plant residues from juniper.

The biotope trees and shrubs are found: *Pseudonapaeus albiplicata*, *Ps. sogdiana*. The density of *Ps. albiplicata* 10–12 copies per 1 m., while *Ps. sogdiana*, this figure is only 2–3 copies.

High-altitude belt – mountain pasture. Located on the heights of 3000–3500 m. and is represented **kobrezievymi** short grass meadows (wasteland), lawn of fine herbs (viviparous knotweed, Altai violets, chickweed) steppes and mountain xerophytes. Soil and vegetation belts mosaic, fragmentary. Large areas are occupied by talus and rocks. Poor and distinctive malocofauna this belt. In the belt of mountain pasture- malocofauna studied in the following habitats: along the banks of small streams among the thickets of grass, 4 on the rocks and scree, in the subalpine meadows.

In the belt of mountain pasture- just found 7 species of terrestrial mollusks. The representative of the kind of *Pseudonapaeus* **not found**.

Thus, in total, the Kurama Range, we investigated 15 habitats and recorded 35 species of terrestrial mollusks, including 3 species belong to the genus *Pseudonapaeus*.

The natural conditions of the vertical profiles of Fergana and Chatkal ranges are similar in nature, so the distribution of terrestrial mollusks on vertical zones and habitats we consider together the two ridges. According to research I. V. Vykhodtseva [8], we are interested in the area allocated 6 high altitude landscape belts.

Desert. The absolute height of 500–600 meters. A large part of these territories is used for the needs of agriculture. Almost all of the valleys are covered with orchards, vegetable gardens and plantations of cotton. The desert belt malacofauna studied in the following habitats: gardens gardens; along the ditches, in the grass and under the stones; river terraces, among the thickets herbs on the stems of plants. In this zone in the Fergana Ridge found 11 and Chatkal ridge 9 species of terrestrial mollusks. However, the representative *Pseudonapaeus prey* kind in the desert was not established. **Belt hot foothills**, the absolute height are 800–1800 m. It is characterized by the dominance of sagebrush ephemeral semi-desert. Among ephemera and ephemerides dominated viviparous bulbous bluegrass, sedge *tolstolobikovaya*, crow's bows, annual fires, Velcro spring, astragals and others. In this zone are studied following habitats: open spaces among the ephemera and ephemerides foot hills in gravelly places among plants along the rivers and under stones, among the plants.

In the hot zone of the foothills, in the Fergana Ridge 7, Chatkal Ridge found 6 species of terrestrial mollusks. As in the belt of the desert here, a representative of the genus *Pseudonapaeus* not found.

Belt warm foothills, altitude 1500–2000 m. Its geobotanical landscapes are distinctive and highly original formation. The belt is characterized by a southern (*savanoidny*) wheatgrass, *saryndyzovymi*, *borodachovymi*, ferulic steppes and outcrops with diverse vegetation exposures. There malacofauna studied in the following habitats:

- a) among almond on gravelly areas — in the Fergana Ridge found *Pseudonapaeus albiplicata*, *Ps. errand*. Whereas in Chatkal is found only *Ps. albiplicata*; The density of *Ps. albiplicata* in the Fergana Ridge 15–17 copies per 1 m² on Chatkal this figure is only 4–5 copies.
- b) on the foot of the slopes, among the thickets of grass and under rocks on the ridge Chatkal found *Ps. subobscura*, the density of which only 1–2 specimens. In the Fergana Ridge this type does not dwell.

Middle belt of mountains, altitude 2500–3000 m. Is characterized by mountain steppes, tall-meadow steppes and meadows, thickets of mesophilic shrubs, deciduous forests and woodlands. Extensive plot belt is characterized by a complex of highly dissected areas with a relatively “quiet” hilly or steeply sloping terrain. This belt of shellfish live in these habitats: among trees and shrubs, thickets of grasses and shrubs on stony areas, and screen slopes with patches of scrub. The biotope among trees and shrubs in the Fergana Ridge found *Pseudonapaeus trigonochilus*, *Ps. retrodens*. Density population *Ps. trigonochilus* 20 copies at 1 m² from *Ps. retrodens* 3–4 copies. Chatkal ridge on the biotope in this representative of the genus *Pseudonapaeus* not found. The biotope bush grasses and shrubs on gravelly areas to live. Fergana Ridge: *Pseudonapaeus retrodens*, *Ps. diplus*, *Ps. albiplicata*, *Ps. trigonochilus*, *Ps. goldfussi*, *Ps. submucronatus*. In Chatkal Ridge found *Ps. albiplicata*, *Ps. submucronatus*. The density of the population of these species varies greatly. For example, if the Fergana Ridge 1 m² can detect 13–15 copies. *Ps. submucronatus*. Whereas in Chatkal is found in a single item.

On the slopes and scree with areas of shrubs in the Fergana Ridge found *Pseudonapaeus trigonochilus*, the population density is 12–14 copies. per 1 m².

Subalpine zone, the absolute height of 3000–3500 m. The subalpine zone in geobotanical aspect is the subalpine zone subalpine meadows, juniper and dwarf shrubs elm long-manned. This belt examined creeping juniper shrub with undergrowth, litter under shrubs in the Fergana ridge dwells *Ps. trigonochilus*. In hatkal *Ps. albiplicata*. In the alpine zone in the studied mountain ranges representative of the genus *Pseudonapaeus* not found. Thus, in the Fergana ridge just inhabits 41 species of terrestrial mollusks are 8 species of the genus *Pseudonapaeus*. In Chatkal Ridge found 37 species of these 4 species are subject to the genus *Pseudonapaeus*. As can be seen from the data the highest density of terrestrial mollusks of the genus *Pseudonapaeus*. Different habitats — including trees and shrubs (20 cop. 1 m²) *Ps. Subobscura* at the foot of the slopes, among the thickets of grass and under the stones found in the density of which only 1–2 copies. The dominant species is the *Ps. trigonochilus* population density of 20 copies per 1 m².

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Algae light brown soil Fergana Valley in Uzbekistan

Abstract: In the study of species diversity of algae found and identified 109 species, including green –43, –36 blue-green, yellow-green –16, –14 diatoms. Dominated by 7 members, of which more common following: Chlorococaceae, Uocystaceae, Oosillatoriaceae, Nostocaceae, richly represented by species of the genus Phoruauidium (9 species), Gleocapsa (4 species).

Most kinds have from one to three species. For a variety of species and the impact on the distribution of the exposure of the slope and edaphic faktor. Na northern slope dominated by blue-green 35 yellow-green 16, 11 diatom species in the southern blue-green. The number of cells of algae ranges from 26.5 to 70.5 thousand. Depending on the number of metereologicheskikh and edaphic factors.

Keywords: phycology, views, exposure of the slope, light-brown soils of the Fergana Valley (Uzbekistan).

Introduction

The soil as a habitat, promotes the development of a mass of microorganisms. Algae is Poston microbiocenoses components of soil and fertility play an important role. With their participation, there are processes of transformation of substances, accumulation of mineral elements of plants and synthesis of organic substances. The number of algal cells in 1g soil ranges from a few hundred to tens of hundreds of thousands. Developing in weight, algae can play a significant role in the formation of phytocenoses (Gorbunova, 1991).

Study of the species composition and dynamics of soil algae is the main task of researchers.

Subjects and methods

The object is a light-brown soils of Namangan region in Uzbekistan's Fergana Valley in the range of 1,600 to 2,000 meters above sea level. Prevails in varying degrees eroded gravelly and rocky significant difference in the content of the list are poor in nitrogen. Vegetation dianavo-motley grass with ezhesbornoy (*Dactylis glomera*) with dubilanym Sharani (*Polygonum coriaryum*) and multicolored lipistrum (*Ligustrum discolor*).

The results and analysis

The light brown soil diversity reached 110, including 43 species of green (40.0%), blue-green, 36 species (31.9%), yellow-green 16 species (14.5%), 14 diatoms (12.7%) and one gold. In the formation of algal communities of green algae is dominated by representatives of the classes Volvucophyceae, Chlorococophyceae and Ulothrichophyceae. Discovered Volvocophyceal classes belong to the same genus *Chlamydomonada*, there are several species. Of these, *Chlamydomonas globosa*, *ch.isogama*, *ch. oblonga* developed in common northern and southern slopes reach considerable development. In the context of a special kind of harmful cultural *Chlamydomonada* first appeared on the walls of the flask with the consecration of the parties.

Richly presented representatives of the class Chlorococophyceae, contains 26 species (23.63%) of the total (60.4%) of the green. The greatest number of species falls on the family Chlorococaceae (6), Oocystaceal (5). The family is represented by three species Chlorococaceae *chlorella tericala*, *ch.vulgaris*, *ch. pyrenaidusa*, abundant in samples of the southern slope. The genus comprises two species *Chlorococcum Chlorococcum humicaba*, *ch. infusionum*. Rhode *T. aspera* *T. gramulata* and develop both on the north and on the south slope. Rhode *Caceomyxa*, *Prtasiphon*, *Cysacocus*, *Chlerae-hytrium*, *tetracaccus*, *Eremasphaeria*, *Macrochloris* represented by a single species. The best kinds of development have *Pleuruchloris vulgaris*, *Miriella magma*, *Keratococcus bicaudatus*. Class Ulothricho-

phyceae represented 10 species. Rhode *Ulothrix* contains two kinds *U. subtilissum*, *U. tenerrima* better developed on the north. *U. variabilis* great on the north. Species of the genus *Hormidium* *H. dissectum* *H. rivulare* and developed on the southern and northern slopes. *Stichococcus basillaris* *S. minor* and marked on the northern slope. From the kind of *Trentepolia* *T. gobii* found on the southern and the northern *T. piceana*. The southern slope of a rich algae and contains 35 species (31.8%) than the North (21 views 19.0%). Blue-green algae is represented by two classes. Class *Chrococaphyceae* 9 species, including 7 species found in the samples of the northern slope, 6 species in the south.

Merismopredia minima, *Gleocapsa alpine*, *G. turgida*, *Stigonema hormoides* developed in common slopes. *Microcystis pulverea*, *Aphonotheca costagnei*, *A. saxicola* found in samples of the northern slope. *Gleocapsa minima*, *G. minor* found in the soils of the southern slope.

Procedure Nostacales includes 8 species, they are not numerous. Widespread proved *Nostacpunctiforme f. populorum* in samples of the general slope. Because of this order in the samples revealed the northern slope of 4 species, and to the south 6.

- How Oscillatoriales 16 species evolved slightly. *Oscillatoria boryana*, *O. schroeteri*, *Borria trilocolioium*, *phormidium foveolarum* found in samples from the general slope. The best development and had *Microcoleus vaginatus* *Plectonema borynaum f. hallerbachiana*. The southern slope of the biological diversity of more than 27 species, 21 species of the north than that caused by a number metereologicheskikh and edaphic factors. Yellow-green algae in the light brown soil consists of 15 species. Widespread proved *Botrydopsis arhiza*, *B. eriensis*, *Arachnochloris major*, *Trachychloron simplex*, *Bumilleritopsis terricola*, *Bumilleria klebsiana*, *Tribonema elegans*, *T. viride*, *T. vulgare*, *Heterothrix bristoliana*, they met in both slopes. Only on the northern slope found *Pleurochloris commutate*, *Polyedriella helvetica*, *Tribonema minus*, *Heterothrix exilis* and *H. stichococceoides*. Common only in the samples from the southern slope of the light brown soil is not it turned whole samples of the northern slope. Detected and identified 15 species in the Southern 12, causing a number metereologicheskikh and edaphic factors. In soils of the western Pamir vyshegornogo V.P. Booth (1963) also noted a more diverse (15 species), the yellow-green algae.

Diatoms are biologically diverse, represented 15 species. Genus *Navicula* contains 5 species, including *Navicula minuscula*, *N. dicephalavar*, *turundulata*, *N. mutica* var. *nivalis* found in the samples as the North and the southern slope. *Navicula cryptocephala* and *N. disephalata* revealed only on the northern slope. From the kind

of *Pinnularia P. borealis* found in common slopes, *P. mesolepta* detected in samples of the northern slope. *Rhode Hantzschia* presented species *H. amphioxys*, *H. capitata* found on the northern and southern slopes, and *H. amphioxys* var. *capitata* is found only on the northern slope. From the genus *Nitzschia N. amphibia* identified on the south, *N. palea* on the northern slope. Weakly developed *Gomphonema acuminata* in samples of the southern slope. The species diversity of the northern slope is represented by 11, 9 species of South meteorological factors causing development and edaphic factors. The total number of cells of algae in a light brown soil, depending on the time of year ranges from 26.5 to 75.0 thousand per 1 g. of soil.

Conclusions

Favorable soil factors, temperature and water regime (especially in summer), a well-defined structure, according to different favor the development of abundant moisture-loving green, yellow-green and diatoms than blue-green. As the number of species dominated by filamentous forms. Characteristic are *Bumilleria klebsiana*, *Bumilleriopsis terrieola*, *B. brevis* from yellow-green, and species of the genus *Phormidium* of blue-green. Representatives *Chlorococcaceae* and *Oocystaceae* giperatsitnye blue-green evolved less. Because diatom samples often come across *Navicula mutica* var. *nivalis*, *N. cryptocephala*, *N. minuscula*, *Pinnularia mesolepta*.

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Algae flora of typically-brown soil of Fergana Valley

Abstract: It was researched the species diversity of the algae flora, identified and defined 106 species, 45 of them are green, 30 of them are blue-green, 16 species are diatoms, 15 species are yellow-green. Dominated by order Chlamydomonadales, Ulothrichales, Nostocales, Heterothrichales. The greatest number of species falls on the family Chlorococcaceae, Oocystaceae, Oscillatoriaceae. Richly represented species of the genus *Chlamydomonada* – 7, *Phormidium* – 8. Most births were from one to three species. On the spread of algal flora affects the exposure of the slope. North Slope is dominated by green, yellow-green, blue-green part, on the southern green and blue-green algae. The number of species and algae cells varies depending on the meteorological and edaphic factors.

Keywords: phycology, view, typical brown soil, the Fergana Valley (Uzbekistan).

Introduction

Algae is a permanent component of soil microbiocenoses and responsive to the changing soil environment. This is evidenced by the classic works of Musayev [6], Hollerbach, Shtina [3], Shtina, Hollerbach [3], Getsen (1990), Gorbunov [2], Kabirav [5] and other researchers. The study of the composition and dynamics of soil algae, physiological and biochemical processes occurring in the soil is the primary goal of researchers — algologists. These issues are clearly expressed in the natural environment, in complex relationships with various algae and organisms of the soil. Identification and species composition is the initial task of the matter.

Subjects and methods

According to A. Z. Genusova [1] in Chatkal-Kurama area in high-altitude zones, where it was held Algological study area covers a large brown soil subtypes. We study of brown typical soils in the redistribution of the Papal area of 1600 m. above sea level. Northern slopes steep 34° dismembered midlands. Vegetation blackberry-forbs, grass powerful, strong. Southern slopes steep 28° – vegetation wheat grass – awn chaff-forbs covered 50% of the surface of the soil, gravelly. Humic horizon painted in brown tones, especially shaded slopes. We apply the methods described in the classical works of Hollerbach, Shtina [3], Shtina, Hollerbach (1979).

The results and analysis

In typical brown soil it was identified and defined 106 species and forms in species dominated by green algae (47%), 44.34%

from total number of species. Green presented the class representative *Volvocophyceae*, *Chlorophyceae* I *Ulothrichophyceae*. How to detect *Volvocophyceae* representatives belong to the genus *Chlamydomonas* number 7 species. In most samples across *Chlamydomonas* *isogama*, *Ch. oblonga* of the northern and southern slopes. The richly represented by species class *Chlorococcophyceae* number 13 species distributing to 9 families. The greatest number of species falls on family *Chlorococcaceae* (7), *Oocystaceae* (6 types). Considerable development had *Palmella hualina*, *P. minita*, *Gleococcus schroeteri*, *Protosiphon botryoides*, *Chlorococcum humicola*, *Ch. imfusionum*, *Chlorella vulgaris*, *Ch. terricola*, *Tetracoccus botryoides*, *Trochiscia aspera*, *Eremosphaeria virides* f. *minor*, *Macrochloris dissecta*, *Pleurochloris vulgaris*. Along unicellular and colonial forms have evolved considerably and filamentous. Class *Ulothrichophyceae* contains 9 species. Family *Ulothrichaceae* presented the family *Ulothrix* views *U. subtilissima*, *U. tenerrima*, *U. variabilis*. Rod has *Phormidium* kinds *H. dissectum*, *H. rivulare*, *H. nitens*. *Rhode Stichococcus* contains species *S. minor*, *S. variabilis*, *S. bacillaris*. Family *Trentepohliaceae* presented views *Trentepohlia gobia* and *T. piceana* although they are not widely spread.

Department of blue-green algae number 30 species (28.3%) from total number. Class *Chroococcophyceae* represented by three species. *Rhode Aphanothece* contains two kinds *A. custagnei*, *A. saxicola* and *Gleocapsa minia* are not widespread. In soils of the south-western spurs of the Tian Shan K. Y. Musayev [6] identified

seven species of the genus *Gleocapsa* and they had a wide distribution. The soils studied abundantly represented Hormogoniophyceae representatives of the class numbering 51 species (48.1 %) from total number of species. The order includes 13 Nostocales view of most representative family Anabaenaceae. The genus *Anabaena* comprises *A. variabilis* to form *tenuis*, *A. oscillarioides*, *A. constricta*. Rhode Nostoc has three kinds of *N. punctiforme* to form population *N. microscopicum* and *N. commune* forming a proliferation of ground. During wet periods, there has been films *Macrocoleus vaginatus* and *Phormidium foveolarum*.

The order includes 13 Oscillatoriales views. Family *Phormidium* includes 8 species of them *Ph. autumnale*, *Ph. foveolarum*, *Ph. fragile*, *Ph. molle*, *Ph. subfuscum* found in samples of the northern and southern slopes, they are few. Rare species of the genera are *Oscillatoria*, *Plectonema*, *Borzia neotmechen* species of the genus *Lyngbya*.

Yellow-green algae are represented by 15 species and about Heterococcales Heterothrichales contains 7 and 8 species. From the family *Pleurochloridaceae* identified and defined 5 types. The widespread were *Pleurochloris commutata*, *Botrydiopsis arhiza*, *B. eriensis*, *Polyedriella helvetica*, *Bumilleriopsis brevis*, *B. terricola*, *Bumilleria klebsiana*. From nitchatnyh Heterothrix *bristoliana*, *H. exilis*, *H. stichococceides*, *Tribonema viride*, *T. vulgare*.

Diatoms are varied, it includes 16 species, represented mainly by genera *Navicula*, *N. atomus*, *N. cryptocephala*, *N. dicephala* identified in samples from the northern slope of the more damp and *Navicula minuscula*, *N. mutica* and *N. dicephala* var. *turundulata*. Rhode *Pinnularia* includes *P. borealis*, *P. mesolepta*. Numerous species of *Hantzschia*, *H. amphioxys* c var. *capitata*, *H. virgata* c var. *borealis*.

Nitzschia genus contains two species *N. amphibia*, *N. palea*. Rhode *Gomphonema* has one type of *G. acuminata*.

The number of species of algae of the northern and southern slope is always the same number. In samples from the northern slope of the typical brown soils identified and defined 87 species constituting 82.0 % of total species of algae. North Slope richer in species of green algae (48.3 %), largely dominated by single-celled colonial forms. The prevalence of these forms is marked K. Y. Musayev [6]. According to him in the mountain belt Chatkal-Kurama ridge of Tien Shan from 1300 to 2000 m. above sea level, is dominated by green, yellow-green and partially ethereal order Noctocales.

South slope detected and identified 73 species, 68.9 % of total algae. By quantity of kinds of green (28 species) prevailed from cyanobacteria (25) of algae. Yellow-green, and diatoms have almost the same number (10 and 9) species.

The total number of algal cells in a typical brown soil depending on meteorological conditions and edaphic factor ranges from 39.0 to 80.8 thousand 1 gram of soil.

Conclusions

Typically, the brown soil sampled areas of biological diversity in the flora of 106 species of algae. As the number of species dominated by green (45 species) and blue-green (30 species). Better than other members of the family have evolved *Chlomydomonadaceae*, *Ulothrichaceae*, *Nostocaceae*, *Anabaenaceae* and filamentous forms of order Heterothrichales. Green and yellow-green to blue-green algae are permanent components of soil algal flora brown soil explore the area. Diatoms are mainly represented by species of the genus *Navicula*, and *Hantzschia*.

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Secton 2. Geography

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The territorial features of effective use of water resources (as Zarafshan basin)

Abstract: Every irrigation systems provide by the definite channel and the name of the system as the same as channel. Moreover, water resources of Zarafshan river divided in different regions, districts and other areas. In this article regions was reflected which was provided by Zarafshan river and analyzed every region separately. In conclusion part was speculated about possibility of using water resources and some suggestions for resolving problems in future.

Keywords: water resources, agriculture, industry, water reservoir, irrigation systems, the channeles, regions and districts.

Introduction. Waterresources are suitable water for using which under the ground, over the ground and humidity of air and soil. Water divided into more than centure (layers over the ground, pole, ices on mountains, high lakes and such kind of water which suitable for using) and restore (river's flow, dynamic and fluctuate stores of under ground, the part of lakes and so on) water types. Water resources also whole objects of rivers, lakes and seas. Because they are used for ships and submarines, hydroenergy, fishing, tour, resting and etc. Therefore, the water is resource of wealthy which importance in life and economy. Almost 2.5 percentage of hydrosphere's water store are suitable for drinking (nearly, 1 percentage of this water suitable for people), 70 percentage of its ices, remain percentages are rivers, lakes, humidity of airs and water stores of the under ground [1].

In Uzbekistan water resources are mainly river's flows, dynamic stores of under ground water (restore resources) and also ices on mountains, permanent water stores of lakes. River's water come in by seasonal snow's layers, melting of ice, snow and rainfalls. The under ground water of mountains were appeared by above resources. The under ground water of near the mountains and grounds were appeared mainly by the water of over ground. Rivers and underground water resources are belong to each others. The using amount level of under ground water its results of the sharpest decreasing river's flowing [2].

In our country for farmer grounds need annual 114 km³ water resources, 74.7% of its from the Amudarya river (together with Zarafshan and Qashkadarya), 39% of its come by the Sirdarya river. Water resources are situated uneven and although appear in mountains they flow by canals to even grounds for using. The full amount of water resources of quality indicates and using level changed at the last 30–40 years. As the result of have been doing some kind of strivers. They are followings:

- The whole rate of annual using of water diminished from 64 mlr./m³ to 51 mlr./m³ between last centure of 80s and nowadays (by contrast decreased in 13 mld. m³);

- Although were used 10–11 thousand m³ water in a hectare till 1990s, nowadays that indicators diminished in 6–7 thousand m³ water in a hectare;

- To provide with water resource overall 3.6 mln. km. hectare farmer grounds are activated 180 thousand km. irrigating systems, 160 thousand water buildings from these are more than 800 high hydrotechnic buildings, 55 of its are water reservoir which whole capacity of 19.2 mlr/m³, 1614 of its are pupping station which annual spendings are 8.2 mlr. kv. electr. energy, 4124 of its are irrigating wells;

- Although by the whole 4.0 mln hectare irrigating grounds were used 2.0 mln hectare for cotton at the and of last centure, nowadays are reduced in 30% or 1.2 mln hectare;

- The rise square also diminished from 180 thousand to 40 thousand. Instead of it used for other crops which need for life;

- The useful managing and equal spreading of water resources come after to pass from administrative management to conditional management of water resources. Today 10 boards of irrigation systems and more than 60 irrigation systems, main canal depatments and 1501 the union of water consumers are organized [1].

Body part. By the capacity and length the Zarafshan river is the third in the republic of Uzbekistan. The total number of water squear are 11,722 thousand km², overall length are 870 km. The annual average capacity of water flowing are 5127 mln. m³. Seasonal water flowing are equal to 4255 mln. m³. The former formal document was reflected distribution of the water resource of the Zarafshan river are following, they are divided by the region in percentage.

Table 1. – The distribution of the Zarafshon river's by the region [3]

№	Regions	Percentage (%)
1.	Samarkand	70.2
2.	Jizzax	7.4
3.	Kashkadarya	9.3
4.	Navoiy	13.1

The spending to industry of Navoiy city and GRS are $32.5 \text{ m}^3/\text{sec}$, this spends doesn't enter in the distribution table above. The whole amount of canal's length are 3233.15 km. which in balance of Basin's board. From this number 185 km. is in regional length, 1295 km. are districtional length, 1546 km. are magistral length and interagricultural canal's length are 1753 km. [2]. There are 1729 hydraulic engineer buildings, 2647 piece of hydraulic stations, 97 piece of duikers, 81 piece of aqueducts and 412 piece of bridges in magistral and inter agricultural canals. There are 10 reservoirs in the territory of basin board which in 1171.8 mln. m^3 capacity. The Zarafshan rivers water amount equal to 4888.3 mln. m^3 from total amount of Uzbekistan. 83.7 percentage of this water spend to irrigating and 797.8 mln. m^3 to water industry, communal services other needs.

Almost 80 percentage of requirements of industry to spend in energy, 15.8 percentage of this to spend in industry, 2.2 percentage of this in communal services, 17 percentage of its in fishing, 0.06 percentage of its spend in other services. From the 637 mln. m^3 water $1/5$ part of its don't come back to the river which are used in energy [3].

The irrigation system were created in the territory of the Zarafshan river for using in effectiveness, there are 8 irrigation systems, which 3 of followings are used in neighbor region. They are "Karmana-Konimeh", "Eski Anhor", "Tuyatortar" canals. The consuming percentage of them are following:

1. Karmana-Konimeh irrigation systems: are consumed 21.5% of total number of the Zarafshan rivers. All of its consumed in the region of Navoiy. Include in city and 6 district near the city. Also irrigate 54355 hectare farmer field. There are have some difference in water consuming. For instance, the city of Navoiy used 701 mln. m^3 , or 66.5% of water in industry and farmer. One of the alone feature of Zarafshan basin it is 14.3% of total number are used in industry. Namely, 91% energy, 63.5% industry and 0.5 mln. m^3 of water are spent in fishing. The 19.7% or 125.8 mln. m^3 water don't come back to the river which are used in energy [3].

And other territories use water only in irrigating. The greatest amount of whole number is equal to Navbahor district which are 174.5 mln. m^3 water used in agricultural system. Because of using more than other district the situation of this district suitable for irrigating farmers and also lower flowings of Zarafshan flowing by there. At the second level the district of Karmana use 13.5% of whole water in irrigation. The district of Xatirchi and Nurota uses the smallest water resources owing to used from other irrigation systems. The next level of using water resources are Dargom irrigation system. This board control the canal of Dargom and also irrigate 123287 hectare of Samarkand. The Dargom canal flows in south after dividing from the post of Ravotxuja and to provide with water territory of two region.

2. The Dargom canal is equal to 17.5% or 856.4 mln. m^3 of total amount of water resource. 95% percentage or 815 mln. m^3 of canal are used for irrigation and only 40.9 mln. m^3 water to spend in industry (industry, communal services, fishing). The higher part of total water store are spent for Pastargom district. Pastargom is the largest square in the irrigation system. The territory of the Dargom canal is more fertile and more suitable for farming than others. Moreover, in districts of Urgut, Tayloq and Samarkand also have some kind of farming, which famous for horticulture, viticulture, to plant tobacco and potatoes over the republic. Yet, districts of Kattakurgon, especially Nurobod are used very fewer water of Dargom because this districts are used more by another basin [3].

3. Mirza-Pay irrigation system — uses 726.5 mln. m^3 of water from the Zarafshan river and irrigate 93172 hectare of fagming. In this irrigation system the main water are used in farming,

only 14.1 mln. m^3 parts use in industry. There is no any difference in distribution of water, consequently all three districts are Bulungur, Jomboy, Payarik consume almost the same amount of water. Payarik uses water (292.7 mln. m^3) in irrigation and needs slightly more than Bulungur, Jomboy [3].

4. Narpay-Navoiy irrigation system — situated in the middle and lower reaches of Zarafshan, uses $1/8$ part or 601.8 mln. m^3 water of the Zarafshan river. Irrigate 60609 hectare of Narpay-Navoiy regions. There are 87% or 33.7 mln. m^3 water from the total water are used in industry. Almost 80% water of Narpay-Navoiy irrigation system are spent in districts of Narpay, Paxtachi. The lowest part of water (12.1 mln. m^3) are used in Nurobod [3].

5. Miyonqol-Toss irrigation system — situated mainly between Okdarya and Koradarya. Consumes 530.3 mln. m^3 water of the Zarafshan basin and irrigates 67705 hectare of territory. Although three districts use by this irrigation system, have a high territorial difference between its (more than 11 times). In particular share 59% to Xatirchi district, 35.4% to Kattakurgan district, 5.3% to Ishtixon district. 59% water of this irrigation system spends in Navoiy region [3].

6. Ok-Karadaryo irrigation system — situated in the eastern side of Miyonkol, provide needs of five district in Samarkand and irrigate 71408 hectare of farms. Consume 421.1 mln. m^3 water of the Zarafshan basin and uses in industry almost 1.5% of total consume. Have any difference between territories for example 80% water share to Ishtixon and Okdarya. The only 7.4 mln. m^3 water uses in Kushrabat district. Also this district provide its needs by the other irrigation system.

7. Eski Anhor irrigation system — although uses fewer water of the Zarafshan basin but provide (73.8 mln. m^3 water) the Amu-Kashkadarya irrigation system which include in Kashkadarya region. Overall 36 mln. m^3 of water consume in two districts of Samarkand, 48926 hectare of territory irrigated in three districts of Kashkadarya region. From the total amount 62% or 398.4 mln. m^3 water uses in the Chirokchi district of Kashkadarya. Uses all water in agriculture [3].

8. Tuyatortar-Canal irrigation system — situated in the northern and eastern edge of the Zarafshan basin, uses the smallest amount of water by the canal of Eski Tuyatortar which including 300.3 mln. m^3 water. Irrigate 49091 hectare agricultural ground in three district of Jizzax region. The only 64% of all water uses by Jizzax district. Baxmal and Gallaorol districts uses less than half as much. The Korovultepa reservoir which situated between two region. It is important to Jizzax's economy and agriculture. There are annually 16 mln. m^3 water poures in reservoir by the canal of Eski Tuyatortar [7]. Have main features of water resources are distributed by the territory. Admittedly, three districts of Kashkadarya and Jizzax, six districts of Navoiy, all districts of Samarkand regions are consumed by the Zarafshan river.

On the table 2 bellow was indicated distribution (division) of water resources in the region of Samarkand. As can be seen from the table, almost full water are used in irrigation in all districts. The only center of region and near the region are used in industry and etc. (3.4%). There are more than 50 times differences of water resources in distribution by the territorial. From ancient times irrigation system have been developing in Samarkand, therefore have more possibilities in farming, especially in irrigation. There are two territory which is the most consumer. In that case, developed in all sphere of farming and irrigating, have more level between other districts of region. They are Pastargom and Payariq districts. Only these districts consume more than 300 mln. m^3 of water or j part of total

number. And almost once level of water are consuming in other districts. There are two of its use a remarkable little water which desert districts (Nurobod and Kushrabot). It is nearly 7.4 mln.m³ or 0.26 % of water belongs to Kushrabot [7].

Table 2. – The distribution of water resources by the region of Samarkand (countedas mln. m³)

№	Districts	The whole number of consuming water	Use in irrigation from the total number
1	Bulungur	208.2	208.2
2	Jomboy	227.8	227.8
3	Ishtixon	211.7	211.7
4	Kattaqurgan	252.6	252.6
5	Narpay	260.0	260.0
6	Nurobod	50.2	50.2
7	Okdaryo	154.8	154.8
8	Pastdargom	364.5	364.5
9	Paxtachi	223.8	223.8
10	Payariq	345.7	345.7
11	Samarqand	118.2	118.2
12	Tayloq	112.2	112.2
13	Urgut	185.7	185.7
14	Kushrabat	7.4	7.4
Needs in industry and farmer		96.8	
Total the whole region		2819.3	2722.6

Note: * — The table above prepared by author with the statistics of the Board irrigation system of Zarafshan.

Admittedly, have more affects the using of water resources in effectiveness. Mainly are followings:

- **Hydro-geographic situation:** situation of territory near the water resources. It is a good factor, because how many more near to water so more higher effectiveness and condition for developing once level of agro-economy. Its steady affects in every sphere if have not enough water. There are more such kind of effective territory besides two desert districts. As we know that the first civilization began in such geographical territories;

- **Features and fertilities of over ground or relief:** it is belongs to a good fertile ground resources, especially important to agricultural district which is need develop. There are kind of problem in such territory have a low comfortable ground for agriculture, the scarcity of water which is required to provide fastly. It is situated in the western region. First of all need permanent looking after such a deficit grounds;

- **Influencing historical situation of population:** although, having unconvinient situation (mountains, near the mountains, any deserts), but people live there from ages and had been flourishing. Moreover, are occupied with stock-racing, horticulture and viticulture.

Conclusion: The Zarafshan river the main water resource which is one of the third in our country. The people are being lived near this basin are situated very dense. Furthermore, economy of this territory depending on more agriculture, therefore main problem providing with water resource. As a result of, there are any problems with water in Samarkand are expecting to solve. There are following results are problems.

1. The increasing of population: Nowadays, over the 6 mln people live near the Zarafshon basin. By contrast it is escalated 20 % more than in the beginning of XXI century. The requirement of water a remarkable increase as much [4].
2. The wide spread of farmer grounds: Increasing of population, also rising needs for foods, enlarging of farming the result of them climbed demands of water resources. Particularly, from the 60s of last century begin to change from desert to farming, widened of cotton fields also result of decreasing of water resources.
3. The developing of industry and producing. By the 80s Navoiy region to begin changing into industrial city. The demands had being provided by the Zarafshon river. Also in Samarkand have been building industrial factories in Kattakurgan and other territories which are near the river. Although, industries used no more water resources but it more influences in quality of water.
4. The decreasing of water resources. As can be seen water resources depend on ices and snow on mountains. But changing of the weather especially increasing level of the weather, no more rainfalls are result of decreasing water resources. Although, the Amudarya and Zarafshan's water flows fully in july, august.
5. The useless wasting of water resources and pollution of rivers. The irregular using of water in farmer and other needs result of water do not coming back river, but water steamed away, absorbing, to gathering and become swamping or saltness of grounds. Furthermore, the wasters of factories the greatest result of dirtiness of river.
6. The transboundary problems. Nowadays, it is important problem but one of the highest increasing in future. Moreover, it is important as political problem.

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Some distribution regularity of atmospheric precipitation in the ridge Kuljuktai

Abstract: In this article it has been learnt some distributive regularity of atmospheric precipitations in the mountain ridge Kuljuktai (Kyzylkum). It is discovered that quantity of atmospheric precipitations are increased in meridional rotation, that's to say, from west to east.

Keywords: mountain ridge, atmospheric precipitation, rhythm, cycle, sectoral zone, streamflow, orographical effect, lithoedaphic, principles, water resources.

Fresh water problem is strategic for the Republic of Uzbekistan. Over 70% of its territory consists of desert or semi-desert areas. Demand for the irrigating water is covered by transboundary rivers the Amudarya and the Syrdarya [5]. Desertification process which is increasing rapidly demands to search for local source of water resources and to use them rationally in different spheres of life.

In this case the low mountain ridge Kuljuktai which is situated in Central part of the Kizilkum Desert, is considered to be potential object for hydrological researches. Kuljuktai as an island ridge stretched from West-North-West to East-South-East in the distance over 100 km, with maximum width approximately 40 km. The highest peak of watershed part of the ridge is 773 and 785 m. According to the tectonic structure the ridge belongs to the category of "reborn" mountains, which is appeared on the platform bases of Alpine orogenic and has folded-blocked low ridge morphostructure [2].

Relief of the ridge is parted to valley cutouts of temporary water streams, there are more than 100 of them with different depth and width which are objective indicators of the result enormous flood waters and their destructive power.

Natural conditions of the ridge is typical to low mountains which is situated in desert area of turan type. Nowadays the territory of the ridge is mainly used as a distant pasture for stockbreeding.

For analyzing regulatory formation and regional aspect of water resources of landscape ridge Kuljuktai, we have analyzed the routine of atmospheric precipitation of many years (1951–2010) which was taken from the weather stations Djengeldy and

Ayakagytma situated in the territory of the ridge. This analysis shows that average quantity of atmospheric precipitation of many years is 96 and 133 mm. [6].

There is no doubt that the quantity of the atmospheric precipitation in the mountainous area is 40–60 mm. more than in the foothills where weather stations situated. To the extent of natural humidification western part of the ridge belongs to extraarid, central and eastern part belongs to arid (typical desert area) bioclimatic zone. Fluctuation range of atmospheric precipitation by years quite different (table 1).

According to the facts of weather stations Djengeldy and Ayakagytma, maximum quantity of precipitation can reach to 169 and 247.7 mm. per year, and minimum can fall to 36.5 and 34.0 mm.

Quantitative fluctuation is 4.6 and 7.4 times. In interannual quantity of atmospheric precipitations it is noticed rhythmicity with variable interval (cyclicality according to academician Kalesnikov S. B.).

Relatively humid years are repeated each 4–5 years, while the driest year comes each 9–10 years. In recent decades the tendency of decreasing quantity atmospheric precipitations is noticed on the average up to 5 mm. Exception is the eastern part of the ridge where in 2000–2011 years the quantity of atmospheric precipitations increased, comparatively with previous decade on the average up to 10.7 mm. It should be mentioned that between atmospheric precipitation and atmospheric temperature there is correlative connection of productivity of pastures which is fluctuating year by year within 0.5–0.2 (3.0) ha. [3].

Table 1. – The extreme significance of atmospheric precipitations according to the information of weather stations (1951–2010 years in mm.)

Weather stations		Per month												Per year
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Djengeldy (h = 209 m.)	Maximum	36.9	47.6	56.5	77.3	91	15.2	14.5	9.6	3.9	20.3	30	35.8	169.6
		1998	1956	1981	1967	1991	1963	1999	1998	1982	1955	1999	1989	1991
	Minimum	0	0	0	0	0	0	0	0	0	0	0	0	36.5
		1971	2004	2008	1989	Many years								1996
Average	9.7	13.2	18.0	16	11.8	2.2	1.1	0.6	0.7	3.7	8.4	10.6	96.0	
Ayakagytma (h = 184 m.)	Maximum	53.6	50.2	96.1	89.2	49.8	26.3	57.7	35.8	11.2	27.9	57.9	62.8	247.7
		1979	1952	1987	1964	1997	1953	1982	1974	1995	1951	1999	1988	1969
	Minimum	0	0	0	0	0	0	0	0	0	0	0	0	34
		1967	1955	1979	2001	1971	Many years						1985	1996
Average	13.7	17.2	25.2	24.8	12.2	2.5	1.4	1.3	0.6	4.9	12.6	16.7	133.0	

By the seasons of the year distribution of the atmospheric precipitation is extremely uneven (table 2).

As it shown in the table 2 winter precipitations 34.9; 47.6, spring precipitations 45.7; 46.7, summer precipitations 2.1; 4.0, autumn precipitations 12.1; 13.7%. Winter and spring precipitations are 81.8;

82.6% overall and they appear to be the main water source of the ridge. Temporary watercourses of the ridge are in a flood mode. Spring floods are especially destructive. They carry out enormous mass of soft mud-stoned flow out of the main vault of the ridge, which flushes pastures and causes huge financial and ethical damage.

Table 2. – Distribution of the atmospheric precipitations in the territory of the ridge Kuljuktau (1951–2010)

Weather stations	Winter (XII–II)	Spring (III–V)	Summer (VI–VIII)	Autumn (IX–XI)	Per year
Djengeldy (h = 209 m.)	33.5	45.8	3.9	12.8	96
	34.9	47.7	4.0	13.3	100
Ayakagytna (h = 184 m.)	47.6	62.2	5.2	18.3	133
	35.7	46.7	3.9	13.7	100

Note: In numerators quantity precipitations by mm; in denominators their comparative significance by percent.

In the regional distribution of the atmospheric precipitations meridional zonality is noticed, especially their annual quantity is increasing from west to east. In the western part (Tuzkoy-Djengeldy mountains) there are 90–100 mm. of them, in the central part — up to 130 mm., and in the eastern part (Hazarnur-Ayakagytna) more than 130 mm. per year. Here hills flow together south-eastern ridge of Nurata Aktau (1993 m.), Karatau (1001 m.), under influence of orographical effect, positively influencing upon the quantity and depth of atmospheric precipitations.

It should be mentioned that formation of water resources directly connected with the type of the landscapes basin of each watercourse. In the area of Kuljuktau ridge on the basis of lithoedaphic (lithology, relief, soil) principle we noticed 6 types of landscapes which have different hydrological features [1; 4].

They are: watershed-cliffy type of landscape folded with metamorphic and partly magmatic type; inclined to terraced- ladder shaped type of landscape, made up of alluvial-accumulative sediments; type of landscape erosive-accumulative valley of temporary watercourses; type of landscape foothill plains and betweenmountain reliefs made up by sandy sediments; type of landscape foothill and outfall relief of temporary watercourses. Streamflow formation of these landscapes quite different.

In this respect the leaders are three types of landscapes. Type of landscape foothill plains and betweenmountain reliefs made up by sandy sediments is not considered effective for forming streamflow. Takyr and brackish type of landscapes are hydrologically insignificant for being fragmental and regionally limited.

All information which is mentioned above allows us to conclude:

1. Average quantity of atmospheric precipitations of many years in the area of the ridge is 96–133 mm. per year according to weather stations of the area. They are the main source of water resources of the ridge;
2. Interannual quantity distribution of atmospheric precipitations quite different. The difference can reach up to 4.6–7.3 times. Their rhythmicity with variable interval is been observed remarkably. Relatively humid years are repeated each 4–5 years, while the driest year comes each 9–10 years;
3. Large amount of atmospheric precipitations fall in winter-spring seasons, as a result destructive power of flood waters of temporary watercourses cause huge financial and ethical damage;
4. In the regional distribution of the atmospheric precipitations meridional zonality is noticed, especially their annual quantity is increasing from west to east;
5. According to hydrological features of the ridge there are 6 types of landscapes spread widely. The watershed-cliffy type of landscape folded with metamorphic and magmatic type is the most effective for stockbreeding;
6. For liquidation of destructive powers of temporary watercourses and for the effective use of water resources of the ridge it is necessary to take steps to improve phytomelioration of mountain pastures, to develop local and international tourism.

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Section 3. History and archaeology

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Historical conditions of forming the European and Eastern-European Nuptiality models

Abstract: The comparative method of studying the structure of families and peasant farms in different regions of the world, proposed by British researcher John Hajnal, was successfully applied in the study of demographic processes in various regions of Russia in the period of XVII – the beginning of XX centuries. Basically, the researchers used the sources of new time, which couldn't allow them to look at the deeper causes of the formation of a specific Nuptiality models in Russia. We have the unique mass sources of earlier period: the Novgorod scribe books. They contain a solid description of peasant farms on the territory of Novgorod land at the turn of the XV–XVI centuries. Due to Novgorod scribe books we can get information about the population of a peasant court yard on the North-West of Russia in much more earlier era, perform a comparative analysis “European” and “Eastern” nuptiality models and make a conclusion about the influence of certain historical conditions in the formation of these patterns.

Keywords: Russia, Novgorod land, Novgorod scribe books, European and Eastern-European Nuptiality models.

Introduction. J. Hajnal compared the demographic statistics of various European countries for the period of the XVIII – beginning of XX centuries and divided them into two large groups, the separation between which passed on conditionally-defined line from St. Petersburg to Trieste. Over the time of the centuries in the Eastern group we can see signs of early and universal marriage. There are 85 to 95 % of twenty-five year old married women and about 70–80 % of men in this group. Joining others in marriage is limited basically by specific biological reasons. There is a lack of marital relations for 30–40 % of women and 50 % men in the Western group for this age. It was not typical for universal marriage rate for this Western model of family behavior, since 10 to 20 % of men had never started a family and remained alone for the whole life [13].

J. Hajnal tied the identified type of the “European” nuptiality with specific way of organization for western countries of peasant farming, which was based on a simple (nuclear) family, consisting of parents and their children. Traditionally, the aged head of the family in Western countries conveyed the farm to one of his sons and only if he had the immovable property could start a family. The other sons remained without an appropriate share of the real property and earned money by themselves: were employed, mastered new professions, and they found their farm. The issue of marriage in the absence of sufficient land and other property was postponed for indefinite term.

Unlike the “European” model cohabitation of several families in the same peasant farming was appertained for the “Eastern” model of nuptiality behavior. The old farm could be divided into new after the death of sons' father or during his lifetime if adult sons became economically independent and able to maintain their own farming without any parental help. However, for the “Eastern Europe” model was characterized a much larger proportion of very large peasant farming, consisting of dozens of people, relating to different generations [14]. For this model, it wasn't rarity a section of the farm between grandchildren.

In the study of nuptial behavior in Russia previously investigated the period of XIX–XX centuries. Belarusian historian V. L. Nosovich studied the family structure and peasant farms in the study of “East European” model of nuptial behavior on the territory of the Russian Empire in the earlier materials. According to his calculations, the average number of yard in the XVI century in the traditional Belarusian village was 6 people, on average, the yard had 1.2 to 1.3 marital couples [15].

However, out of scientists' view there were some questions such as when the distinctive features of nuptial behavior began to form and how they were caused. At the same time, the existing sources about North and North-West Russia could tell us about multiple nuptial behavior that depends on many circumstances, and increasing the number of multi-family peasant farms during the XVII–XIX centuries [3, 56–58; 4, 37–38]. I. A. Chernyakova inhabited one-generation and two-generation families on the basis of absolute predominance (64 %) at the end of the XVII century peasant farms, tells us about the closeness of the “European” nuptiality model and Karelia inhabitants' family behaviour [12, 359–360].

Material and methods. Some conclusions about the numerical composition of the peasant farming in North-West Russia at the turn of XV–XVI centuries can be done basing on the study the data of the Novgorod Scribe books. In the end of XV century there were 37–38 thousand settlements in Novgorod, which were mainly small peasant farm yards [6, 49]. With over 40 % of settlements consisted of one peasant farm [1, 324]. The sample was formed the total number of settlements, which included 7 195 yards, where there were 10 499 men's souls. To build the sample of the Novgorod Scribe books of the late XV – early XVI century, the material was subjected to continuous systematic statistical processing. The economic indicators were selected from the scribe books' text, characterizing one-yard village, which consisted of one peasant farm, and economic indicators separately described the peasant farms of

multi-yards villages. They did not include the courts in the sample, where the landowners and their serfs, unplowables and other people.

Results and Discussion. As it turns out, on average, a farm-house in the Novgorod land in XV–XVI century contributes 1.5 men's souls. This factor is slightly higher than the previously data in our historiography, which, in turn, is connected with various methods of retrieving information from the scribe books. According to previous data, there was 1.3 men's souls at a farm-house in the Novgorod land, but in some areas, this rate was increased to 1.6 [7, 274]. Undoubtedly, the average figures negate differences in some territories. Therefore, an analysis was conducted both on macro- and microarray of Novgorod land. In particular, the descriptions of 1 247 farmhouses in Shelonskaya Pyatina were included in the sample, where 2 071 male resided, 2 963 yards with 3 421 male soul in Derevsky Pyatina, 1 859 yards with 3 130 men's souls in Vodskaya Pyatina, 906 yards with 1 560 male souls in Obonezh Pyatina, 220 yards with 317 men's souls in Bezhetskaya Pyatina. Despite of the differences in the number of peasant farms in this sample, there is an average of 1.7 people at a farm-house in Shelonskaya, Vodskaya and Oboneshskaya Patina. There is 1.4 person in Bezhetskaya Pyatina and 1.2 in Derevlyanskaya.

The area-based indicators are almost the same. For example, on the average there are 1.6 men's souls in the old Russian district at a peasant farm, 1.7 are in Perovsk and Novgorod districts, 1.6 male souls are in Koreisk Uyezd of Vodskaya Pyatina, 1.7 are in Novgorod district. There are also 1.7 men's souls at one peasant farm in Nagornaya part of Obonezhskaya patina, 1.8 are in Zaonezhskaya part. It's a little more only in Derevskaya Pyatina: on the average there is 1.05 man a yard in its Central part of and 1.2 is in the Northern areas.

It should be noted that the scribes recorded not only men, but also widows, daughters-in-law, buddies, neighbours, drones, solitary men, colonels in Novgorod scribe books. However, the widow was called only if there weren't adult males, and other categories of the population are mentioned quite rarely. In the historiography of the study of Novgorod scribe books, most researchers came to the conclusion that the men's souls which were recorded in the scribe books were the heads of families, i. e. married men. At the same time the researchers sorted out the yards among multi-family peasant families, which were jointly owned by married brothers, as well as the courts with the presence of cousins, sons-in-law, grandchildren and nephews [8, 143].

The analysis of selected indicators on the microarray allowed us to conclude about the presence of a large number of nuclear families consisting of one or two generations of relatives in the Novgorod land in XV–XVI century. Since that time, the North-West of Russia tended one-yard spread of settlements, we can say that existing land resources are allowed to produce the sections of families, and separated from his father's farm adult sons. The process of settlement in Novgorod was continued throughout the first half of the XVI century [11, 76–78], but they were very mixed. So, the number of peasant farms in the village increased significantly in Staraya Russian and Novgorod counties, but the number of one-yard villages simultaneously decreased. The number of one-yard settlements in

Derevsky Pyatina and Porhovskom uyezd of Shelonskaya Pyatina continued to grow, but the number of peasant farms in the village simultaneously reduced [2, 112–113]. In this time they marked the number of rural settlements in Vodskaya Pyatina was increased in due to development of land areas, which were remote from old settlements [10, 56–62]. The number of settlements in Zaonezh graveyards of Obonezh Pyatina increased slightly from the end of XV century till the end of XVII century; however they became larger at the expense of an increasing number of peasant farms [5, 263]. In the first half of the XVI century the number of settlements increased in Bezhetskaya Pyatina by 81 % due to the active development of its Eastern part [2, 185].

On the whole, the demographic situation in the Novgorod land at the beginning of the XVI century was quite safe. At this time the total population was 472 thousand persons. The population of Novgorod Patina in the first half of the XVI century was increased to 526 thousand people [9, 88]. The number of settlements has reached 40 thousand. That was the maximum value of the number in all history of the region [2, 153]. The most fertile and easier to cultivate the lands have been mastered in the course of peasant colonization in the previous centuries. In the first half of the XVI century peasant colonization was focused in the more remote areas of the Novgorod land, previously they were less convenient for farming. There is also the development of the territories were situated to the East of the Novgorod land, it happens because of shifting political and economic center after the annexation of Novgorod to Moscow.

Conclusion. There is a relatively smooth average of the number of peasant farms in patina and microarray to indicate the presence in the Novgorod land in XV–XVI centuries, small farms, consisting of parents and their children. Since the founding of new settlements, there are still undeveloped land, at this time, we have not seen a large number of multi-family peasant farms. During the XV–XVI centuries the main production unit of the region is the small peasant family.

For centuries the existence of multi-family peasant farms in the countries of Western Europe was limited by the principle of primogeniture, which was in close dependence on the historical land-use type based on the system of undivided land. Each plot was heritable to one of his sons and was the basis for the formation of small family. We can see the dependence between available land resources and family size also in the North-West of Russia in the XV–XVI centuries. However, an important difference from Western Europe is the availability of vacant, undeveloped land in this region and the apparent lack of overpopulation of the territory. These resources helped to separate young families from the parental peasant farm and to make peasant transitions to vacant land.

Thus, at the turn of XV–XVI centuries, the model of nuptial behavior did not conform to the classic "Eastern European" model in North-West Russia because a peasant farm was based on a simple (nuclear) family. At this time there was widespread cohabitation of several families in the same yard with the same peasant farm. The structure of the peasant farm and the family formed up on the basis of economic feasibility.

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Section 4. Medical science

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The effectiveness of endoscopic sinus-surgery in immunoreactivity recovery, oxidative stress and endothelial dysfunction elimination at chronic rhinosinusitis associated with comorbidity with immunocomprometation

Abstract: One of the most difficult patients' groups is chronic rhinosinusitis patients with nasal polyps (CRSP) with chronic glomerulonephritis (CGN), whose possibility to undergo surgery removing polyps and sites of chronic infection is limited by high incidence of intra- and postoperative complications. Difficulties in selection of therapeutic approach at CRSP + CGN are caused by immunocomprometation, abnormalities of blood rheology, as well as inflammation and oxidative stress (OS) persistence.

Keywords: chronic rhinosinusitis with nasal polyps, chronic glomerulonephritis, oxidative stress.

Importance of an issue. In 2012 the prevalence of nasal polyps was 2.7% of general population in Sweden, 0.5% in Korea, 4.3% in Finland, 2.1% in France, which points out high enough rate of chronic rhinosinusitis with nasal polyps [9, 25]. Treatment of chronic polypous rhinosinusitis remains an important issue, as rates of disease recurrence vary widely: from 26 to 83%. This indicates a complexity of CRSP pathogenesis at that the comorbidity assumes particular importance [20]. One of the most difficult patients' groups is chronic rhinosinusitis patients with chronic glomerulonephritis (CGN), whose possibility to undergo surgery removing polyps and sites of chronic infection is limited by high incidence of intra- and postoperative complications [12]. Difficulties in selection of therapeutic approach at CRSP + CGN are caused by immunocomprometation, abnormalities of blood rheology, as well as inflammation and oxidative stress persistence [10, 16].

Immunodeficiency and disregulation of immune response are developed in CRSP + CGN patients, because, regardless the stage of development, morphologic and clinical form of disease, the glomerulonephritis is considered as autoimmune pathologic process with predominant affection of glomerules, as well as tubules of interstitial tissue. Immune inflammation takes place with damage of T-cellular component, inclusion of pro- and anti-inflammatory cytokines, formation of circulating immune complex and/or autoantibodies.

Long period of immunodepressant administration also changes immunoreactivity in CRSP + CGN patients, which requires special management [9, 25].

One of the mechanisms of chronic renal disease (CRD) progression is an oxidative stress (OS) and antioxidative activity decrease in tubules [7]. Probable OS activation factor at CRD is an increase of angiotensin II prooxidant production and a decrease of endogenous renal antioxidant activity — atrial natriuretic peptide (ANP) and renal dopamine [17]. Prooxidative action of angiotensin II (AT-II) consists in activation of phospholipase A2, in such way increasing an intracellular content of arachidonic acid and lysophospholipids, which promotes lipid peroxidation enhancement [24]. AT-II is a factor assisting in nitrogen oxide transformation into highly toxic active form of nitrogen — peroxynitrite, increasing OS. Through specific nuclear receptors the AT-II directionally activates an expression of TGF-beta1 genes, promoting strong proinflammatory response development, and TGF-beta, in turn, stimulates angiotensinogen gene expression, p-38-dependent MAPK-activation and expression of proapoptotic p53, moreover, by means of ROS-signaling [8]. This mechanism shows an AT-II and TGF-beta impact on nephron damage through ROS regions. It is an activation of TGF-bets and a following mesangial cells hypertrophy, hyperproduction of mesangial matrix substance that conditions prosclerotic action of AT-II in kidneys. Locally in nephrons the AT-II through NF-kB activation induces

genes, involved in inflammation and fibrosis, infiltration by monocytes and macrophages, lymphocytes, synthesis of proinflammatory factors and adhesion molecules — endothelin-1, V-CAM, I-CAM, chemokines and cytokines [6].

Lipid peroxidation enhancement and membrane destruction also underlies a ciliated epithelium functional failure at CRSP [11]. Excessive production of reactive oxygen species (ROS) result in activation of protein-tyrosine kinase and protein kinase C (PKC), which is accompanied by stimulation, in particular, of mitogen-activated protein kinases (MAP-kinases) the consequence of which is an activation of proliferation, underlying both nephrosclerosis and polyp formation in paranasal sinuses [21]. Increasing activity of different protein kinases, the ROS participates in regulation of numerous cellular processes, such as cellular adhesion, proliferation, signal transduction, apoptosis, etc. The ROS activates various signal paths, such as path of AP-1 protein and NF- κ B transcription factor [4]. Thus, OS participates in fibrosis development both in nephron and paranasal sinuses (PNS).

Both CGN and CRSP are accompanied by endothelial dysfunction (ED) and clotting abnormalities [3]. Under the influence of factors, activating or damaging endothelium (microbial endotoxins, circulating immune complex, cytokines, inflammation mediators, lipid peroxides) a sudden change of para- and autocrine endothelium activity with loss of its native feature of thromboresistance and increase of procoagulant and proaggregate effects take place: a formation of Willebrand factor, plasminogen 1 activator inhibitor (PAI-1), tissue thromboplastin, fibronectin increases, a synthesis of tissue type plasminogen activator, thrombomodulin, antithrombin, prostacyclin, nitrogen oxide decreases, endothelium is involved in synthesis of prooxidants, vasoconstrictors [16].

A decrease of nitrogen oxide level was found in nasal cavity [15] at CRSP, which conditions ciliary dyskinesia and decrease of ciliated epithelium transportation function, and local increase of fibrin stabilizing factor results in formation of fibrin deposits in submucosal of nasal polyps, which contributes in remodeling of polyp tissue at CRSP. According to Takabayashi T. et al. (2013), a level of fibrin degradation products, D-dimer was significantly reduced in nasal polyps in CRS patients without polyps and control, which proved fibrinolysis abnormality and noncompletion in polypous tissue. Significant reduction in epithelium and glands at mRNA level and in protein of tissue-type plasminogen activator (t-PA) was noticed in patients with polypous form of chronic rhinosinusitis [23].

As noted from literature data, there is local impaired coagulation at CRSP, which is a reason of microthromb formation and trophism abnormality in mucous membrane, local blood flow degradation.

Work objective: to study immunoreactivity, intensity of OS, systemic inflammation and markers of endothelial dysfunction in CRSP + CGN patients, evaluate effectiveness of endoscopic sinus-surgery with pathogenetically substantiated medication correction for the dynamics of these blood values.

Materials and methods. 102 patients were examined with chronic nasal and paranasal sinuses diseases with chronic glomerulonephritis of nephrotic form (CGN) in the age of 18 to 60 years, men — 76, women — 26. 24 of them were CRSP + CGN patients (1st group), and 32 were CRSP patients without comorbidity (2nd group). The duration of CGP in 1st group patients constituted 2.5 ± 0.8 years, proteinuria was 2.44 ± 0.22 g/day, which indicated noncomplete clinical-laboratory remission, CGP stage 2. Endoscopic rhino-sinus-surgery (FESS) combined with medication

correction (MC) was carried out in 1st and 2nd group patients. For comparative evaluation ERSS + MC and traditional treatment a comparison group was separated — CRSP + CGN patients receiving traditional conservative treatment (n = 8). Control group consisted of 9 healthy volunteers of the same age. Surgical intervention — functional endoscopic sinus-surgery — was carried out under standard technique of endonasal microsurgery with diode laser, additional MC included Antibacterial treatment, antifungal agent, antioxidant therapy, irrigating therapy, topical glucocorticosteroids and oral steroids.

Determination of total number of peripheral blood lymphocytes was conducted at Automatic Hematology Analyzed MIN-DRAY BC-5800 (China). T-helper/inductor cells (CD4+), Suppressor/Cytotoxic T cells (CD8+) were determined by method of Zalyalieva M. V. (2003) using monoclonal antilymphocyte antibodies, produced by Research Institute of Immunology of Russian Federation (Moscow). Immunoregulatory index was determined by ratio CD4+/CD8+. Circulating immune complexes (CIC) were discovered by method of Menshikov V. V., 1987, by precipitation in 3.5 % solution of polyethyleneglycol (PEG), the measurements were taken at spectrometer SF-46 at 280 nm ant expressed in standard units. A neutrophil phagocytic activity of (NPA) was examined by phagocytic index, determined by neutrophil capability to absorb inert particles of melamine-formaldehyde latexes. Used inert particles melamine-formaldehyde latexes were 1.5 to 2.0 μ m in size and produced by Institution of Biological Instrumentation (Moscow), the neutrophils absorbed one or more particles of latex were considered phagocytic, 100 neutrophils were calculated and this way the phagocytic activity was determined.

A concentration of endothelin-1 (ET-1) was determined by immunoenzyme method at the Analyzer ELx808 manufactured by BIO-TEK INSTRUMENTS INC (USA) using sets produced by Biomedica. Using the same analyzer a concentration of immunoglobulin IgE, tumor necrosis factor-alpha (TNFa), D-dimer in blood plasma was determined by EIA method using standard sets produced by CJSC VECTOR-BEST, Novosibirsk, Russia «total IgE — EIA-BEST», D-dimer — EIA-BEST, Alpha-TNF-EIA-BEST respectively.

Determination of activated partial thromboplastin time (APTT) and fibrinogen concentration in plasma was carried out with standard sets of company Cypress Diagnostics, Belgium.

Concentration of C-reactive protein (CRP) was estimated at automatic biochemical analyzer VITROS — 350 with reagents of company ORTO-clinical diagnostic, USA. Determination of malondialdehyde (MDA) in blood serum was carried out by method of Stalnaya I. D. et al. [5]. Determination of superoxide dismutase (SOD) activity in blood was conducted by method of Mirsa P. H., Fridovich I. modified by Brusov O. S. et al. [1, 18]. Catalase activity in blood was studied according to Zubkova S. M. et al. [2].

Results. Initially, before treatment 1st group CRSP + CGN patients showed expressed lymphopenia (a decrease in lymphocyte content by 1.9 times as for the control), a decrease in CD4+ by 1.2 times as for the control and 1.3 as for the 2nd group, as well as an increase by 1.7 times and a decrease of NPA by 1.5 times as for the control. Immunogram in CRSP of 2nd group patients were characterized with proved increase of Suppressor T cells (CD8+) by 1.3 times as for the control at normal content of CD4+ and total lymphocytes. Immunoregulatory index (IRI) of this group was reduced to 1.67 characterizing current chronic inflammatory process. CIC and NPA content in 2nd group of patients were compared to control (Table 1).

Table 1. – Immunoreactivity indices in polypous form chronic rhinosinusitis patients with immunocompromentation before and after treatment

Patients groups	Control, n = 9	Before treatment		After treatment		
		1 st group (CRSP + CGN), n = 16	2 nd group (CRSP), n = 32	1 st group (CRSP + CGN), n = 16	2 nd group (CRSP), n = 32	Comparison group (CRSP + CGN tra- ditionally), n = 8
Total lymphocytes, %	32.4 ± 1.3	23.8 ± 3.9	29.4 ± 1.6	27.1 ± 0.9 ^{*,**}	29.9 ± 0.8	24.2 ± 2.0
CD4+, %	39.1 ± 2.4	32.1 ± 2.7	42.2 ± 1.6	35.4 ± 0.5	41.6 ± 1.1 ^{***}	33.7 ± 1.9
CD8+, %	19.5 ± 1.1	29.3 ± 1.8	25.2 ± 1.9 [*]	24.6 ± 0.9 ^{*,**}	21.0 ± 0.9 ^{**,***}	28.8 ± 0.9 ^{***}
IRI	2.0 ± 0.1	0.9 ± 0.1	1.7 ± 0.2	1.43 ± 0.2 ^{*,**}	1.98 ± 0.2 ^{***}	1.17 ± 0.1 ^{***}
IgE, IU/l	32.0 ± 2.3	299 ± 19	235.0 ± 13.5	99 ± 13 ^{*,**}	63 ± 11 ^{**,***}	253 ± 13 ^{***}
NPA, %	61.2 ± 9.1	39.7 ± 1.2	65.2 ± 1.4	55.3 ± 2.2 ^{*,**}	65.9 ± 1.9 ^{***}	43.6 ± 1.9 ^{***}
sIgA, µg/ml	0.81 ± 0.03	0.42 ± 0.03	0.49 ± 0.03 [*]	0.66 ± 0.06 ^{*,**}	0.79 ± 0.02 ^{**,***}	0.45 ± 0.03 ^{***}
CIC, SU	69.3 ± 2.4	121.0 ± 11.2	76.2 ± 2.9	92.7 ± 1.1 ^{*,**}	71.1 ± 0.8 ^{**,***}	114.2 ± 3.3 ^{***}
D-dimer, ng/ml	130 ± 10	229 ± 18	179 ± 9	147 ± 8	128 ± 7	190 ± 5
APTT	38.1 ± 2.0	21.9 ± 2.0	38.2 ± 1.7	32.3 ± 1.5	37.0 ± 0.7	22.4 ± 0.9

Note: * — proved as for the traditional treatment method, $P < 0.05$; ** — proved as for before treatment, $P < 0.05$; *** — proved as for the 1st group, $P < 0.05$.

As obvious from the Table 1, CRSP + CGN patients have deep T-cellular deficiency combined with allergic component in the form of immunoglobulin E increase with sharp decrease of IRI and CIC increase, showing immune response dysregulation. These shifts in T-helper content in CRS + CGN patients are dangerous for deep dysregulatory changes in immune status, as T-helper cytokines provide for the development of effective immune response. 1 type T-helpers (Th-1) producing IL-2 and IFN-gamma support cell-mediated immunity formation, and 2 type T-helpers (Th-2) population synthesize IL-4 and IL-10, IL-13 acting to activate humoral immunity, proliferation stimulation and B-lymphocyte differentiation, as well as synthesis of different classes of antibodies. Which path the T helper would follow depends on cytokine background, antigen nature and its amount [26].

The association of CRSP with Th-2 dominant inflammation is stated in Nagarkar D. R. et al., 2013, as these authors found thymic stromal lymphopoietin (TSL) and its RNA in nasal polyps' content. TSL is a trigger of Th-2 inflammatory response in dendrite cells and an inducer of IL-1-dependent production of Th-2 profile cytokines by mast cells. Nasal polyps extract increased IL-5 concentration in mast cells induced by IL-1 beta [19]. The study of epithelial cytokine expression, involved in Th-2 inflammation, IL-25, IL-33, TSL, as well as chemoattractant properties of eosinophils in polyp tissue and mucous membrane showed the high level of them at CRSP, correlated with CT and endoscopy data [13], which proves Th-2 response prevalence at CRSP [14].

Therefore, immunologic peculiarities of CRSP include CD8+ reduce without proved IRI change, while CGN comorbidity patients have deep T-cellular deficiency with immune response dysregulation.

After ERSS 1st group patients showed statistically proved as for the index before treatment increase of IRI owing to CD8 reduce, total amount of lymphocytes also proved to increase. This indicates immunoreactivity restoration resulting from secondary immunodeficiency arresting in CRSP + CGN patients. An increase of NPA and secretory immunoglobulin A shows local immunity competence after complex treatment completion in 1st patients group. It must be noted, that immunogram parameters in 1 patients group had positive dynamics, but didn't reach the control level. Thus, the CIC level reduced by 1.3 times as for before treatment content, but it exceeded control level by 1.32 times, the IgE concentration decreased by 3.0 times compared to before treatment index, by it exceeded

control level by 3.1 times. Despite this all, immunogram indices reasonably differed between the 1st and the comparison groups. Traditional treatment did not show significant influence on immune state at CRSP + CGN, immunodeficiency state remained at the level corresponding to the beginning of treatment. Thus, immunogram parameters in 1st patients group before the treatment show positive shifts in cellular immunity increasing CD4+ and decreasing CD8+, which promotes an IRI increase up to 1.43. This is lower than in control group, but reasonably higher than before treatment index. Furthermore, restoration of lymphocytes regulatory functions assisted NPA increase as well as growth of secretory immunoglobulin A amount, which is an important factor of local immunity.

One of the peculiarities of CRSP + CGN progression is development of hypercoagulation syndrome, appeared as APTT shortening, tendency to increase D-dimer and fibrinogen. After traditional treatment, these indices were not significantly different from the level before treatment. After endoscopic sinus-surgery the D-dimer concentration reduced by 1.6 times and basic haemostatic profile of APTT elongated by 1.5 times in 1st patients group. We believe that positive dynamics of hypercoagulation syndrome is conditioned by decrease of endothelial dysfunction manifestations and OS when using offered method of treatment. It must be noted that blood rheological properties restoration is a favorable factor of CGN progression.

Biochemical research showed that MDA and endothelin-1 levels at CRS + CGN significantly exceeded the ones in CRSP patients, and were reasonably higher than control, which proves endothelium activation as the result of its damage and systemic oxidative stress. These shifts were accompanied by sharp suppression of antioxidative system (AOS) in terms of noncompensated oxidative stress. Thus, CRSP + CGN patients before treatment had an elevated level of MDA by 11.6 times as for control and by 1.4 times as for CRSP patients. They had SOD activity suppressed by 3.0 times and catalase by 1.5 times as for control, and by 2.0 and 1.2 times respectively as for CRSP patients. CRP concentration in 1st patients group was increased by 3.2 times as for control and by 1.2 times as for the 2nd patients group.

The results of laboratory monitoring at CRSP + CGN and CRSP after 1 month of therapy showed positive dynamics of oxidative stress parameters increasing the activity of enzymatic component of AOS, decreasing MDA, as well as reduction of systemic inflammation response syndrome in the course of complex treatment using radical polyp removal and modified sections of mucous membrane of sinuses (Table 2).

Table 2. – Indices of oxidative stress, inflammation and endothelial dysfunction in chronic rhinosinusitis patients before and after treatment

Patients groups	Control, n = 9	Before treatment		After treatment		Comparison group (CRSP + CGN tra- ditionally), n = 8
		1 st group (CRSP + CGN), n = 16	2 nd group (CRSP), n = 32	1 st group (CRSP + CGN), n = 16	2 nd group (CRSP), n = 32	
MDA, (nmol/mg of protein*min)	0.51 ± 0.01	5.92 ± 1.21	4.16 ± 0.21	2.33 ± 0.5 ^{*,**}	0.84 ± 0.05 ^{*,**,***}	3.78 ± 0.33 ^{***}
SOD (U/l)	4.62 ± 0.23	1.56 ± 0.13	3.12 ± 0.11	3.46 ± 0.2 ^{*,**}	4.1 ± 0.3 [*]	2.15 ± 0.42 ^{***}
Catalase, (mmol H ₂ O ₂ /mln. of er.*min)	38.1 ± 0.4	26.2 ± 1.3	32.1 ± 1.0	34.2 ± 1.1 ^{*,**}	37.3 ± 0.5 ^{*,**}	29.4 ± 1.4 ^{***}
CRP, mg/l	4.4 ± 0.8	14.1 ± 1.5	12.1 ± 2.0	8.4 ± 0.9 ^{*,**}	6.0 ± 1.2 ^{*,**}	12.3 ± 0.7 ^{***}
TNF-alpha, pg/ml	0.56 ± 0.02	29.5 ± 1.7	10.8 ± 0.9	15.3 ± 0.4 ^{*,**}	7.2 ± 1.1 ^{*,**,***}	27.6 ± 1.3 ^{***}
Endothelin, pg/ml	1.91 ± 0.20	19.3 ± 0.41	14.13 ± 0.62	9.7 ± 0.5 ^{*,**}	4.4 ± 0.4 ^{*,**,***}	17.3 ± 0.9 ^{***}

Note: * — proved as for the traditional treatment method, $P < 0.05$; ** — proved as for before treatment, $P < 0.05$; *** — proved as for the 1st group, $P < 0.05$.

As the Table 2 shows, all parameters of systemic inflammation (CRP, TNFa) endothelial dysfunction (endothelin-1) and OS after the treatment by offered method were reasonably different from indices of comparison group, which was treated traditionally without operative intervention application. Furthermore, all the above parameters in 1st group were reasonably different from indices before treatment.

Positive dynamics of MDA in 1st group expressed in its reduction by 2.5 times as for the index before treatment, with that SOD and catalase activity increased by 2.2 and 1.3 times respectively. The level of OS indices in this group was reasonably lower than the control after 1 month of therapy, however, this significant reduction (by 2–2.5 times) from the original data allows to state the expressed positive effect of the developed method of CRSP + CGN treatment, which wasn't shown by the comparison group, where the intensity of OS was similar to the one before treatment.

The endothelin-1 level in 1st group reduced by 1.98 times, TNFa — by 1.93 times as for the content before treatment, and CRP decreased by 1.7 times, pointing out significant reduction of systemic inflammation and endothelial dysfunction, while appropriate aeration of sinuses was restored and abnormal focus was eliminated by sinus-surgery, which wasn't noted in comparison group. In traditionally treated patients, these parameters were not reasonably different from the values before treatment.

I.e. conservative therapy without elimination of one of the focuses of chronic infection and sensibilization does not result in objective improvement of pathochemical processes underlying systemic oxidative stress and inflammation at CRSP + CGN.

Comparative analysis of the results in 1st and 2nd groups demonstrated that application of ERSS + MC promotes blood antioxidant activity restoration in CRSP + CGN patients to the CRSP level. Thus, we managed to approximate the effectiveness of impact on AOS to the results of patients without comorbidity, as the parameters of SOD and blood catalase were not reasonably different between 1st and 2nd groups. MDA concentration, TNFa and endothelin-1 levels differed in statistically proved limits in 1st and 2nd groups, showing a contribution of CRD into systemic increase of these parameters, which is characteristic for CGN rather than for CRSP. At the same time, the concentration of systemic inflammation marker was not reasonably different in 1st and 2nd groups, demonstrating high efficiency of ERSS + MC.

Abnormal focus removal, aeration restoration, sinus drainage provision coupled with therapy optimization in the form of administration of small doses of topical steroids and antioxidant-mucolytics

allowed significantly reduce the intensity of ROS generation in blood, signs of endothelial dysfunction and inflammation.

The above stated proves absolute necessity of endoscopic sinus-surgery in CRSP + CGN. With that, the conservative part of therapy is directed to improve drainage function of ciliated epithelium, gives anti-inflammatory, immunomodulatory and antioxidant action. Cumulative impact of abnormal immunostimulation focus eradication and pathogenetic symptomatic treatment results in objective improvement of cellular, humoral and local immunity parameters.

Comparative analysis of treatment results in 1st and 2nd groups showed that application of complex therapy in the group without comorbidity leads to complete restoration of IRI, and OL, CD-4, CD-8, NPA, CIC, sIgA parameters were not significantly different from the controls. This proves high effectiveness of this offered method of polypous rhinosinusitis treatment.

Abnormal focus removal, aeration restoration, sinus drainage provision coupled with therapy optimization in the form of administration of small doses of topical steroids and antioxidant-mucolytics allowed to restore immunoreactivity, significantly reduce the intensity of ROS generation in blood, signs of endothelial dysfunction and inflammation. This also promoted local immunity restoration, positively affected the immunoreactivity in general.

Conclusions:

1. CGN contributes in chronic rhinosinusitis progress in the form of endothelial dysfunction, hypercoagulation syndrome, OS enhancement and AOS reduction, T-cellular immunodeficiency with immune response disregulation, systemic inflammation.

2. CRS at CGN progresses much worse than without comorbidity, accompanied by MDA increase by 3.3 times, CRP — by 1.4 times, TNF-alpha — by 5.3 times, endothelin-1 — by 4.5 times, SOD suppression by 2.9 times as for the CRS group without CGN.

3. Comparative analysis of CRSP + CGN and CRSP showed that ERSS + MC application promotes restoration of blood antioxidant activity in CRS + CGN patients up to the CRSP level, decrease of endothelial dysfunction by 1.9 times, systemic inflammation by 1.7 times, OS by 4.2 times as for the level before treatment, which the traditional conservative therapy does not show.

4. Comparative analysis of CRSP + CGN and CRSP showed that ERSS + MC application promotes restoration of blood antioxidant activity in CRS + CGN patients up to the CRSP level, decrease of endothelial dysfunction by 1.9 times, systemic inflammation by 1.7 times, OS by 4.2 times as for the level before treatment, which the traditional conservative therapy does not show.

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The intensity of systemic oxidative stress and optimization of therapeutic tactics in patients with opioid addiction

Abstract: The pathogenetic significance of systemic oxidative stress, depending on the duration of opioid narcotization and availability of comorbid damage to the liver for further optimization of therapeutic tactics is examined in the article. Inclusion of alpha-tocopherol in the complex treatment of opioid addiction contributes to sustainable and prolonged suppression of free radical oxidation in the blood, observed immediately after treatment.

Keywords: opioid addiction, systemic oxidative stress, therapeutic tactics, alpha-tocopherol.

In recent times, more and more attention is paid to the participation pathochemical reactions in the genesis of many diseases [5, 60–62]. The study of the liver in heroin addiction is extremely important, because depends on it for abstinence for neutralization and clearance of the drug is carried by the liver [6, 10–12]. In the literature, there is enough information, says the activation of free radical oxidation and the presence of endogenous intoxication with heroin addiction, shows aggravation of lipid peroxidation, increase the level of nitric oxide and peroxide hemolysis of red blood cells with increasing doses of heroin, as well as the correlation between low levels of NO and low concentrations of antioxidants plasma (vitamin E and C) at prolonged narcotization [1, 59–63]. Nevertheless, the association of the level of reactive oxygen species (ROS) and the characteristics of the course of withdrawal symptoms, the impact of somatic pathology, have been conducted.

The aim of the study was to investigate the pathogenetic significance of systemic oxidative stress, depending on the duration of opioid narcotization and availability of comorbid damage to the liver for further optimization of therapeutic tactics.

Material and methods. The study included 52 male patients aged from 18 to 55 years with clinically-defined the drug addiction (ICD-10 — F11.2). To analyze the importance of clinical and dynamic factors in the development of opioid addiction patients are divided into 2 groups: one group of opioids addicts in conjunction with somatic disorders and the comparison group is represented by opioids addicts without physical illness. Data on the primary somatic disorders in the primary study group: the presence of viral hepatitis B and C. The main methods of investigation were clinical-psychopathological. To determine the intensity of lipid peroxidation (LPO) to determine the level of malondialdehyde was conducted (MDA) in serum [4, 66–68], the activity of catalase in the blood [3, 81–83], the definition of middle molecules (SMP) [2, 10–15].

Results and discussion. During the study we found that the total level of enzyme was higher in the study group than the control group, but is within the reference range (11–66 U/L), indicating the absence of acute or chronic liver disease. A deeper analysis of the data revealed that the rate of generation of ROS in the blood, and ALT activity in the examined patients varies widely, and increases with increasing duration of narcotization, accession of liver damage in the form of toxic and infectious hepatitis, which was the basis to allocate a group of patients with duration of narcotization up to 1 year — 8.3 ± 2.1 months and addicts who use opium for more than 1 year — 20.2 ± 9.8 months.

With this approach to the interpretation of the data could reveal that patients with a duration of narcotization up to 1 year has moderately severe endotoxemia — SMP ($0.063 \pm 0.009^*$) increase 3 times and oxidative stress — MDA ($1.31 \pm 0.10^*$) increase 2.6 times due to lower activity of catalase in 1.5 times ($26.9 \pm 1.1^*$) compared with the control

(MDA 0.51 ± 0.09 nmol/mg protein, SMP 0.021 ± 0.001 AU/mg protein, catalase 40.1 ± 1.7 mmol of H_2O_2 /mln. Erith * m), whereas patients with more than one year duration of narcotization the reduction of catalase activity was observed in 3.5 times — $11.6 \pm 0.9^{**}$ and the level of MDA — $2.61 \pm 0.13^{**}$ and SMP — $0.109 \pm 0.012^{**}$ exceeded control in 5.0 and 5.5 times, respectively (Note: * — Significant in relation to the control, $P < 0.05$; ** — Significantly with respect to narcotization duration up to 1 year). In the blood increase in ROS generation in opioid addicts occur with increasing time of drug dependence and connection of liver damage. Differences indicators MDA, SMP, catalase and blood ALT, depending on the duration of narcotization in all cases were significant ($P < 0.05$).

It should be noted that our results of research on the state of the antioxidant system in patients who use opioids, according to the oppression of the enzymatic link of antioxidant protection and the need to include substances with antioxidant properties, in the treatment of these patients. Relief of oxidative stress necessary to normalize membrane-destructive processes in the body, primarily in the brain and liver, will provide adequate metabolism microsomal oxidative preparations system used in treatment — antidepressants, antipsychotics, etc., optimizes post opioid detoxified, thus shortening during the withdrawal syndrome and reduce its severity.

Based on the identified pathochemical features of the course of acute and chronic drug intoxication opiates, as well as the availability of the system operating in the blood of opioid addicts, the traditional therapeutic tactics has been optimized as follows: included pathogenetic therapy with an effect on metabolic processes with the use of antioxidants, apply individual approaches appointment of psychotropic drugs in the framework of the existing treatment standards. In relief of withdrawal syndrome used psychopharmacological drugs according to the protocol of treatment of opioid, aimed at the relief of its main components: analgesics (diclofenac), tranquilizers (sibazon), as well as a means to suppress craving for drug (carbamazepine). By this scheme, in some cases, for the relief of the craving for the drug was added neuroleptic. Limited use of antipsychotic drugs in patients with comorbid pathology was associated with a paradoxical clinical effects by increasing agitation, high frequency of side effects with the development of phenomena neuroleptic syndrome, neurological complications. When included in the treatment regimen neuroleptic his choice was determined by the peculiarities of psychopathological component withdrawal syndrome. In opioid addicts with comorbid disorders during the treatment of withdrawal symptoms as pathogenetic therapy of viral hepatitis carried out a massive infusion of crystalloid and colloid solutions, glucose solutions with the correction of electrolyte composition blood and acid-base balance. Adequate fluid therapy led to an improvement in general condition of patients and increased the tolerance used in the relief of withdrawal symptoms of

drugs. Along with the traditional as membrane-pathogenetic therapy administered alpha-tocopherol at a dose of 800 mg/day for 2 admission. Also, patients with comorbid pathology throughout the course of treatment prescribed hepatoprotectors. Doses of drugs consumed were determined taking into account biological factors: a daily dose of heroin, the duration of narcotization, the constitution and weight of the patient. To reduce the risk of complications and minimize the side effects of psychotropic drugs prescribed may lower doses in patients with comorbid pathology. At post abstinent disorders drugs of choice were antidepressants and neuroleptics. The study was conducted to compare the efficacy of conventional therapy and optimize treatment with the antioxidant alpha-tocopherol. Excessive ROS during abstinence initiates the process of lipid peroxidation (LPO) in the blood of patients in both clinical groups, as evidenced by the increase in MDA level, depending on the duration of narcotization with respect to the norm. The most important role in the regulation of free-radical process belongs to the antioxidant enzyme catalase, which functions conjugate and inhibits lipid peroxidation in the step of activation of oxygen, the origin and the chain branching process.

A comparative study of two groups of drug users receiving different treatments — traditional and optimized in combination with alpha-tocopherol shows a more pronounced therapeutic effect bioregularly antioxidant therapy. In the traditional method of treatment, the level of MDA was significantly higher than before the treatment in the subgroup with the duration of narcotization over 1 year ($2.94 \pm 0.10^{**}$) and did not differ significantly from the index before treatment in the subgroup with the duration of narcotization to 1 year ($1.24 \pm 0.09^{**}$), indicating that the lack of effect of traditional therapy on the operating parameters. Moreover, in patients with liver damage, the operating system on the background of intensified conventional therapy.

When using the alpha-tocopherol in the composition optimized therapy lowering MDA levels observed in patients both subgroups, although its concentration is not reached control values. The catalase activity was restored to the control level in all patients and was not statistically different from the control group level. It is

also noteworthy that there were significant differences between the effectiveness of the optimized therapy with antioxidant relatively traditional in terms of MDA, SMP and catalase.

As in people, long-term opiate abusers and drug addicts with experience within a 1-year-optimized therapy including antioxidants have beneficial effects more pronounced in patients subgroup with duration of narcotization over 1 year. They noted a significant decrease from baseline in SMP ($0.045 \pm 0.012^{***}$) and MDA ($1.33 \pm 0.10^{***}$), which proves that the contribution of the liver in the system OS development with opiate addiction, as well as the fact that the recovery of the antioxidant capacity of the body leads to the relief of the OS (Note: * — Significant in relation to the traditional method of treatment, $P < 0.05$; ** — Significantly relative to controls ($P < 0.05$); *** — significantly relative to the treatment ($P < 0.05$)).

The study period of abstinence in patients receiving optimized treatment including an antioxidant, found that significantly reduced the duration of withdrawal symptoms, reduced craving for the drug, and the low intensity of the generation of ROS in the blood correlates with the effectiveness of therapy. Listing of alpha-tocopherol in the range of optimized therapy for opioid dependence contributes to sustainable and prolonged suppression of free radical oxidation in the blood, observed immediately after treatment.

Conclusion. Using optimized therapy helped achieve a significant reduction from baseline indicators of lipid peroxidation, which proves that the liver contribute to the development of the system operating in opium addiction, as well as the fact that the recovery of the antioxidant capacity of the body leads to the relief of the oxidative stress. The study period of abstinence in patients receiving optimized treatment including an antioxidant, found that significantly reduced the duration of withdrawal symptoms, reduced craving for the drug, and the low intensity of the generation of active forms of oxygen in the blood correlates with the effectiveness of therapy. Inclusion of alpha-tocopherol in the complex treatment of opioid addiction contributes to sustainable and prolonged suppression of free radical oxidation in the blood, observed immediately after treatment.

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A comprehensive assessment of the treatment effectiveness of bronchial asthma in children with metabolic syndrome

Abstract: It is installed the positive effect of metformin on clinical and metabolic parameters of insulin resistance syndrome. There was a positive trend in body weight, body mass index, total cholesterol, high density lipoprotein.

Keywords: Bronchial asthma, metabolic syndrome, children, treatment.

Actuality: In recent years, the attentions of scientists around the world are increasingly attracted to the problem of the combination of pathologies, which is one of the most difficult problems faced by doctors. Currently, the problem remains topical treatment of metabolic syndrome (MS) in children with asthma [1]. Among the younger generation over the past 10–15 years, in some extent was developed dietary and physical activity [2]. However, the above mentioned approach for the majority of children and adolescents are often ineffective. First of all, measures aimed at changing the image, the power of stereotypes and behavior require major modifications mentality of the patient, especially a child [3; 4]. The problem of drug correction of metabolic syndrome in children with bronchial asthma (BA) has been developed. It is well known that the progression of excess weight in childhood and adolescence in comorbidity is associated with significant metabolic disorders that may be a “trigger” link in MS development [4]. Given the available evidence about the role of insulin resistance in the mechanisms of formation and development of MS, the prospects for the pharmacotherapy it’s a group of drugs that improve insulin sensitivity, which include drugs metformin group [5]. Metformin and its analogs (siofor) are widely used in the treatment of adult patients. Using in pediatric patients appeared only in the last 3–4 years. However, studies of metformin in children are isolated, not take into account the various forms of obesity, its stage, duration of the treatment and the side effects of [6].

Purpose of the study. To evaluate the effectiveness of complex treatment of bronchial asthma in children with metabolic syndrome.

Materials and methods. The criterion for selection of children and adolescents in the main group was the presence of BA with MS. Sampling was carried out in the comparison group by the criterion of normal body weight with BA.

Exclusion criteria were congenital endocrine pathology, secondary arterial hypertension (AH), long-term hormone therapy (more than 1 month) of the first type of diabetes, as well as the age of 3 years old. In our study to assess the efficacy of metformin in treatment of metabolic syndrome in children and adolescents with BA compared anthropometric, metabolic parameters and tools. The study involved 53 asthmatic children with MS, mean age — 10.44 ± 0.2 g. At the time of entry into the study the mean body mass index (BMI) was 26.79 ± 3.94 , waist circumference/femur circumference — 09 ± 0.01 . The comparison group consisted of 46 children aged 6 to 14 years (average 10.44 ± 0.2 g.) with normal weight. The first group of patients were on standard therapy (a combination of a reduced calorie diet with adequate exercise), the second — in addition to the basic treatment metformin. Basic therapy included: the use of anti-inflammatory therapy, mucolytics, inhaled and systemic corticosteroids (Beklazon-eco 100 mcg.), specific immunotherapy, inhaled sympathomimetic (Salbutamol), oral methylxanthines (Theophilus 100 mg., aminophylline 0.2%), humidified oxygen, antihistamines, breathing exercises, massage of the chest.

As a result of the treatment in the first and second group of 3–6 months was registered an increase mean values growth, but without significant differences ($p > 0.05$). No statistically significant changes in mean values of the growth registered between subgroups with BA and MS on background of standard treatment and during treatment with metformin.

In the study of indicators FEV1 and MEF 25% in the BA group and indicators MEF 25% MEF 50% MEF 75% in the group with comorbidity significantly lower than the corresponding figures RF patients with MS.

Patients in acute disease revealed moderately expressed disturbances of RF in obstructive type, manifested primarily in reducing FEV1, MEF 25% MEF 50% MEF 75% and the index Tiffno. Against the background of the therapy improvements were recorded in all the examined, but in BA patients with obesity more often than in the group with normal body weight, there is no full normalization of RF, mostly VC and FEVC ($P > 0.05$).

Overweight leads to changes in the mechanical properties of lungs, limiting respiratory excursion and thus reducing the VC index. And inflammation of the airways in BA produce an airway obstruction, reflected in the decline in FEV1 speed performance. The differences between the groups suggest, in our view, a significant role in shaping the nature of MS clinical course of BA, BA combined with MS have a more pronounced negative effect on the RF rather than separately BA. Before initiation of therapy in 28 patients (70%) were fasting hyperglycemia (40 children was determined by IR). For the diagnosis of IR patients was calculated HOMA-R, as measured by the index of fasting glucose/fasting insulin. IR was diagnosed in 30 children (75%). Initially, an elevated level of fasting insulin was detected in 24 children (60%), and 2 hours after the load — in 28 children (70%). After 12 months of therapy with metformin was showed a significant decrease in fasting glucose to 6.2 ± 0.15 mmol/l to 5.4 ± 0.1 mmol/l ($P < 0.001$). Children in this group baselines fasting immunoreactive insulin (IRI), as postprandial were above normal ($N < 12.5$ mcIU/ml) and accounted for, on average, 18.7 ± 6.98 mcIU/ml, 35.1 ± 1.083 mcIU/ml respectively. Against the background of 12 month metformin therapy tended to reduce the concentration of fasting IRI to an average of 13.1 ± 9.12 mcIU/ml and postprandial levels, on average, up to 31.62 ± 7.13 mcIU/ml. HOMA-IR index, which characterizes the level of IR, was not significantly changed.

In the analysis in 48 children (80%) treated with metformin recorded by reduction as FG and postprandial glucose, moreover 42 children (70%) of all patients with initially diagnosed fasting hyperglycemia achieved the target values of fasting glucose. The decrease in fasting insulin was found in 30 patients (50%), and 2 hours after the load — in 36 patients (60%). Reduced HOMA-R was 16.2 (27%) patients.

Thus, 70% of children with metformin therapy led to the restoration target fasting glucose level (fasting glucose in plasma < 6.1 mmol/l).

On the background of 12 month therapy with metformin on 41 children (68%) patients with high level occurred reliable reduction of IL-1 β , IL-4, IL-8 and TNF- α levels. In group II, 12 months later, the observed immunological status of children, characterized by a significant reduction in levels of IL-1 β — 200 ± 25 and 120.4 ± 23 respectively in relation to an indicator of group I, that is, almost close to the reference value. There was a significant positive dynamics on the part of IL-4, IL-6, IL-8 and TNF- α performance compared to children in group I (P of < 0.01 to < 0.001), but remained above the reference value.

One of the most important violations of risk factors for MS is the typical violation of lipid metabolism. To this end, we evaluated the following parameters of lipid transport system: the average concentration of total cholesterol (TC), triglycerides (TG), HDL cholesterol and LDL cholesterol; studied the dynamics of the above mentioned parameters and frequency variations, depending on the time and method of treatment.

The data showed a significant decrease in HDL levels in the group of BA children with MS. Increasing levels total cholesterol

was observed in 15 infants (75%) LDL – 17 (80%) and TG – in 13 children (60%) of the group. Reduction of HDL was found in 6 children (40%).

After 12 months of therapy with metformin was found a significant reduction in total cholesterol to 6.1 ± 0.28 mmol/l to 5.3 ± 0.22 mmol/l ($P < 0.001$), 6 months later these figures with 5.3 ± 0.22 mmol/l decreased to 4.2 ± 0.22 mmol/l. LDL before treatment averaged 2.8 ± 0.8 mmol/l, and after 3 months was 2.6 ± 0.2 mmol/l, and after 6 months 2.4 ± 0.2 mmol/l ($P < 0.001$). TG levels were also significantly decreased from 1.2 ± 0.7 mmol/l, after 6 months there was a significant decline in 1.1 ± 0.5 mmol/l.

Against the background of the treatment in 16 children (80%) decreased triglyceride levels, and 3 children (20%) managed to reach the target level.

The results of our work had a predominant influence on therapy with metformin, a standard treatment in the clinical and metabolic parameters in children with asthma. This effect is related to indicators, carbohydrate and fat metabolism, and had a statistically significant effect in children with MS.

Conclusions

1. Recommended treatment regimens that include reducing insulin resistance - metformin, the correction of body weight, recovery of carbohydrate and lipid metabolism, and normalization of all components of MS, advanced mode of physical activity, subcalorie diet bronchial asthma in school-age children have a positive effective lead in achieving long-term remission and improving prognosis of disease.

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Results of surgical treatment of patient with pituitary tumor apoplexy

Abstract:

Objective: Apoplexy in pituitary tumor, resulting from the acute hemorrhage or infarction mainly in pituitary adenomas, is a rare yet major clinical event with neurological, ophthalmological and hormonal urgent consequences. The authors describe their surgical experience with a series of 89 cases of pituitary apoplexy.

Methods: The 205 patients with pituitary tumor operated via transsphenoidal approach in our hospital between 2005–2015 and 89 cases with pituitary apoplexy were retrospectively analyzed. The indications for urgent transsphenoidal surgery were as follows: mental deterioration, rapid visual loss and pituitary insufficiency.

Results: The mean age of patients (39 male and 50 female) was 38 years. Pituitary apoplexy occurred as an initial manifestation of pituitary adenoma in all patients. Headache was the most common presenting symptom (88.7%). Visual disturbance was found in 49.4% of patients. 39.3% of the patients had hypopituitarism. On magnetic resonance imaging (MRI), this catastrophic event accompanied with macroadenoma in a mean size of 26.5 mm. There was no specific complication in any of these patients.

Conclusion: The differential approach based on the account of features of a clinical case, possible increase already available pathologic infringements and high level of technics of operative intervention is a basis for favorable results of treatment at pituitary adenomas.

Keywords: pituitary adenoma, pituitary tumor apoplexy, transsphenoidal approach, hypothalamic syndrome.

Introduction

Pituitary tumor apoplexy (PA) refers to the abrupt onset of a severe headache frequently accompanied with nausea, vertigo,

meningism, and/or decreased level of consciousness, often with involvement of optic nerves, chiasm and CN III, IV, VI. The PA is potentially a life threatening pathology when the hemorrhage and/or

necrosis results to significant sudden increase in mass of the tumor [8, 4–6; 9, 160–164]. The incidence of apoplexy in pituitary adenomas occurs in 6–31% patients. Asymptomatic (subclinic) forms consist 25% from all operated of severe pituitary adenomas [5, 278–280; 6, 181–188; 7, 65–72; 8, 4–6].

The biggest influence on the clinical picture of pituitary adenomas is rendered on the pathological processes developing in the tumor [4, 22–25]. Pituitary apoplexy irrespective of size of a clinical current is accompanied with vasospasm which can be the starting factor to development of fatal ischemia of the brain [2, 363–373; 3, 114–118; 1, 602–609; 10, 109–115].

Patients with pituitary adenomas consist the special group among sick of tumors of sella areas and in the absence of adequate treatment can lead to frequency increase fatal outcome, that it is necessary to consider at their management [2, 363–373].

The authors performed a retrospective analysis to evaluate clinical presentation, postoperative courses, and pathological findings in

a series of patients surgically treated for symptomatic pituitary apoplexy during last 10 years.

Clinical Material and Methods. Based on brain tumor database, 205 pituitary adenomas had been operated between 2005 and 2015. During this period, 89 patients (39 male and 50 female) were surgically treated for acute or subacute presentation of pituitary apoplexy. Using retrospective analysis of 89 patients, the reviewed the details of clinical presentations, radiologic findings, endocrine studies, pathologic findings, postoperative complication and outcomes (Fig. 1).

All patients underwent assessment of anterior pituitary function on admission and subsequent follow-up in department of endocrinology. Assessment of anterior pituitary function was made by measuring random serum levels of PRL, ACTH, cortisol, GH Free T4, T3, TSH, FSH and IGF-1. The presence of hypopituitarism was defined by proven biochemical deficiency of at least one endocrine axis. The degree of visual disturbance was assessed by Snellen visual acuity and automated visual field testing.

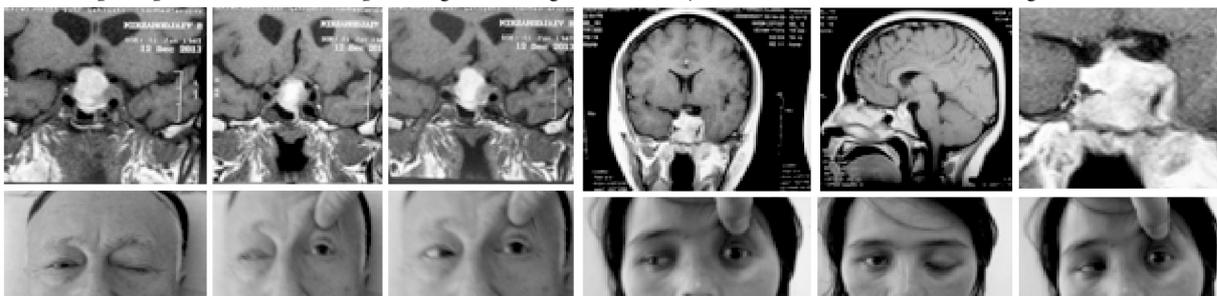


Fig. 1. The patients with invasive pituitary tumor complicated with intratumoral hemorrhage and total ophthalmoplegia

Surgical Management

In all patients the surgical treatment was a primary method of treatment. The pituitary decompression by transseptal-transsphenoidal approach was performed within different period after apoplexy.

The technique was as follows: the patient is on a table in a supine position. All stages of operation were spent under the microscope and fluoroscope control. The operative microscope was used as the primary instrument for tumor visualization. Only one (right) nostril

was used in all patient. At the closing stage, the free fat graft was laid in the tumor resection cavity if a CSF leak encountered intraoperatively sphenoid sinus was paced with an absorbable sponge to provide additional support to the fat graft. On intraoperation, hemorrhage and necrosis was obtained in 50 (56.1%) cases, in 39 (43.8%) patients revealed massive intratumoral hemorrhage (fig. 3). For revealing of the feature pituitary apoplexy, it had been considered the early postoperative period and the nearest results of treatment are analysed. The scheme of sellar stage is shown in fig. 2.

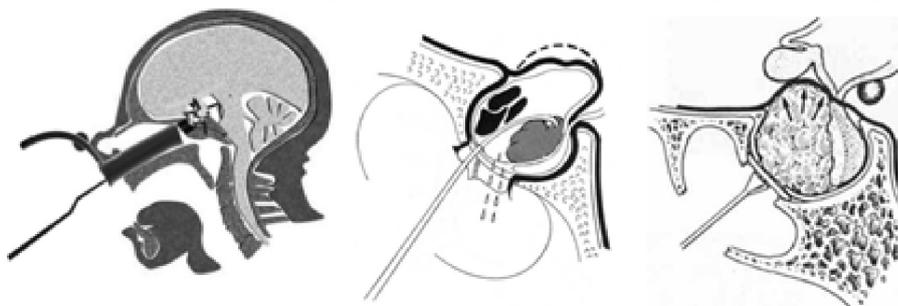


Fig. 2. The scheme of sellar stage

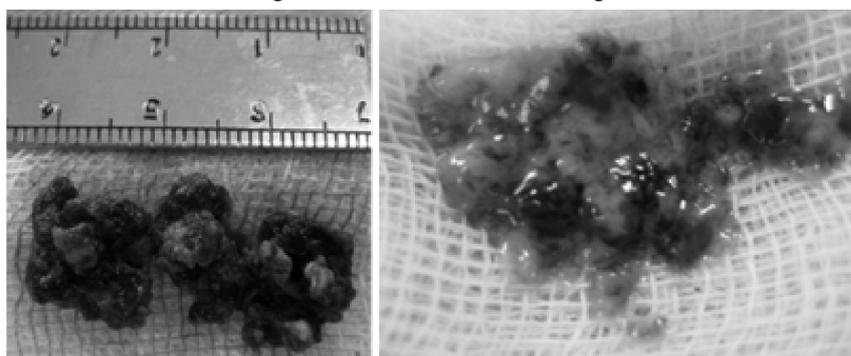


Fig. 3. Removed tumor fragments

Results

Clinical features

The main presenting symptoms and signs are listed in the Table 1. Headache, typically of sudden onset, was the most common complaint, occurring in all but one patient. Headache was frequently in 96% of patients associated with nausea, vomiting and visual symptoms. Neuroophthalmological evaluation was performed in all cases and revealed visual disturbance in 44 of cases. On visual field examination, bitemporal hemianopsia was found in 29 patients included 18 case of right temporal hemianopsia and left anopsia and 11 case of both temporal upper quadrantanopsia. Decreased visual acuity was recognized in 44 cases. 19 patient demonstrated altered consciousness (Table 1).

Table 1. – Common presenting symptoms and signs in 145 patients with pituitary apoplexy

Symptom and signs	Number of patients (%)
Headache	79 (88.7%)
Altered consciousness	19 (21.3%)
Nausea/vomiting	17 (19.1%)
Decreased visual acuity	44 (49.4%)
Visual field deficits	29 (32.5%)
Ocular palsy	9 (10.1%)

Endocrine and pathologic findings

The results of pituitary function test at presentation were available in all patients. In considerable portion of apoplectic patients, preoperative assessments of pituitary hormone were substituted by measurement of random serum levels of hormone because the patients were needed urgent operation. 66 patients had clinically nonfunctioning pituitary adenomas. 35 patients showed deficiency of one or more pituitary hormones; corticotrophin deficiency was found in 6, thyrotrophin deficiency with adrenal insufficiency in 4, growth hormone deficiency in 20 and panhypopituitarism in 5. 15 patients had normal pituitary functions, and 39 patients had hyperpituitarism; hyperprolactinemia was found in 19 patient (Table 2).

Table 2. – Hormonal secretion characteristics in patient with pituitary apoplexy

Hormone secretion	No
Hiperfunction	39
GH	11
Prolactin	19
ACTH	9
Hipofunction	30
ACTH	6
TSH	4
GH	20
Normal function	15
Panhypopituitarism	5

Radiologic features and operative findings

All patients with apoplexy underwent MRI as a primary investigation (Fig. 1). All the tumors were macroadenomas, with an average size of 26.5 mm. According to Hardy classification, IIA, IIIA and IIB types were the most common ones (Tab. 5). Definitive hemorrhagic changes on MRI study were found in 57 cases; early subacute stage of hemorrhage in 17, late subacute stage of hemorrhage in 50. The cystic or necrotic degeneration of pituitary adenoma was in 32 (Table 3, Fig. 4).

Table 3. – Radiologic classification of size and extension in patients with pituitary apoplexy (based on the classification system by Hardy, modified by Wylson)

Destruction of sella turcica	Extrasellar extension				
	A	B	C	D	E
I	9	3	5	1	–
II	19	9	–	3	1
III	17	6	–	–	2
IV	7	4	–	–	3

In table 3 sella turcica destruction: I – local bulging; II – diffuse bulging; III – focal destruction; IV – diffuse destruction. Extrasellar extension: A – suprasellar cistern only; B – up to 3rd ventricle floor; C – in or above 3rd ventricle; D – intradural lateral extension; E – extradural lateral extension.

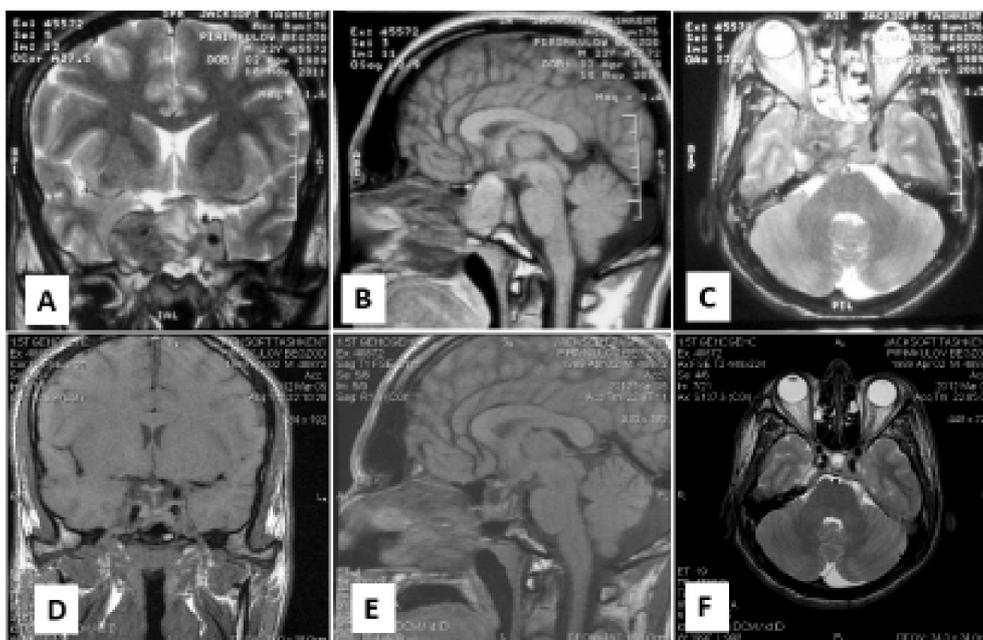


Fig. 4. MRI scans of a 24-year-old man who presented with headache, left ptosis and hypopituitarism. A, B, C: Preoperative MRI scans show a 2.9x1.9x2.5 cm. sized pituitary macroadenoma with supra-para-infrasellar extension with intratumoral hemorrhage; D, E, F: Postoperative MRI scans was obtained 3 months later revealing decompression of optic nerve and nearly total removal of tumor

Outcomes

The average length of follow-up in this series was 10 days and there were 5 death cases. Patient's most recent clinical state at follow-up was assessed and divided into the following groups: no symptoms in 12 patients; non-disabling symptoms (requiring hormonal replacement) in 5 patients. Visual acuity was assessed after 3 month in 80 patients and was improved but not normal in 31, unchanged 9 and 4 was worse. Visual fields improved in 23, unchanged in 4 and were worse in 2 patients. Cranial nerve palsy regressed in 77.7% of patients (Table 4). Data on postoperative endocrine function were available in all patients (Table 5). Among 15 patients with normal endocrine function before operation, 2 showed postoperative hypopituitarism. Among 35 patients who showed preoperative hypopituitarism, 5 needed continuous hormonal replacement. 12 patients had remnant mass after 3 and 6 month imaging study. All of them received radiotherapy and was managed with dopamine receptor agonist.

Table 4. – Postsurgical outcomes of visual and cranial nerve function of patient with PA

	Improved	Unchanged	Worse
Visual acuity	31 (70.4%)	9 (20.4%)	4 (9%)
Visual field	23 (79.3%)	4 (13.7%)	2 (6.8%)
Ocular nerve palsy	7 (77.7%)	2 (28.7%)	0

Table 5. – Postsurgical endocrine outcomes of patients with pituitary apoplexy

Initial endocrine function	Follow-up endocrine function		
	Hyperpituitarism	Normal function	Hypopituitarism
Hyperpituitarism (n = 39)	10	44	4
Hypopituitarism (n = 35)	0	0	35
Normal function (n = 15)	0	13	2

Complications of surgical treatment

For an estimation of results of treatment we used gradation of complications of the early postoperative period according to the recommendations developed in the Scientific Research Centre of Neurosurgery named after N. N. Burdenko. Postoperative complications have been divided into 3 degrees. Of complications in the postoperative period, headache was more frequent and occurred in 25 (17%) patient; moderately increase hypopituitarism in 6 (6.7%); diabetes insipidus in 11 (12.3%); CSF leak in 5 (5.6%) cases; visual deterioration 15 (16.8%). In majority of them regressed by the discharge moment from hospital. In our series (2 cases), abdominal fat graft were placed in the sella when postoperative CSF leak was encountered.

Huge complications have been related by brain blood circulation infringement. The mass effect produced by the infarct and oedematous brain, usually caused mortality in these cases. A 26 year old female presented with history of sudden onset of headache,

vomiting, ophthalmoplegia and rapid deterioration of vision in the right eye 3 week prior to admission at our hospital. She mentioned total loss of vision and decreased level of consciousness following admission. CT scan showed a hyperdense sellar mass with right parasellar extension. On steroids background she underwent an emergency transnasal transsphenoidal decompression of sellar cavity. At surgery, the tumor was necrotic with hemorrhage and was excised except for a small portion invading the right cavernous sinus. Afterwards, the patient was electively ventilated and follow-up CT scan [11] showed a large infarction in the right internal carotid artery territory with mass effect and midline shift. He developed signs of progressive brainstem dysfunction and diabetes insipidus, which was treated with desmopressin. Patient died on the tenth postoperative day. The biopsy showed a pituitary adenoma with hemorrhage and necrosis. Autopsy showed an infarction in the right internal carotid artery territory. Coronal sections through the sella and parasellar region showed the evidence of compression of the right intracavernous internal carotid artery by the tumor.

In preoperative and postoperative period all patients received intensive therapy. Depending on prevalence of this or that kind of complication, the following medicine were included: microcirculation improves colloid solutions, glucocorticoids, desmopressin, neuroleptics and etc. Rapid hypothalamic syndrome (hypothalamo-hypophysial dysfunction) developed in the early postoperative period, demanded immediate and active medical actions directed toward careful management of fluid and electrolyte balance.

Conclusions

The patients with pituitary apoplexy consist a special group among tumors of sellar area, and it is necessary to take into account at their diagnostics and management. The sudden headache, progressing ophthalmologic infringements, mental deteriorations should suggest the expert about pituitary apoplexy and to timely rendering of emergency specialised medical aid.

The mass effect produced by the infarction and oedematous brain, is usual cause of mortality in these cases. Methods of preventive maintenance of postoperative hemorrhages after subtotal surgical removal are as follow: local application of haemostatic means, control and correction of functions (mainly, arterial blood pressure and external breath) and indicators of system of haemo-coagulation.

According to our data, the favorable outcome is possible due to adequate preoperative and postoperative conservative therapy directed on correction of haemodynamic infringements and maintenance of the homeostasis.

Thus, the differential approach based on taking into account features of a clinical case, possible increasing of already available infringements and high level of technics of operative intervention are a mandatory terms for favorable results of treatment at pituitary apoplexy. Early transsphenoidal decompression with high-dose corticosteroid replacement result to good outcome for these patient.

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The study of the improved complex neurosurgical treatment in patients with posttraumatic chronic subdural hematomas and hygromas

Abstract: The article about improved complex neurosurgical treatment in patients with posttraumatic chronic subdural hematomas and hygromas use of endolumbally insufflation of ozone after operation. Received the positive results — improved clinical and neurological status in GOSE.

Keywords: chronic, subdural, hematoma, hygroma, ozone, GOSE.

For the present time among general traumatism cranio-cerebral traumas (CCT) make 30–50 % and according to World Health Organization data every year this index has been on average in 2 %. The disability index after cranio-cerebral traumas has been examined in 25–30 % of patients and this index shows the actuality of the problem [8; 9; 11]. Among the consequences of CCT under acute and chronic subdural hematomas (CSH), also hygromas have a separate neurosurgical importance as nosologic unit.

Based on the literature data in the development of chronic subdural hematomas it requires time from 1 week to 4 months [5; 18; 1; 12; 13; 14; 19]. As a result of the received materials during surgical operations and morphologic investigations CSH-s have been developed after capsulated traumas or spontaneous rupture of blood vessels during the period of two weeks and exactly this period gives us the opportunity to divide hematomas into under acute and chronic forms [9; 12; 13]. To determine the formation period of CSH capsule is very difficult, because this process depends on the many individual features, such as premorbid status and properties of reactivity. It should be separately emphasized that after formation

of capsule, development and evolution process of this one require several months and several years [17; 6; 14].

According to the data of some investigators the probability of CSH development after CCT is 1.1–8 % i. e. in every 100 000 of population it has been occurred in 1.72 cases [2; 7]. Among all subdural hematomas chronic forms have been occurred in 8–63 % of cases and besides that among all intracranial chronic hematomas CSH has been occurred in 82–86 % of cases [2; 15]. Among all intracranial hemorrhages bilateral CSH-s have been occurred in 0.57 % of cases and only among CHS-s this index is 5–18 % [15; 16].

The aim of the scientific investigation was to improve the methods and results of complex treatment of posttraumatic subdural hematomas and subdural hygromas.

Material and methods of investigations. Scientific investigations have been carried out on the basis of assessment of 167 patients with the diagnosis of posttraumatic chronic and under acute subdural hematomas and hygromas (Fig. 1) who had surgical operations in the neurosurgical clinic of Samarkand State Medical Institute for the period of 2003–2014 years.



Fig. 1. a) Bilateral chronic posttraumatic hygroma in the fronto-temporal regions of the brain (MRI);
b) Chronic posttraumatic chronic hematoma in the left fronto-temporal region of the brain (CT);
c) Chronic posttraumatic common subdural hematoma in the left hemisphere of the brain (MRI)

142 patients (85%) were men and 25 patients (15%) were women. The most investigated patients were young and efficient people which it has been seen from Fig. 2.

For the last years the amount of patients with chronic subdural hematomas and hygromas who had surgical operations have been gradually increased (Fig. 3).

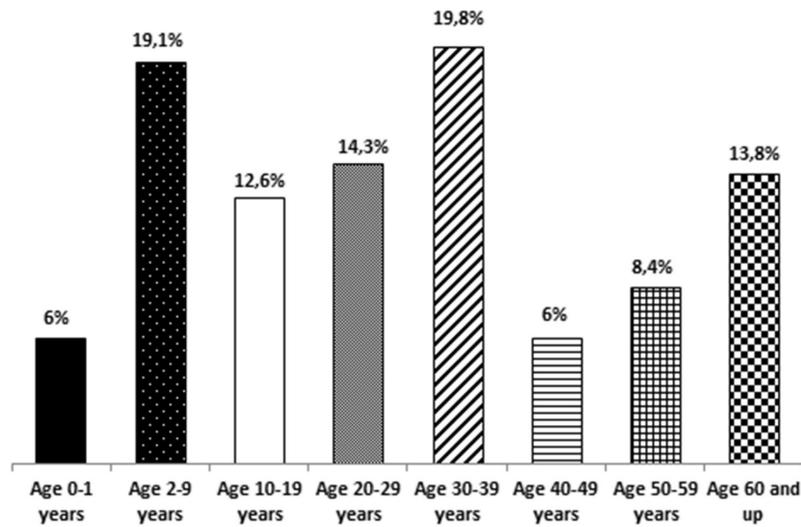


Fig. 2. Distribution of the patients due to age

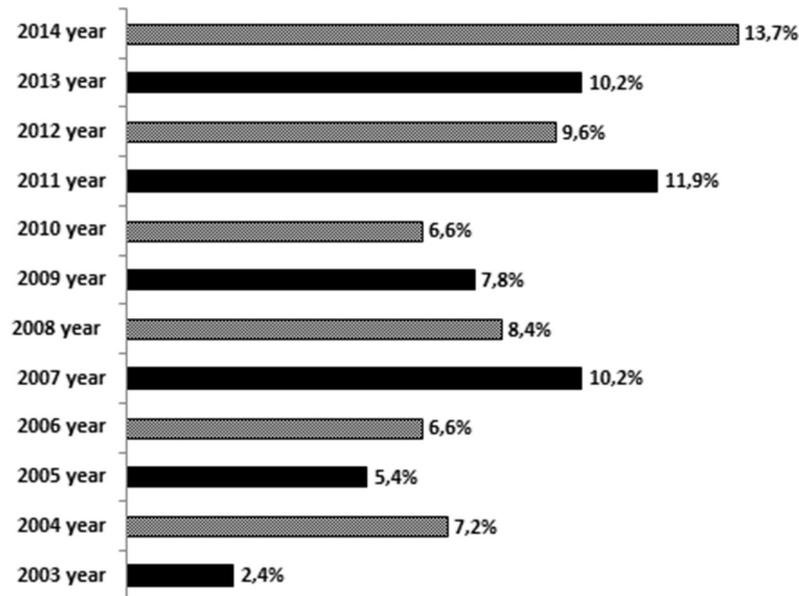


Fig. 3. Distribution of the patients due to the years of suffering

Hematomas 70–100 ml. in size evacuated after surgical operations have been in the most concentration during dividing groups of patients due to the size of the evacuated hematomas (Fig. 4.).

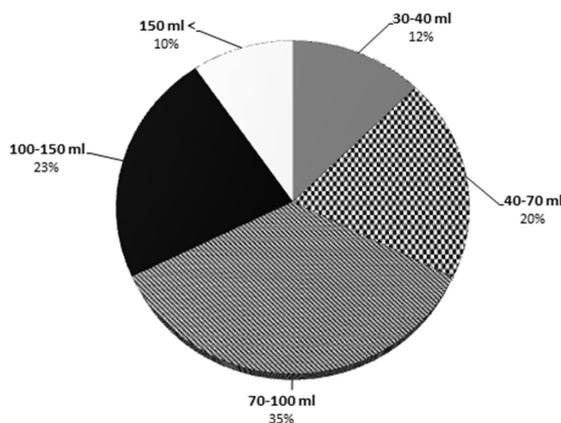


Fig. 4. Distribution of the patients due to the amount of hematomas evacuated after surgical operation

In order to prevent the probability of complications (cerebral arachnoiditis, arachnoid cysts, atrophic-gliosis processes) caused by the development of liquorodynamic and hemodynamic disorders in the postoperative period in the 8–9 days of treatment we used endolumbal insufflations and these patients (49) have been included in the first group. 118 patients have been treated by the traditional methods without using endolumbal procedures in the postoperative period and they have been included in the control group.

There are several approaches in the surgery of chronic subdural hematomas regarding drainage of subdural cavity after surgical operation. Some group of researchers consider that there is no need drainage of subdural cavity after surgical operation and the others consider the necessity of using drainage of subdural cavity after surgical operation. In 155 patients (92.8%) it has been carried out removing of chronic subdural hematomas by miniinvasive method of surgical treatment with the put of milling holes or milling chinks and removing of chronic subdural hematomas by the use of bone-plastic trepanation has been carried out in 12 patients (7.2%). In 65 patients (38.9%) after surgical operations in the subdural cavity it

has been placed one chlorvinile drainages, in 9 patients (5.4%) it has been fixed two incoming and out coming chlorvinile drainages, also in 86 patients (51.5%) it has been placed only rubber drainages and in the rest 7 patients (4.2%) after surgical operation has been determined that subdural cavity left without drainage.

In 49 patients of the basic investigated group after surgical operation in the last 8–9 days after primary healing of the operational wound and after removing sutures in the dressing room under

aseptic conditions after suitable processing of the lumbar-sacral area of patient it has been carried out lumbar puncture between VL_{III-IV} with evacuation of 20 ml. of liquor, then it has been carried out endolumbal insufflations of 15–25 sm³ of ozone.

For the present time in the practice of the world neurosurgeons patients' general health and neurological status has been assessed by the widely used "Glasgow Extended Scale of the Outcomes of the Traumatic Brain Injury" (GOSE) [20] (Table 1).

Table 1. – The results of assessing patients' general health and neurological status by the use of "Glasgow Extended Scale of the Outcomes of the Traumatic Brain Injury" [20]

Points	Category	Group № 1	Group № 2
1 point	The death of the first hours (D1)	0	0
2 point	Death after the first hours (D2)	0	0
3 point	Vegetative state (VS)	2 (4.1%)	3 (2.5%)
4 point	Lower Severe disability (LSD)	1 (2.1%)	14 (11.9%)
5 point	Upper Severe disability (USD)	3 (6.1%)	17 (14.4%)
6 point	Lower Moderate disability (LMD)	27 (55.1%)	43 (36.4%)
7 point	Upper Moderate disability (UMD)	11 (22.4%)	27 (22.9%)
8 point	Lower Good recovery (LGR)	5 (10.2%)	14 (11.9%)
9 point	Upper Good recovery (UGR)	0	0
Total		49 (100%)	118 (100%)

As you can see from table 1 in the preoperative period during assessment of patients' general health and neurological status by the use of GOSE in the 1 group of patients chronic vegetative status (VS) has been observed in 2 patients (4.1%), lower severe disability has been observed in 1 (2.1%) patient (LSD), in 3 patients (6.1%) it has been observed upper severe disability (USD), in 27 patients (55.1%) it has been observed lower moderate disability (LMD), in 11 (22.4%) patients it has been observed upper moderate disability (UMD) and in 5 patients (10.2%) it has been observed lower good recovery (LGR), in the 2 group of patients the assessment results of patients' general health and neurological status were the following — in 3 patients (2.5%) it has been observed VS, in 14 patients (11.9%) it has been observed LSD, in 17 patients (14.4%) it has been observed USD, in 43 patients (36.4%) it has been observed LMD, in 27 patients (22.9%) it has been observed UMD and at last in 14 patients (11.9%) it has been observed LGR.

General health and neurological status of the investigated patients in 3–6 months after surgical operations has been reassessed by the use of GOSE and we received the following results: in the 1 group of patients after surgical removing of subdural hematomas and hygromas and as a result of complex treatment with using ozone insufflations after surgical operation in 2 patients with vegetative status general health condition and the presented neurological deficits have temporary recovered and in 1 patient it has been observed the improvement of the changes until lower severe disability (LSD), and also in 1 patient his condition has been improved until 8 scale (LGR) "lower good recovery". In the other contingent of the basic group we have been received the positive results, i. e. patients who had 5 scale (USD) "upper severe disability condition" have been decreased in 1 time and patients who had 6 scale (LMD) "lower moderate disability condition" have been decreased in 5 times. The amount of patients' contingent who has been assessed as 7 scale (UMD) "upper moderate disability condition" the recoveries in their general health status and neurological deficits have been determined in 3 times less cases. The amount of patients' contingent who has been assessed as 8 scale "lower good recovery" (LGR) in the contrast of the other patients' contingent who had lower scale it has been observed the improvement of the general health status which has been increased in 2 times, and the amount of

patients' contingent who had 9 scale (UGR) "upper good recovery" was 28 (57.1%) which we have not observed before performing complex treatment (Fig. 5).

During the analyses of the treatment results of the control group of patients treated with usual methods we received the following data: from 3 patients with vegetative status in 2 ones general condition and presented neurological deficit have been changed in better way and this group of patients transferred in high score contingent of patients. In the control group patients who had 4 scale of LSD "lower severe disability" general amount of patients have been decreased from 14 to 9 patients, in the group of patients who had 5 scale (USD) "upper severe disability" general amount of patients have been decreased from 17 to 13 patients, in the group of patients who had 6 scale (LMD) "lower moderate disability condition" general amount of patients have been decreased in 2 times and in the group of patients who had 7 scale (UMD) "upper moderate disability condition" general amount of patients have been decreased in 3 times. "Lower good recovery" (LGR) contingent (8 scale) of patients as mentioned before like the other lower contingent of patients have been increased in 3 times, the contingent of patients who 9 scale (UGR) "upper good recovery" have not been determined before treatment, but after having suitable their amount have been increased in 13.6% and this data in the comparison of the basic group contingent have been decreased in 5 times (Fig. 6).

During the differential assessing of the Fig. 7 we could see that in group patients with posttraumatic chronic and under acute hematomas and hygromas in the early period after surgical operation complex treated by endolumbal insufflations of ozone the general health condition and neurological status in the comparison with the group of patients treated by the ordinary method the positive results of the assessment by the use of GOSE were seen.

Conclusions

- Posttraumatic chronic subdural hematomas and hygromas should be removed by the use of miniinvasive surgical operation with the put of milling holes or milling chinks;
- After surgical operation of the big hematomas and hygromas it should be carried out chlorvinile drainage of subdural cavity and evacuation step by step;

- The use of complex endolumbal ozone insufflations procedure which performed step by step in 8–9 days after

surgical operation have got positive results and patients' working ability have been restored in the early stages.

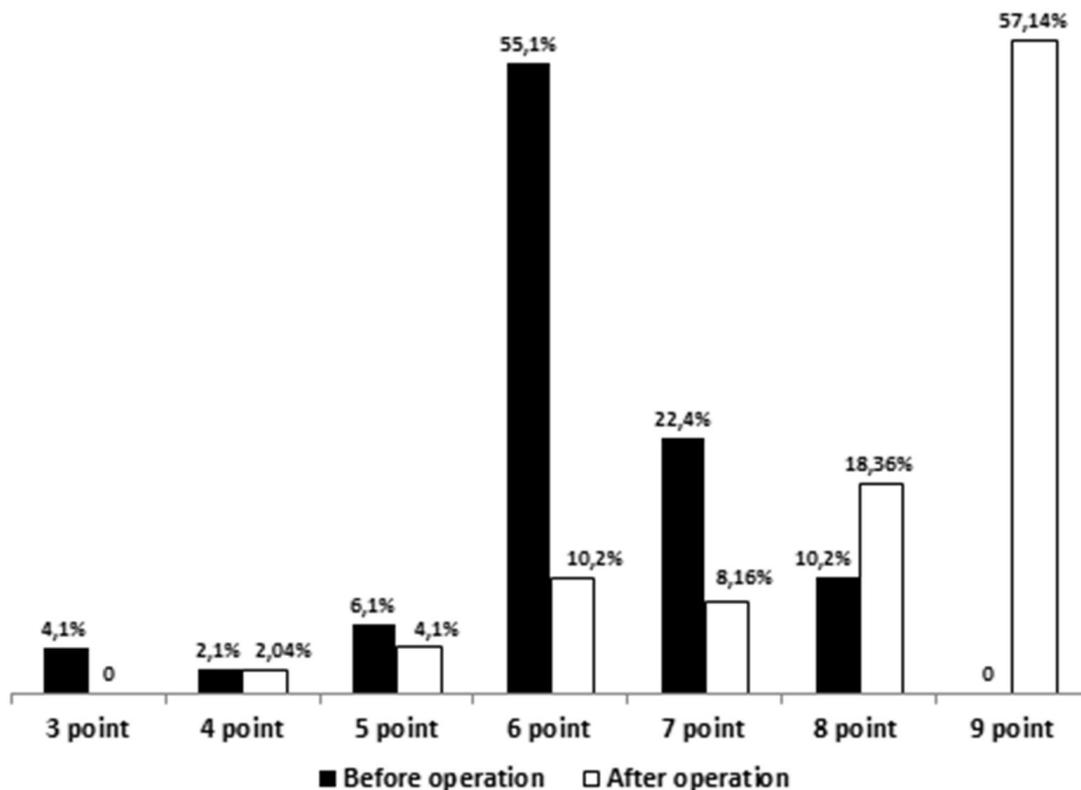


Fig. 5. The differential results of the assessment of general condition and neurological status of the patients in the basic group with the use of GOSE before and after treatment

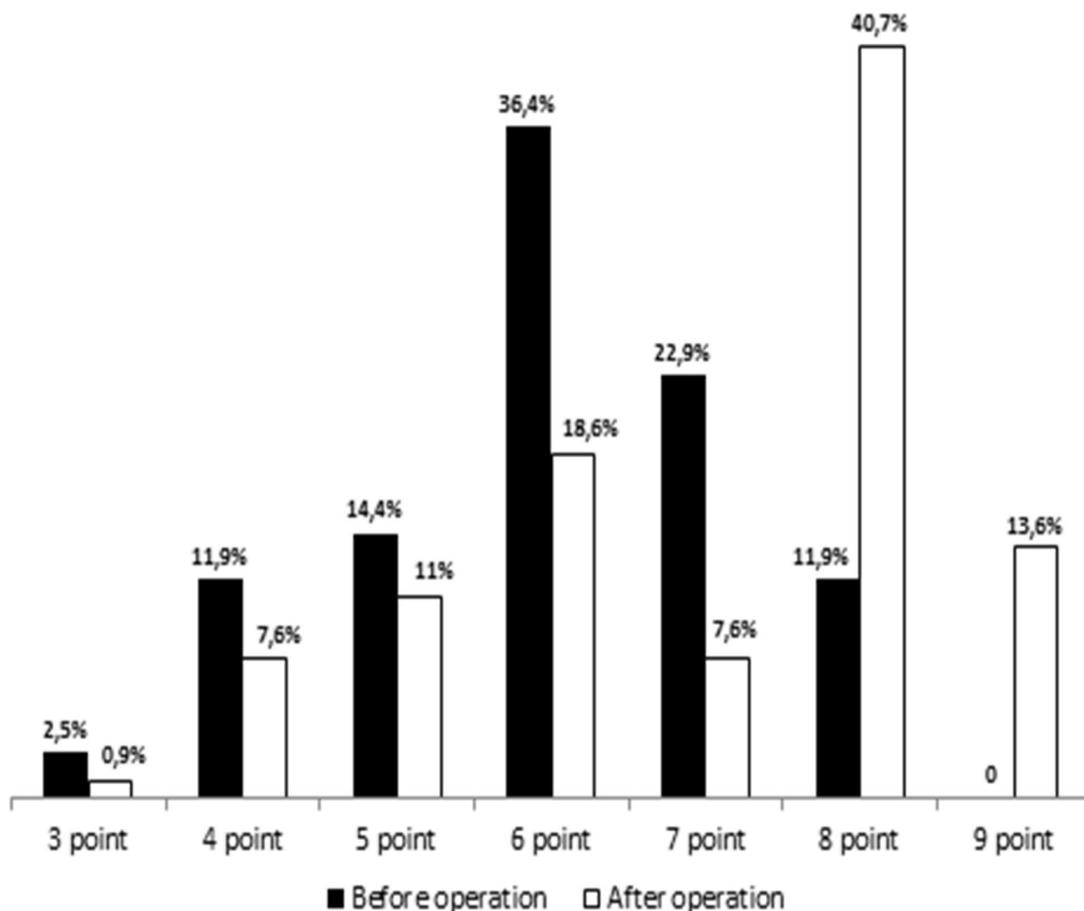


Fig. 6. The differential assessment results of general condition and neurological status before and after treatment of the 2nd group patients by the use of GOSE

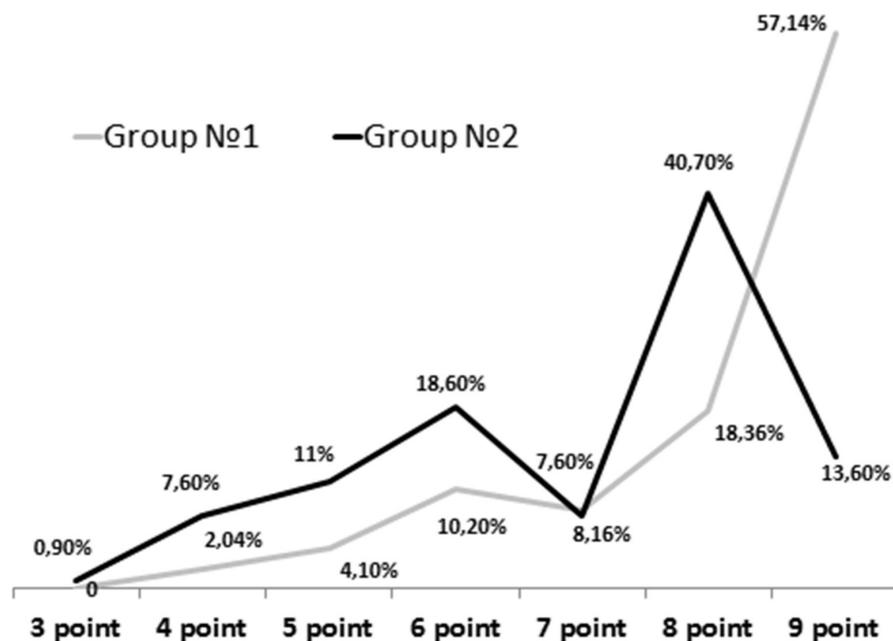


Fig. 7. The differential assessment results of general condition and neurological status after treatment of the basic and control groups patients by the use of GOSE

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Factors of nonspecific resistance and their clinical value at patients with recurrent aphthous stomatitis

Abstract: indicators of nonspecific resistance in RAS are objective criteria of severity of its clinical course. In patients with mild and severe clinical course progressive decrease of IgA, sIgA, lysozyme and phagocytosis is accompanied increase of IgA, sIgA, IgG and IgM which is evidence of suppression organism and oralmucosa is resistance.

Keywords: recurrent aphthous stomatitis, immunoglobulins A, M, G, lysozyme, phagocytosis.

The recurrent aphthous stomatitis (RAS) remains an actual problem of stomatology, keeping the leading positions in structure of diseases of the mucous membrane of oral cavity (MMOC).

The topical antimicrobial preparations and antibiotics of a wide range, which are applied to treatment of patients, promote development of a dysbiosis of the main biotopes of an organism, have immunosuppressive effect and become an additional adverse pathogenetic factor at RAS [4, 23–25; 6, 20–22; 7, 14–17].

Key links of pathogenesis of RAS make local provocative factors and reactivity of a microorganism, which in modern conditions is affected by adverse factors [1, 636–642; 3, 368].

Thus wellbeing of a clinical course and outcomes of diseases of oral mucosa depends on the adequate answer of nonspecific factors of resistance.

In recent years convincing evidences of participation of specific and nonspecific links of protection at RAS are received [6, 20–22; 7, 14–17; 9, 271–273].

However the questions of a solvency of nonspecific protection of organism in RAS of different severity are little-investigated aspect of this problem. It causes difficulties with adoption of the reasonable decision on indicators to correction of the revealed deviations.

Purpose of research: to estimate a condition of nonspecific factors of resistance in patients with various severities of RAS and to determine their clinical course.

Materials and methods. Material for the analysis and conclusions were results of 116 patients with RAS, which were on out-patient treatment in clinic of dental therapeutics of Tashkent medical academy during the period from 2012 year till 2015 year.

The clinical assessment of RAS severity was carried out according to methodical instructions of Kh. P. Kamilov and U. A. Shukurova (2008) and concluded assessment of severity of clinical course by the index of the total severity (ITS) representing an average score of the basic clinical symptoms and manifestations of a disease [2, 16]. The assessment of RAS on the ITS index is presented by: 0.5–1.0 points — mild RAS; 1.1–2.0 — medium RAS and 2.1–3.0 points — severe RAS.

Among all the patients with RAS there were 72 (62.07%) patients with medium severity of disease; 32 (27.59%) patients with mild RAS and 12 (10.34%) patients with severe form.

Patients received the standard complex of treatment and preventive actions including prescription of the full-fledged sparing diet, anesthesia of erosive and ulcer surfaces with Lidocaine spray

or Sinetidin, desensibilizing and vitamin therapy, course of immunomodulators (T-aktivin, Immunomodulin) according to indications, and probiotics (Lakto- and Byfidobacterin).

During remission period dental readjustment of oral cavity, elimination of agents of chronic infection, treatment of organ pathology were carried out.

The assessment of efficiency of treatment of RAS was carried out on the basis of studying local (oral liquid) and system (blood serum) indicators of nonspecific resistance.

Concentration of Immunoglobulins A, G, M was studied by method of simple radial immunodiffusion in an agar by G. Manchini and A. Garbonava (1965) in modification of E. V. Chernokhvostova and S. I. Golderman (1975). Activity of lysozyme was studied by nephelometry by V. G. Dorofeychuk (1968), and phagocyte activity neutrophilic leukocytes was studied according to M. A. Temirbayev (1989).

The data obtained in the course of clinical and laboratory research was exposed to statistical processing with the use of Excel program. Statistically reliable distinctions between indicators were defined by Student's T-criterion with the standard degree of reliability $P \leq 0.01$.

Results and discussion. In patients with RAS in the acute period of a disease there was disturbance of indicators of nonspecific reactivity, which nature of change was defined by severity of a clinical course, established.

In patients with mild RAS in the acute period of a disease in both studied environments there was decrease of the activity of a lysozyme, phagocytosis and increase of IgA, IgG, IgM established. So, in oral liquid activity of lysozyme was lowered by 11.92% ($P > 0.05$); phagocytosis was by 24.46% ($P < 0.01$); and concentration of IgA, IgG and IgM increased by 18.42% ($P < 0.05$); 19.61% ($P < 0.05$) and 27.27% ($P < 0.05$) respectively. The corresponding dynamics in blood serum decreased in lysozyme by 16.43% ($P < 0.05$); in phagocytosis — by 14.84% ($P < 0.05$) and increase in IgA, IgG and IgM for 19.0% ($P < 0.05$); 23.69% ($P < 0.05$) and 17.90% ($P < 0.05$) respectively (table 1).

The analysis of the quantity of IgA in both studied biological liquids revealed authentically low ($P < 0.05$) value of this indicator in patients with medium RAS and severe RAS that testified to oppression of local immunity in the acute period of a disease. Besides reliable oppression of phagocytal function of neutrophils and lysozyme, reliable growth of IgG and IgM, decrease of the activity of lysozyme and phagocytosis were noted.

The revealed changes progressed with increase of RAS severity. So, In patients with medium RAS lysozyme activity was lowered on 34.59 % ($P < 0.01$); phagocytosis was on 36.18 % ($P < 0.01$); IgA was lowered on 31.56 % ($P < 0.01$); and IgG

and IgM were raised on 39.22 % ($P < 0.01$) and 54.55 % ($P < 0.01$); the corresponding dynamics of these indicators in blood serum were 28.20 % ($P < 0.01$); 22.23 % of 18.07 % ($P < 0.05$); 44.75 % ($P < 0.01$) and 35.80 % ($P < 0.01$).

Table 1. – Indicators of nonspecific resistance at patients with various RAS severity depending on the disease period

Group	Liz, %	Phagocytosis, %	IgA, g/l	IgG, g/l	IgM, g/l
Oral liquid					
Control	46.25 ± 2.11	49.6 ± 2.38	0.38 ± 0.01	1.02 ± 0.04	0.11 ± 0.02
Patients with RAS					
Acute period					
1 Mild	36.11	37.21 ± 1.25	0.45 ± 0.02	1.22 ± 0.06	0.14 ± 0.06
2 Medium	30.25	31.42 ± 1.02	0.26 ± 2.01	1.42 ± 0.07	0.17 ± 0.007
3 Severe	24.81	26.53 ± 0.96	0.21 ± 0.06	1.71 ± 0.08	0.19 ± 0.08
Convalescence period					
1 Mild	45.32 ± 2.4	47.32 ± 2.08	0.40 ± 0.07	1.08 ± 0.04	0.12 ± 0.05
2 Medium	40.81 ± 1.97	39.41 ± 1.52	0.32 ± 0.01	1.22 ± 0.05	0.13 ± 0.006
3 Severe	35.44 ± 1.62	33.62 ± 1.44	0.25 ± 0.01	1.41 ± 0.06	0.14 ± 0.007
Blood serum					
Control	42.37	47.37 ± 2.14	3.21 ± 0.10	15.62 ± 0.81	1.62 ± 0.06
Patients with RAS					
Acute period					
1 Mild	35.41 ± 1.52	40.35 ± 2.03	3.82 ± 0.12	19.32 ± 0.85	1.91 ± 0.08
2 Medium	30.42 ± 1.29	32.11 ± 1.44	26.30 ± 0.07	22.61 ± 0.92	2.22 ± 0.05
3 Severe	24.31 ± 1.02	24.52 ± 1.03	2.03 ± 0.04	25.81 ± 1.03	2.53 ± 0.07
Convalescence period					
1 Mild	41.03 ± 1.62	46.92 ± 2.06	3.31 ± 0.12	16.01 ± 0.71	1.66 ± 0.07
2 Medium	39.61 ± 1.38	38.11 ± 1.42	2.91 ± 0.08	19.81 ± 0.62	1.91 ± 0.06
3 Severe	31.25 ± 1.44	32.61 ± 1.53	2.51 ± 0.11	23.11 ± 0.88	2.02 ± 0.08

Note: * — $P < 0.05$ concerning norm; ° — $P < 0.05$ concerning acute period; X — $P < 0.05$ concerning mild clinical course; ^ — $P < 0.05$ concerning medium clinical course.

In patients with severe RAS these changes were even more expressed. So, in oral liquid lysozyme activity was lowered on 46.36 % ($P < 0.01$); phagocytosis was on 46.14 % ($P < 0.01$); IgA was on 44.74 % ($P < 0.01$); and IgG and IgM increased by 67.65 % ($P < 0.01$) and 79.73 % ($P < 0.01$) respectively; the corresponding dynamics of these indicators in blood serum decreased by 42.62 % ($P < 0.01$); 48.27 % ($P < 0.01$); 36.76 % ($P < 0.01$) and increased by 65.74 % ($P < 0.01$) and 57.17 % ($P < 0.01$) (table 1).

Thus, indicators of nonspecific resistance in RAS are objective criteria of severity of its clinical course.

The main function serum IgA is neutralization of infectious agents on mucosa. SIgA-function is protection against an infection. Serum antibodies possess the expressed anti-sorption properties: they interfere with an attachment of bacteria to a surface the epithelial cells, prevent adhesion without which bacterial damage becomes impossible. Together with other nonspecific factors provide protection of mucous membranes against microbes and viruses [5, 112–116; 8, 752]. It is possible to explain with high IgA and sIgA level benign course and low frequency of recurrence or mild RAS.

Emergence of IgM and its increase with increase of weight of RAS testifies to progressing of inflammatory process.

Antibodies of IgG class play a fundamental role in providing the long humoral answer. The IgG level increases in response to a chronic infection or an autoimmune disease. The main IgG function is formation of the anti-gene — antibody complex [3, 368; 5, 112–116; 8, 752].

The increase in IGM and IgG with increase of clinical symptoms of RAS and decrease in IgA reflect progressing of the system and local inflammatory answer and decrease in antibacterial protection.

In the period of convalescence in patients with RAS there were noted reliable ($P < 0.05$) changes of the studied indicators. Extent of normalization of the studied indicators was defined by initial disease severity.

So, in mild RAS in oral liquid and blood serum the studied indicators of nonspecific resistance had no considerable distinctions with control ($P < 0.05$); in patients with a medium RAS only the part of indicators had no significant distinctions with control; and in severe RAS their value differed in the adverse party from control indicators ($P < 0.05$) (table 1).

In patients in the acute period disorder of nonspecific resistance is noted. Thus dynamics of the studied indicators is interconnected with a clinical course of RAS.

– In patients with mild RAS the adequate answer of factors of nonspecific resistance is formed. High level of immunoglobulin A in serum of blood and oral liquid during RAS of an easy current testifies to a solvency of resistance of an organism and oral mucosa that reflects clinical symptoms. Normalization of indicators in the period of convalescence determines the minimum frequency of recurrence.

– The progressing decrease of concentration of IgA, sIgA, lysozymes, phagocytes was followed by increase of IgA, sIgA, IgG and IgM, testifying about lowered antibacterial protection, suppression of resistance of an organism and oral mucosa, progressing of system and local inflammatory and autoimmune processes, in patients with medium and severe RAS.

– After carried out treatment of medium and severe RAS according to the standard scheme all the shifts in studied links of immune system have remained with, testifying about low efficiency of treatment and need of development of the treatment schemes, adapted for severity of a clinical course of a disease.

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Evaluation of medical and preventive care of patients with diabetes mellitus according to the register in Fergana region

Abstract: Clinical courses of DM 1 and 2 were analyzed from of 10 436 register-cards in Fergana region. It was established that most of the patients were in decompensation stage that result from poor management of diabetes and increases rate of diabetic complications. Based on the results, conclusions were made about the necessity of reviewing current treatment modalities and on increasing general awareness among healthcare personnel.

Keywords: diabetes mellitus, register, cards, decompensation, treatment.

Urgency. At present, cardiovascular diseases, cancer and other diseases of non-infectious origin became major causes of morbidity, disability and early mortality. The problem of diabetes mellitus (DM) is acquiring ever-increasing importance among them. According to the World Health Organization, that global prevalence of DM increased during the last decade more than two-fold, reaching some 387 million to the end of 2014 and it was estimated to affect 9 % of adults aged 18 and over. WHO projects that diabetes will be the 7th leading cause of death in 2030 [14]. In the absence of a well-organized health and social care to patients, DM leads to early disability, increased mortality and reduced life expectancy of affected individuals. Uzbekistan encounters a sharp growth in the prevalence of DM, like many other countries. Currently, the number of registered patients with diabetes in Uzbekistan has exceeded 157 000 people. However, epidemiological studies of the prevalence of diabetes suggest that actual prevalence is several times greater than the officially registered and, by estimates comprises 5.2–9.1 % of population [2; 7; 8; 13].

Establishment of a national registry is an essential step towards optimization of care provided to diabetic patients. The data of register

make it possible to solve both the practical problems faced by the healthcare authorities and carry out a scientific analysis of the peculiarities of clinical course and manifestation of DM in Uzbekistan.

The study was aimed at analyzing the clinical course of type 1 and type 2 diabetes in the last 12 months (2007) in Fergana region.

Materials and methods of research. Analysis Clinical course of DM was studied with aid of register-cards in Fergana region. The register-cards were unified forms of national register, elaborated by employees of the center with account taken of EASD recommendations and experience of other countries [1; 4; 5; 9; 10].

10 436 register-cards of same numbered patients, including 9 384 patients with type 2 DM, 1 052 of type 1 DM and 1 — gestational diabetes, were filled in Fergana region; the data of clinical course and treatment were processed with aid of computer.

The age of patients with 1 type DM ranged mainly from 1 to 14, up to 80 and included 560 men, 492 women.

The age of patients with type 2 DM was 14 to 80 years, 4 086 men and 5 297 women. The number of patients who were on constant follow-up or what is called dispensary observation comprised 11 659, filling in of register-cards comprised 89.51 %.

Table 1. – The age and sex composition of patients with DM type 1 and type 2 in Fergana region

Values		Total number	Age								
			1–14	15–18	19–29	30–39	40–49	50–59	60–69	70–79	80–89
DM type 1	Men	560	10	21	95	120	132	106	47	28	1
	Women	492	14	22	70	107	119	93	42	20	5
	Total	1 052	24	43	165	221	251	199	89	48	6
DM type 2	Men	4 086	1	4	30	121	756	1 588	1 003	503	80
	Women	5 297	2	3	34	120	865	1 923	1 403	761	186
	Total	9 383	3	7	64	241	1 621	3 511	2 406	1 264	266
DM and pregnancy		1									
Total		10 436	27	50	229	468	1 872	3 710	2 495	1 312	272

As seen from table 1, the number of women exceeded that of men for almost 1.02 times. It is known that the prevalence indicators of type 2 diabetes increases with age and the obtained data comply with such pattern. Thus, the prevalence of type 2 diabetes, according to the register reached its maximum values in individuals 50–59 years of age, being: 1 588 men and 1 923 women, whereas there were only 121 men and 120 women in the age group of 30–39 years.

Disposing data on the prevalence of diabetes, it becomes possible to plan activities of therapeutic and preventive care. However, the data on the prevalence only would be deficient without information on the prevalence of complications of diabetes and information about types of hypoglycemic agents used in the treatment of these patients, and finally, how high are the morbidity and mortality of patients with diabetes.

Results and discussion. From the surveying of diabetic patients it was found that patients did not comply with due diet well and more or less frequently violated it.

353 (33.8%) patients with type 1 diabetes were on intensified insulin therapy, the rest — on traditional.

Among patients with type 2 diabetes solely on diet were 4 (0.44%) patients, 8 735 (83.69%) on combination of diet and oral hypoglycemic drugs, including 7 883 (75.53%) on sulfonylureas, 96 (0.92%) on meglitinides, 1 559 (14.4%) on biguanides, 149 (1.43%) on tiazolidiones, 889 (8.52%) on sulfonamides plus biguanides. It is worthy of note that there were no patients registered with type 2 diabetes on insulin therapy.

The incidence of complications in surveyed type 1 diabetes patients was as following: presence of changes in nervous system in 781 of cases (74.23%), including sensory neuropathy — 465 (44.2%), autonomic neuropathy — 33 (3.14%), orthostatic hypotension — 123 (11.69%), diarrhea — 66 (6.27%), impotence — 91 (8.65%), amyotrophy — 3 (0.29%); diabetic ulcers were in 54 patients (5.13%), 52 patients had angina (4.94%), arterial hypertension — 240 (22.81%), MI — 11 (1.05%), patients with diabetic ophthalmopathy — 523 (49.71%), cataract — 60 (5.70%), complete absence of vision in 1 or 2 eyes — 8 (0.76%), proteinuria — 366 (34.79%), CKD 19 (1.81%) patients. Acute complications of diabetes occurred with the following frequency: comas altogether comprised 36 (3.742%), of which 16 (1.52%) were ketoacidotic, in 1 case (0.10%) hyperosmolar, lactic acidosis — 3 (0.29%), hypoglycemic — 14 (1.33%).

Among 9 384 patients with type 2 diabetes, 3 400 (32.58%) had sensory neuropathy, 2 844 (27.22%) had macroangiopathy of lower extremities, 211 (2.25%) — autonomous neuropathy, 431 (4.523%) — orthostatic hypotension, 287 (3.06%) — diarrhea, 524 (7.66%) — impotence, 13 (0.10%) — amyotrophy. Patients with diabetic ulcers amounted to 150 (2.2%), amputation was carried out in 276 (2.94%), MI — 131 (1.44%), recurrent MI in — 4 (0.04%), CVA — 129 (1.37%), hypertension — 2 732 (29.11%),

angina — 675 (7.19%), retinopathy — 3 644 (38.83%), absence of vision in 1 or 2 eyes — 114 (1.21%), cataract — 705 (7.51%), proteinuria — 2 196 (23.4%), CKD — 45 (0.48%), none of patients was receiving hemodialysis. Acute complications of diabetes occurred with the following frequency: all comas — 41 cases (0.44%), including of which ketoacidotic — 18 (0.19%), hyperosmolar — 3 (0.03%), lactic acidosis — 1 (0.01%), hypoglycemic — 18 (0.19%).

Analysis of the prevalence of complications, considering the type of diabetes, showed that the prevalence of specific complications of diabetes is significantly higher in patients with type 1 diabetes than in type 2. Thereby, comparison of the shares of diabetic retinopathy in type 1 and 2 were respectively 49.7% and 38.83%, diabetic nephropathy — 34.79% and 23.4%, autonomic neuropathy 3.14% and 2.25%, sensory neuropathy — 44.3% and 27.22%.

Reverse trend had place in the prevalence of various forms of macroangiopathy in the two compared groups. CAD, MI, hypertension and others were significantly more common in type 2 diabetes than in type 1. The share of CAD in type 1 and type 2 were respectively 4.94% and 7.193%, MI — 1.05% and of 1.44%, hypertension — 22.81% and 29.11%. However, it should be noted, that compared with the registered data, the prevalence of all of the above complications at early stages in epidemiological studies of a row of authors [3; 6; 7; 12] was much higher.

The quality of glycemic control plays an essential role in the development and progression of complications. The following data were received upon biochemical studies conducted: FBG < 6.5 mmol/L was found in 95 (0.92%), PPG < 9.0 mmol/L in 278 (2.69%) of patients with type 1 diabetes. In type 2 diabetes patients the figures: FBG < 6.5 mmol/L in 1 265 (12.23%), PPG < 9.0 mmol/L in 3 113 (30.09%), glycated hemoglobin < 7% in 72 (0.7%). These figures demonstrate significant decompensation among patients of both types, due to inadequate provision of antidiabetic agents, insufficient self-control, and low detectability of the disease, especially in the early stages.

The level of blood lipids, included as a criterion of diabetes compensation, is also important in the development of diabetic complications and requires an adequate controlling. Total cholesterol was measured in 84.72% of patients, triglycerides determined in 158 (1.53%). Cholesterol over 4.8 mmol/L was revealed in 6 219 (60.12%) and triglycerides over 1.7 mmol/L in 20 (0.19%).

Officially registered disability was among 2 176 (20.85%) patients, 1 785 (17.10%) of which were due to diabetes and 391 (17.96%) cases for account of other reasons. 129 (1.24%) individual were classified as disabled from childhood, 124 (1.19%) were disabled persons of group 1, 1 907 (18.27%) of group 2, and 80 (0.77%) had registered 3rd group of disability.

Overall mortality, for the given year, comprised 18 (from 10 436 records), the share of various causes is provided in table 2.

Table 2. – Mortality of patients with diabetes, by causes in Fergana region

Causes of death	Number of deaths by cause
Diabetic coma	1 (5.26)
Hypoglycemic coma	
Chronic Renal Failure	8 (42.11)
Congestive Heart Failure	3 (15.79)
Miocardial infarction	1 (5.26)
Cerebrovascular accidents	1 (5.26)
Gangrene complicated by sepsis	
Pneumonia	
Tuberculosis	
Cirrhosis	1 (5.26)
Malignant tumors	
Acute infections	
Other reasons	3 (15.79)
Overall deaths	18
Information not available	

As can be seen from the table, the most frequent causes of death in diabetic patients were CKD — in 8 (42.11 %) cases. The rest of the causes of mortality of patients with diabetes are arranged in decreasing order: diabetic coma (5.26 %), CHF, MI, CVA, cirrhosis and other causes accounted for 3 (15.79 %). Analysis of mortality in diabetic patients showed a high percentage of diabetic comas, which is avoidable with timely adequate treatment. At the same time, the share of deaths due to MI and CVA were 5.26 % and 5.26 % respectively, whereas, according to the world literature, these types of macroangiopathies are the main killers.

According to the analysis, from 9373 patients with type 2 diabetes, self-control learning courses were taken by 5262 (88.84 %), regular self-control was carried out by 4193 (87.81 %). Those who had taken self-control courses amount type 1 diabetes comprised 612 (58.17 %), of whom 533 (87 %) were carrying out self-control.

Hypertension was revealed in 2973 of patients (28.49 %), 240 (22.81 %) of whom were with type 1 and 2732 (29.11 %) with type 2 diabetes. Antihypertensive therapy was administered to 4505 (43.16 %) patients, with 4179 (40.04 %) taking ACE inhibitors, 93 (0.89 %) — beta-blockers, 256 (2.45 %) — calcium antagonists, 353 (3.38 %) — diuretics, 45 (0.43 %) — other antihypertensive drugs. None of patients received a combination of different antihypertensive drug groups.

Lipid-lowering therapy was implemented with 1267 (12.14 %) patients, the predominant majority of whom — 641 (6.14 %) where administered nicotinic acid, followed by in fibrates, used in 239 (2.29 %) of cases, statins — 397 (3.8 %), other drugs 10 (0.1 %).

For the whole period of registry, pregnancy was identified in one patient. Figures, taken from the histories of gestation provided the following: from overall 5790 pregnancies 2972 (51.33 %) records indicated normal delivery, 25 (0.43 %) miscarriage, and 12 (0.21 %) — premature birth.

The main target of the treatment of patients with diabetes is the prevention of its complications, for which achieving compensation of the disease is necessary. According to the current criteria, compensation includes not only keeping glycemic fluctuations within the normal ranges but also controlling blood pressure and lipid profile. From the register-cards of the overwhelming majority of patients, it is difficult to judge about the state of compensation even based on carbohydrate metabolism (due to insufficient volume of tests monitoring glycemia and almost complete absence of studies

of glycosylated hemoglobin). The volume of tests of lipid profile is also extremely limited.

In terms of the quality of treatment overwhelming majority of patients with diabetes type 1 remain on conventional insulin therapy (share of IT 33.8 %), and considering the need of the earlier start of insulin therapy in patients with type 2 diabetes, in the light of current recommendation, the fact that none of patients were transferred to insulin therapy appears to be perplexing.

According to the data of register, almost 100 % of patients were carrying out self-control, which raises some doubts and requires clarification of the sources from which patients were provided by the means of self-control and reliability of that data on glycemia, obtained by self-control.

Information on current pregnancies and past pregnancies is incomplete, which makes it difficult to draw any conclusions.

Thus, conducted analysis of the register-cards in Fergana region, demonstrates that the provision of therapeutic and preventive care to patients with diabetes to date does not meet the commonly accepted criteria, whereby there is a high risk of development and progression of cardiovascular disease and chronic microvascular complications of diabetes.

Conclusions:

1. The register involved 10436 (89.51 %) patients, 1052 (10.08 %) of which were patients with type 1 diabetes and 9384 (89.91 %) with type 2 diabetes. The number of women was 1.02 % times higher than of men.

2. It was found from register that the share of compensated, in terms of the level of fasting plasma glucose, patients with type 1 diabetes comprised 0.92 % and the share of compensated patients with type 2 diabetes — 12.23 %. The level of compensation, in respect to postprandial glycemia comprised in type 1 diabetes — 2.69 % patients and 30.09 % — in type 2 diabetes. This shows a very inadequate compensation of carbohydrate metabolism in patients with diabetes in general.

3. Testing of cholesterol level was performed in 84.72 %, triglycerides were examined in less than 1.53 % of patients. Lipid-lowering therapy is mainly carried out with ineffective drugs of nicotinic acid.

4. According to register 83.64 % of patients with type 2 diabetes receive oral hypoglycemic agents. The predominant majority of them are administered sulfonylurea drugs — 75.53 %, biguanides were used very rarely — in 14.4 %, tiazolidiones — in 1.43 %, sulfonamides with a Biguanides — in 8.52 %, and Meglitinides — in 0.92 %.

5. Only 33.8 % of patients with type 1 diabetes were on intensified insulin therapy and the rest on conventional. Not even single patient with type 2 diabetes was recorded to be receiving insulin therapy.

6. Analysis of antihypertensive therapy has revealed the following: hypertension was diagnosed in 28.49 % of patients, 40.04 % of whom were administered ACE inhibitors, 0.89 % — beta blockers, 2.45 % — calcium antagonists, 3.38 % — diuretics, 0.06 % — alpha blockers, 0.43 % — other antihypertensive agents. Combinations of different groups of antihypertensive drugs were not used at all.

7. The composition of the complications of type 2 diabetes were as following: retinopathy diagnosed in 38.83 %, cataract — in 7.5 %, nephropathy — in 23.4 %, neuropathy — in 48.5 %, with low rates of registered macroangiopathies: MI — 1.37 %, CVA — 1.37 %, macroangiopathy of lower extremities — 27.22 %, arterial hypertension — 28.49 %.

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Prevalence of coronary artery disease and miocardial infarction in patients with type 2 diabetes according to the register in Uzbekistan

Abstract: Clinical course of type 2 DM was analyzed based on 61 568 register-cards, taken from National Register of DM, Uzbekistan. 10 130, from the total number of patients, were found to have CAD and 949 MI. From the analysis of management of DM, macrovascular complication and causes of mortality it becomes clear that earlier mortality and disabilities resulted from poor compensation of diabetes. It was found that in the many cases the carried out management did not comply with commonly accepted standards of treatment.

Keywords: diabetes, CAD, MI, register, cards, decompensation, macroangiopathy, management.

Urgency. Angina belongs to a group of common diseases with high prevalence — about 20 thousand cases per million of population. The number of people with angina pectoris in Russia amounts to 2.8–5.6 million and the number of affected with it individuals keeps increasing worldwide due to the aging of population and the improvement of activities aimed at prevention of atherosclerosis. The burden of cost from the treatment of patients with stable CAD

worldwide is high (in EU spending amounts to about 45 billion Euros, which comprises 2.6 % of the total health budget). According to the Division of Epidemiology and Prevention of Republican Specialized Center of Cardiology, in Uzbekistan, the prevalence of CAD in Uzbekistan comprises 8–10.5 %.

It is known that in 40–60 % the cause of death in diabetes is MI, atherosclerosis of main vessels in diabetes develops 4–6 times

more often than in those without diabetes, DM increases the risk of MI and mortality among patients 2–4 times more often than in its absence [8; 9]. DM is an independent risk factor for CAD.

Epidemiological studies on the prevalence of CAD in patients with type 2 diabetes in Tashkent demonstrated an obvious correlation of CAD occurrence with the presence of macroangiopathy, age, type of diabetes, risk factors for cardiovascular disease, and duration of DM (Akbarov Z. S., Khaydarova F. A., Kayumova D., 1995, 2005). It was shown that CAD had a higher degree of occurrence in patients with diabetes, ranging from 42.1 to 82.5 %, and occurrence of MI, in the studied population, was found to be 16 times higher among individuals with type 2 diabetes than in those without diabetes and, in contrast to other forms of ischemic heart disease, there was clear relationship with the degree of compensation of carbohydrate metabolism.

Establishing a national register of type 2 diabetes in Uzbekistan, in view of the above, was obviously reasonable and essential effort in shedding light on the true state of issues, associated with diagnosing of type 2 diabetes and its macrovascular and microvascular complications and for estimating the quality of medical and preventive care in the regions.

Objective: to study the clinical and epidemiological aspects of diabetes and concomitant CAD according to the DM register in Uzbekistan.

Materials and methods of study. Clinical course of DM was studied with aid of register-cards, elaborated by employees of the center with account taken of EASD recommendations and experience of other countries [1; 3; 4; 7]. Such analysis was carried out in all regions of Uzbekistan, except for the city of Tashkent.

Overall 61 568 register-cards of patients with type 2 diabetes were analyzed across all regions. 11 079 people among them were recorded to have macrovascular lesions in the form of CAD, MI, including 5 325 (8.6 %) men and 4 805 (7.8 %) women. MI was registered in 314 (0.5 %) men and 635 (1.0 %) women.

Results and discussion. Analysis of the prevalence of CAD in patients with type 2 diabetes by regions demonstrated that its highest rates were in Samarkand, Andijan, Tashkent and Kashkadarya regions and the lowest ones were in Jizzakh, Surkhandarya, Syrdarya, Khorezm and the Republic of Karakalpakstan. This causes a lot of reasonable questions and apparently is evidence of a low quality of diagnosing of this disease or lack of due awareness on the part of physicians to the problem of macroangiopathy. The situation was even worse regarding registration of MI across all the regions and according to the register, only some regions, including Tashkent, Namangan and Fergana had more adequate record keeping, and the Republic of Karakalpakstan, Kashkadarya, Khorezm regions had the lowest percentage of MI indicators, which intrinsically demonstrates a level of quality of the management of these patients. Cases of recurrent MI were only registered in 8 regions and such records were not maintained in Kashkadarya, Samarkand, Surkhandarya, Syrdarya and the Republic of Karakalpakstan.

Analysis of the prevalence of MI and CAD in patients with type 2 diabetes, in respect to age and gender showed that the gained data did not correspond to the data on MI and CAD prevalence provided in epidemiological studies of several authors [5; 6; 8], where the values were significantly higher. It is known from epidemiological studies that the prevalence of type 2 diabetes increases with age [6; 7; 9]. Similar, to some extent, pattern was confirmed by the results of the register. Thus, the prevalence of type 2 diabetes, according to the obtained results, reaches its maximum in individuals at age of 50–59, where the number of men in this group comprised 1 816 and women — 1982. Starting from 60 and further to 80 years

of age the ratio men to women shifts and prevalence becomes higher among men.

The highest prevalence rate of CAD in both men and women was in the age group of 50–59 years (6.2 % and in women higher than in men) and 60–69 years (5.1 %); concerning MI — the highest rates at 40–49 years of age and then the highest rates among women are twice as likely than men (66.9 % vs. 33.1 %).

Analysis of carbohydrate metabolism compensation in patients with type 2 diabetes according to the register shows the discrepancy between the figures of fasting plasma glucose and postprandial glycemia with glycated hemoglobin, which raises questions about the reliability of the results. The average values of fasting plasma glucose and postprandial blood glucose in patients with both MI and CHD indicate significant decompensation in patients that is associated with inadequate glycemic control, both by doctors and by patients, as well as, probably, due to inadequate provision of antidiabetic agents.

In compliance with current recommendations, compensation criteria for diabetes include blood lipid values, the level of which play essential role in the development of diabetic complications and especially of diabetic macroangiopathy [6; 8; 9]. According to the register, the rates of cholesterol and triglycerides of patients with type 2 diabetes with concomitant CAD were high, but at the same time, these values were not specified in all provinces, such in Kashkadarya region cholesterol and triglycerides in patients with CAD and MI were not determined at all. Unsystematic approach was seen also from other facts, such as detection of only blood cholesterol in some regions (Navoi, Namangan), absence of records on the lipids of patients with MI and CAD (Jizzakh, Surkhandarya and Khorezm).

Evaluation of the medical care provided to patients with CAD and MI, depending on the regions showed that in total across the Republic antihypertensive therapy is administered to 23 081 (37.5 %) patients, with a very low percentage in Kashkadarya, Khorezm and the Republic of Karakalpakstan, and absolutely absent records on antihypertensive therapy in Surkhandarya. Of no less importance is also the completeness of the records, which should specify the specific points of antihypertensive therapy, such as types of agents used for compensation of hypertension and how they affect hypertension. Hereby, although the region of Jizzakh contained records of antihypertensive therapy of 567 patients, there was no information on the groups of drugs used for the management of hypertension. From generalized data available it could be concluded that ACE inhibitors were used in 19 800 cases (32.2 %), beta-blockers — in 6 324 (10.3 %), angiotensin receptor blockers — 2 484 (4.03 %), calcium channel blockers — 161 (0.3 %), diuretics — 5 634 people (9.2 %). Interestingly though, there were no records of combined treatment with different groups of antihypertensive drugs.

Lipid-lowering therapy was administered to 21 685 (35.2 %) patients with the predominant majority of patients — 18 466 (30 %) receiving niacin; fibrates were used in 2 380 (3.9 %) patients, and comparatively very few cases of use of statins — in 2 125 (3.5 %) patients. Of all patients with MI and CAD, antianginal drugs were receiving 4 057 individuals (6.6 %).

Thus, the analysis of register-cards showed that today, in the regions across the country the maintained records both on the registration of patients with type 2 diabetes and its macrovascular complications are inadequate.

Glycemic control in terms of fasting plasma glucose and postprandial glucose does not allow making an objective judgment about the level of compensation of carbohydrate metabolism due to the

fact, that the concept, in general, includes also normal blood lipids and optimal blood pressure levels. An assessment of quality of medical and preventive care for patients with diabetes who have concomitant CAD and MI, demonstrates that it does not meet commonly accepted standards [11; 12]: inadequately low percentage of prescribing first-line drugs for the management of these patients — ACE inhibitors, beta-blockers, statins, antiplatelet agents, not to mention about combination therapy.

Conclusions

61 568 register-cards of patients with type 2 diabetes were analyzed for assessment of prevalence of CAD in the given population and for assessment of medical and preventive measures provided to patients with CAD. 10 130 (16.5 %) of all patients were found to have CAD and 949 (1.5 %) of them had MI. In general, the number of men with CAD was 5 325 (52.6 %), which was higher than among women — 4 805 (47.4 %). However, concerning particularly MI, the number of women with MI was twice higher than that of men (66.9 % vs. 33.1 %).

Indicators of fasting plasma glucose and postprandial blood glucose in patients with CAD and MI did not range significantly between each other, remaining within high values: 8.5 ± 0.1 and 10.4 ± 0.2 mmol/l, respectively. HbA1c was a common value, registered in all regions, but they were inadmissibly high: 8.5 ± 0.2 %.

Concerning registration of blood lipids, it can be said that this aspect was also defective, with some regions determining only one part of lipid spectrum and one region completely omitting registrations of lipids. Despite high levels of cholesterol and triglycerides, lipid-lowering therapy in 30 % of cases consisted only of nicotinic acid and statins were administered with unreasonably low frequency — 3.5 %.

Analysis of prescriptions for patients with type 2 diabetes in the presence of CAD and MI showed that drugs of first choice were not used frequently enough: ACE inhibitors — 32.2 %, beta-blockers — 10.3 %, diuretics — 9.2 %. There were no records on usage of antiplatelet agents. Unsatisfactory situation was also with administration of combination therapy with different groups of drugs, which can be concluded from absence of any records about such.

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Estimation of efficiency two protocols of correction of autoimmune thyroiditis in patients with reproductive dysfunction

Abstract: There were held a prospective, parallel-group study of 80 patients at different stages of autoimmune thyroiditis (AIT), before and after the correction of levothyroxine, and the combination levothyroxine with thiamazolium. It is shown that at AIT along with thyroid disbalance, elevated antithyroid antibodies observed elevated levels of proinflammatory cytokines. Correction of AIT combination with levothyroxine thiamazolium led to a significant reduction in levels of pro-inflammatory cytokines, titers of antithyroid antibodies, thyroid imbalance and restoration.

Keywords: autoimmune thyroiditis, antithyroid antibodies, cytokines, infertility, miscarriage.

Thyroid diseases rank first among the causes of endocrine infertility and miscarriage. The close relationship of thyroid and reproductive systems determined the presence of common central regulatory mechanisms, as well as interaction on the peripheral thyroid hormone levels and ovaries [7; 9]. In the structure of thyroid pathology leading place occupies the AIT, which, according to the definition of domestic and foreign authors is an organ multifactorial disease of the thyroid gland and is characterized by lymphocytic infiltration of its tissue, followed by progressive destruction of epithelial cells of the thyroid, leading to a permanent reduction of its function [3; 9] is a major cause of primary hypothyroidism.

Currently there is no evidence for the effectiveness of any methods of influence on the actual autoimmune process in the thyroid gland (immunosuppressants, immunomodulators, corticosteroids, plasmapheresis, drugs of thyroid hormones) [2]. At the same time there is evidence of immunocorrective effect of levothyroxine, is widely used in the treatment of autoimmune thyroiditis [4].

A. M. McGregor with coauthors (1980) showed that acts directly on carbimazole autoantibody synthesis by lymphocytes [18], D. P. Rennie with coauthors (1983) studied the effect of methimazole, thyroxine and their combined use with rats induced thyroiditis thyroglobulin [20]. According to the authors the use of methimazole and thyroxine significantly reduced the severity of the disease, the effect of thyroxine on antibody levels was less effective. The use of combination therapy was more effective than monotherapy with methimazole. Meanwhile R. Jansson with coauthors (1985) not indicated statistically significant difference in reducing the level of antibodies to thyroid peroxidase (ATPO) when using a combination of thyroxine and thyroxine with methimazole [15]. The authors suggest that thyroxine, normalizing the concentration of thyroid-stimulating hormone in the blood serum may reduce the autoantigen properties to tireotsitov with subsequent decrease autoantibody titers. According A. P. Weetman with coauthors (1983) and M. L. Chabernaud with coauthors (1996) methimazole inhibits lymphocyte proliferation and inhibits the production of autoantibodies to thyroglobulin [13; 22]. Analysis of the given literature shows a lack of consensus on AIT correction. Of particular relevance given circumstance becomes in women with autoimmune thyroiditis and reproductive dysfunction. According to the local authorities is not advisable to control the level of antithyroid autoantibodies to assess the dynamics of treatment and predicting AIT, as well as to treat the isolated presence of antithyroid antibodies [9]. In accordance with clinical guidelines of the Russian Association of Endocrinologists, "big" diagnostic features, the combination of which allows to establish the diagnosis of AIT, are: primary hypothyroidism (overt or subclinical resistant); antibodies to thyroid tissue; ultrasound signs of autoimmune disease (diffuse decrease in echogenicity of the thyroid gland). In the absence of at least one of the "big" diagnostic features diagnosed AIT is merely probabilistic in nature [11]. According Whickam' study, the annual risk of hypothyroidism in women with elevated ATPO and euthyroid is 2.1% [21]. Non-equity methodological approaches require a woman addressed with reproductive dysfunction, and elevated levels of antithyroid antibodies, when the time allotted for the restoration of reproductive function is limited. Analysis of completed clinical studies examining the relationship of autoimmune diseases of the thyroid gland and the female reproductive system, confirm that the underestimation of the thyroid function and the absence of standards of treatment leads to an increase in women's reproductive disorders [16; 17; 19]. Position gynecologist based on timely diagnosis of AIT, an autoimmune process refinement phase with the assessment of the functional state of the ovaries.

Objective: Estimation of the effectiveness of levothyroxine monotherapy and combination with levothyroxine thiamazolium in women with autoimmune thyroiditis and reproductive dysfunction.

Materials and methods

The study involved 80 women with reproductive dysfunction and autoimmune thyroiditis, in 41.3% of women diagnosed with early pregnancy miscarriage, at 58.7% of infertility. The diagnosis of autoimmune thyroiditis was set on the basis of complaints, typical ultrasound picture of the thyroid gland, and increased content of antithyroid autoantibodies in the blood. The criterion for inclusion of patients was raising ATPO and/or antibodies to thyroglobulin (ATG) more than 5 times with strictly to the parameters specified in the test kit.

All women, together with the physical examination, conducted a study of hormonal, cytokine levels, and ultrasound of the thyroid gland. Determination of blood thyroid stimulating hormone (TSH), free thyroxine (fT4) was performed by immunoenzyme method using a standard set of firms «Human» (Germany). To determine the blood of autoantibodies to thyroglobulin (ATG) and thyroid peroxidase (ATPO) use a standard set of the company "Med-Bio-line" (Russia). Study of cytokines: interleukin-1 (IL-1 β), interleukin-6 (IL-6), interleukin-18 (IL-18) and tumor necrosis factor- α (TNF- α) was performed on Stat Fax-2100 unit using standard sets of the company «Vector-Best» (Russian).

Depending on the level of TSH and fT4 4 groups of patients were formed: Group 1 — thyrotoxicosis (n = 20), all the patients in this group was lower than normal TSH, fT4 normal or above normal; Group 2 — subclinical hypothyroidism (n = 20), the criterion for inclusion was the content of TSH above normal, normal fT4; Group 3 — overt hypothyroidism (n = 20), patients had high levels of TSH and reduced fT4 respect to the parameters specified in the test kit; Group 4 — euthyroidism (n = 20), all patients TSH level was normal. Depending on the treatment, each group was divided into 2 subgroups of 10 persons. Thus, we investigated the efficacy of the methods of AIT correction differentially depending on the functional state of the thyroid gland on a background of an autoimmune process.

Group of patients with AIT stage of hyperthyroidism monotherapy conducted cardioselective β -blocker metoprolol in doses of 25–50 mg. per day, in groups of women with subclinical hypothyroidism, the manifest hypothyroidism and euthyrosis stage levothyroxine used in individually selected dose of 25–100 mkg. depending on the level TSH. In parallel, a combined therapy is similar in all groups of patients, and included 2 drugs: levothyroxine individually selected dose of 25–100 mkg/day depending on the level of TSH and thiamazol individually selected dose of 10–20 mg/day depending on the level of anti-thyroid antibodies. Assessment of the effectiveness of the treatment was carried out in 2 months. The average age of patients was 27.3 ± 5.3 years. The control group consisted of 10 women with reproductive dysfunction without AIT. The average age of patients in the control group was 29.2 ± 4.3 years.

Statistical processing of the results was carried out on a Personal Computers using standard packages applied statistical analysis software (SPSS-22, Microsoft Excel). Determination of the distribution type of sampling performed using the Kolmogorov-Smirnov test. To analyze the results of the study nonparametric test (U-test the Mann and Whitney test for independent samples, the Wilcoxon test for dependent samples, Spearman rank correlation) were used. To determine the statistical differences between the study groups, the analysis was carried out with the help of U-test the Mann and Whitney test for independent samples, the results of which showed no

significant difference between the groups prior to the intervention. After the treatment in order to study the effectiveness of the intervention of a comparative analysis using the Wilcoxon test was carried out for dependent samples in each group.

Results and discussions

The results of the study of thyroid status in patients with autoimmune thyroiditis in the stage of leveling hyperthyroidism showed symptoms of hyperthyroidism in all patients receiving combination therapy, baseline TSH was 0.2 ± 0.1 mIU/L after treatment 1.3 ± 0.6 mIU/L ($p=0.005$). In the group of patients receiving metoprolol thyrotoxicosis only survived after 3 months, no significant changes were observed in the level of TSH. Against the background of a combination therapy achieved significant reduction ATPO level with 960.1 ± 810.6 IU/mL before treatment to 459.8 ± 514.2 IU/mL after treatment ($p=0.005$) and ATG with 413.3 ± 298.7 IU/ml before treatment to 166.6 ± 208.7 IU/ml after treatment ($p=0.005$). In the group of patients who received monotherapy observed increase in titer ATPO and ATG, although the changes were not statistically significant.

The results of the study of proinflammatory cytokines in patients with autoimmune thyroiditis hyperthyroidism in a stage shown a significant decrease of IL-1 β , IL-6, IL-18 and TNF- α at the significance level of $p=0.005$ after combination therapy. As a result, symptomatic therapy with metoprolol, in the absence of pathogenic therapy observed natural course of the disease, which was reflected in statistically significant decrease in the level of IL-1 β and IL-6 and increased levels of IL-18 and TNF- α with respect to baseline values before treatment.

The results of the study of thyroid status in patients with AIT in a stage of subclinical hypothyroidism showed similar efficacy in restoring thyroid imbalance: on the background of levothyroxine monotherapy showed a significant decrease in TSH levels with 8.8 ± 6.5 mIU/l to 3.3 ± 1.8 mIU/l after the treatment ($p=0.005$) for the combined therapy has changed from TSH 6.4 ± 2.1 mIU/l to 3.1 ± 1.4 mIU/l after treatment ($p=0.005$) and increase in the content fT4 — with 1.2 ± 0.2 ng/dl to 1.6 ± 0.2 ng/dl ($p=0.005$) after monotherapy and 1.4 ± 0.2 ng/dl to 1.7 ± 0.2 ng/dl ($p=0.005$) after the combination therapy. Level ATPO resulting monotherapy decreased from 1353.1 ± 987.6 IU/ml to 1076.0 ± 724.7 IU/ml ($p=0.013$), as a result of combination therapy was able to achieve a significant reduction — from 1311.4 ± 915.7 IU/mL to 660.9 ± 654.4 IU/ml ($p=0.005$). A similar pattern was observed in the level of APG, which decreased by monotherapy with 528.8 ± 796.3 IU/mL to 473.9 ± 730.8 IU/ml ($p=0.047$), on the background of a combination therapy with 628.2 ± 489.0 IU/ml and 236.7 ± 281.0 IU/ml ($p=0.005$). These results confirm the observations of other authors, according to which patients with AIT after treatment with levothyroxine was reduced level of ATG [1, 10]. Burmeister L. A. (1994) thinks that probably this can be explained by the fact that fT4 inhibits production of TSH, resulting in decreased synthesis of thyroglobulin [12] and as a result — is reduced synthesis of autoantibodies directed against him. To date, the actual the question is about mechanisms underlying dysregulation of immune system in autoimmune disease [8]. According to research an important role in apoptosis belong thyroxine, which regulates the functioning of the protein tyrosinekinase, an important element in the implementation of the death signal [14]. With a lack of thyroid hormone suppression of apoptosis occurs [6]. Dynamics of proinflammatory cytokines, depending on the type of correction showed a significant decrease of IL-1 β in both groups, with 75.8 ± 49.6 pg/ml to 32.7 pg/ml ($p=0.005$) after monotherapy and 74.1 ± 56.5 pg/ml to 24.7 ± 43.4 pg/ml ($p=0.005$)

after the combination therapy. IL-6 values decreased with the same level of importance in both groups after treatment with 123.1 ± 67.6 pg/ml to 57.2 ± 43.5 pg/ml ($p=0.007$) after monotherapy and 144.7 ± 66.3 pg/ml to 25.2 ± 59.2 pg/ml ($p=0.007$) after the combination therapy. Values of IL-18 remained within the regulatory parameters before and after treatment in both groups were not statistically significant deviations. TNF- α was significantly more decreased as a result of monotherapy and amounted to 20.0 ± 29.6 pg/ml vs. 51.4 ± 48.0 pg/mL before treatment ($p=0.005$), decreased to as a result of the combination therapy 7.1 ± 9.7 pg/ml vs 38.0 ± 51.6 pg/ml before treatment ($p=0.028$).

Against the background of the correction in AIT stage overt hypothyroidism was observed a significantly decrease in TSH and elevated levels fT4 in both groups after treatment. TSH levels decreased as a result of monotherapy to 4.5 ± 2.7 mIU/L versus 14.8 ± 6.8 mIU/L before treatment ($p=0.005$) and a result of combination therapy to 2.9 ± 2.1 mIU/l versus 12.9 ± 4.0 mIU/l before treatment ($p=0.005$). Content fT4 on monotherapy was 1.3 ± 0.3 ng/dL vs. 0.5 ± 0.1 ng/dL before treatment ($p=0.005$), in the combined therapy — 1.4 ± 0.4 ng/dL vs. 0.6 ± 0.1 ng/dL before treatment ($p=0.005$). Meaning ATPO decreased in both groups, more significantly after combined therapy — up to 662.3 ± 752.3 IU/ml with respect to 1395.3 ± 1136.6 IU/mL before treatment ($p=0.007$) after monotherapy decreased to 844.6 ± 625.5 U/ml relative to 1183.2 ± 943.9 IU/ml before treatment ($p=0.028$). Content ATG has hardly changed in the group of women who received monotherapy, whereas in the group of patients receiving combination therapy with ATG level significantly decreased to 381.5 ± 333.9 IU/ml with respect to 793.5 ± 478.3 IU/mL before treatment ($p=0.005$).

Against the background of the correction in AIT stage overt hypothyroidism significantly decrease in the level of IL-1 β was achieved only as a result of combination therapy — with 69.4 ± 48.7 pg/ml to 7.0 ± 2.6 pg/mL after treatment ($p=0.005$). Similarly, there was a significant reduction in IL-6 only as a result of the combination therapy — from 111.3 ± 73.4 pg/ml to 16.8 ± 10.9 pg/ml ($p=0.005$). The content of IL-18 in both groups before and after treatment remained within standard parameters. With regard to TNF- α , its content is significantly reduced as a result of the combination therapy and has made 4.9 ± 1.9 pg/ml with respect to 66.9 ± 64.7 pg/mL before treatment ($p=0.008$). As a result, variables of monotherapy of the parameters of IL-1 β , IL-6 and TNF- α was not observed.

The results of the study of thyroid status in patients with autoimmune thyroiditis in euthyrosis stage showed no significant changes in the level of TSH and fT4 before and after treatment in both groups. As for the content ATPO, it was significantly reduced in both groups, with 978.0 ± 873.6 IU/mL to 749.7 ± 689.6 IU/ml after monotherapy ($p=0.007$), and 1027.3 ± 535.2 IU/ml and 521.1 ± 396.4 IU/ml after combination therapy ($p=0.005$). Contents ATG more significantly decreased as a result of the combination therapy — 173.1 ± 239.2 IU/ml (compared to 375.0 ± 299.6 IU/ml before the treatment, $p=0.005$) resulting in monotherapy ATG decreased to 382.3 ± 408.9 U/ml (compared to 477.8 ± 439.0 IU/ml before the treatment, $p=0.037$).

Cytokines had a major role in the pathogenesis and development of autoimmune thyroid disease. At AIT characteristic is the activation of the immune system, and increase the level of pro-inflammatory cytokines. It is known that TNF- α , is the most apoptotic cytokine. Patients with AIT sets significantly increase in TNF- α concentration in serum more pronounced at AIT in euthyrosis stage. Our results are consistent with those of other authors. According to O. I. Urazova with coauthors (2008), Production of this cytokine is

associated with both the severity of the immune process and the level of thyroid hormones [8]. The results of the study of cytokine status in patients with autoimmune thyroiditis in euthyrosis stage showed a significant decrease in the level of IL-1 β , IL-6, IL-18 and TNF- α have received combination therapy patients. However, as a result of monotherapy significantly decrease was noted only in the level of IL-1 β and TNF- α . TNF- α . It has an activating effect on the cytotoxic activity of lymphocytes infiltrating the thyroid gland, and is involved in the processes of destruction mediated apoptosis i. e. It is a component of host defense response, which controls the «strength» of the autoimmune process [10]. The release of TNF- α thyroid stimulated autoimmune thyroiditis lymphocytes

plays an important role in the progression of the disease and its stage of development of the ultimate — hypothyroidism [5].

Conclusions:

1. Combination Therapy of thymazolum and thyroxine led to the most significant decrease in the level of ATPO, ATG and proinflammatory cytokines IL-1 β , IL-6 and TNF- α in patients with autoimmune thyroiditis patients regardless of the stage. Suppression of autoimmune aggression will likely contribute to the preservation and restoration of thyroid cells and thyroid imbalance.

2. The results of the research make it necessary to continue research in assessing the functional status of patients with ovarian AIT patients with regard to the stage and treatment protocol.

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Antagonism of microelements and the impact on mineral Exchange in newborns

Abstract: Researches order to assess content level of some microelements in newborns, born with normal and low weight also determine the impact on their growth and development especially the relationship of trace elements of iron gland and calcium. Deficiency of vitamins and bio-elements is a common cause dysfunction of organs and systems, intrauterine fetal growth retardation, indicating that the value a comprehensive approach in the treatment of anemia in pregnant women.

Keywords: microelements, antagonism, newborns, prenatal development.

Urgency. Among the various conditions disease risk newborns in the neonatal period, an important place belongs to fetal growth retardation, which is the result of various pathological conditions in pregnant women. Despite numerous studies on the disclosure of the reasons for low birth weight, the problem is still relevant in Pediatrics [5]. Migrated anemia in women during pregnancy and their treatment only iron supplements can cause an imbalance of calcium and iron in the body of the fetus and the child after birth. Microelements are involved in all the metabolic processes of the body and Their disadvantage, altering the functioning of enzymes and other proteins, reduces the intensity of metabolism and causes a delay in fetal growth [1; 4].

The cause of micronutrient deficiencies in the body may be the interaction of trace elements, as antagonism or synergism [2; 8]. Items similar to each other in their physical and chemical properties or size of atoms can actively interact or compete in systems that perform absorption, transport or metabolism [6]. In the body of excess phosphorus and iron may interfere utilization of calcium and promotes its removal from the bone.

So, a large amount of calcium inhibits the absorption of Zinc. Use of nutritional supplements that contain zinc in doses exceeding the daily requirement of more than 10 times leads to copper deficiency, and anemia [3]. At a high content of phosphorus disturbed absorption of magnesium and iron (up to 3%), etc. Last years, with the advent of parenteral use in different types of microelements prevalence of such disorders has increased [7].

The question of the possible effect of iron on the bioavailability of calcium studied for a long time both in animal experiments and in human studies. Numerous works have shown that iron is reduces intake of calcium, exerting an inhibitory effect or to transport it in the gastrointestinal tract, or receptor binding [1; 7]. Our studies have focused on the identification of calcium metabolism in the body of the newborn when used by pregnant only iron-containing preparations (ICP) for the treatment of anemia.

The aim of research — to evaluate the levels of some microelements in newborns, born with normal and low birth weight and to determine the effect of the interplay between microelements of iron and calcium in their growth and development.

Materials and methods. Were examined 20 newborns born with low birth weight (LW) of mothers with anemia. The control group

consisted of 35 apparently healthy term infants with normal weight (NW) of mothers without anemia and their mother. All children conducted determination of iron content (Fe), calcium (Ca), and other microelements (ME) in the cord blood serum, amniotic fluid and breast milk of mothers. Research of microelements was conducted in the Republican Center for Forensic Science by mass spectrometry inductively coupled plasma the instrument on ICP-MS (mass spectrometer with inductively coupled plasma, production of Japan — 2001.) AT 7 500 mode “Semiquant” by the method “Test/M”. Conduct a full anthropometry, clinical examination of children, the severity of those or other pathological signs, Apgar scores. All newborns were examined blood on the basic parameters.

Results and discussion. The research resulted in it was revealed that all the clinical indices children with low birth weight are inferior for newborns with normal weight. By weight of children with LW superior to 931.1 grams in average indicators of children with CF ($3\,370.6 \pm 2.19$ and $2\,439.5 \pm 0.87$ respectively). Gestational age is also greater in the group of newborns with NW at 1.6 (39.5 ± 1.2 and 37.9 ± 2.3 , respectively).

In the WHO data to assess the physical development of the child, there is a table with the body mass index (BMI) is the ratio of weight to length (height). This table can be used for all children up to 5 years [3]. When BMI above the number of 12.0 corresponds to children born with normal weight relative to growth at birth and gestational age, and children with indicators below that — born with LW.

Assessment of the Apgar score testifying to decrease of performance in these children at birth. At 1 and 5 minutes, she was 6 and 7 points in 3 children from 20 newborns (15.0%) were born with LW, and in 1 child 5 and 6 points (5.0%). A basic number of children assessment of 7 and 8 points, that was 75%, only in one child 8 and 8 (5%).

Physiological jaundice in newborns with NW from mothers without anemia was observed on average during 2.7 ± 0.37 days, and in newborns with LW from mothers with anemia who received ICP physiological jaundice is observed on average during 6.6 ± 0.41 days, an increase of 3.9 days.

Based on the scientific researches proved that the hemoglobin content in the blood in healthy term infants with NW basically not

affected. Level on the average made 191.5 ± 5.8 g/l, erythrocytes — 5.9 ± 0.2 mln. And leukocytes — 14.4 ± 0.6 thousand, in newborns with LW lower — 165.9 ± 3.9 g/l, 5.8 ± 0.4 mln. and 13.7 ± 0.8 thousand, respectively. In 12 children from 20 constituting this group, there was a decrease in the level hemoglobin in the blood, i. e. anemia (60%).

In the study of the ME content special attention is paid parameters of iron and calcium. The study of iron in the cord blood in the studied groups of newborns with NW reveals that in normal umbilical cord blood contains an average of 98.66 ± 0.62 g/ml of iron, in the amniotic fluid, the figure was 97.51 ± 0.62 g/ml.

Maximum values up to 139.35 g/ml reaches the Fe content of umbilical cord blood in children with LW under the influence of the regular admission ICP mothers with anemia, as opposed to the lower content of amniotic fluid — 82.09 ± 0.50 g/ml. The highest rates of Fe in the cord blood, and conversely the lowest in the amniotic fluid in children with LW from mothers with anemia who received ICP.

Analyzing the average calcium content of the umbilical cord blood of newborns in the study group with NW from mothers without anemia, found that its content is 55.37 ± 0.50 g/ml, in the amniotic fluid 58.87 ± 0.53 g/ml. In the group of newborns with LBW from mothers with anemia with receiving ICP content of Ca in cord blood expectedly low, and is 42.23 ± 0.35 g/ml, in the amniotic fluid 77.17 ± 0.60 g/ml, indicating that Ca excretion into the amniotic fluid.

The studies revealed pathological distribution of iron on the background of anemia and low birth weight, which indicates the

failure of adaptive and compensatory mechanisms of the body of Mother and Child by pharmacological “support” of iron, which is for the whole group research the disastrous mistake in respect of iron homeostasis in the system “mother-placenta-fetus”. It is this feature of the conduct of mothers with anemia and LBW presence of the fetus necessary to consider doctors in own practice that will benefit undeniable practical health.

The results of our research and analysis of the literature suggest that the iron ions are able to reduce the level of calcium absorption. The possibility of such interactions are most relevant and should be considered in the treatment of iron deficiency anemia and calcium deficiency states, particularly in high-risk groups (children, pregnant women, the elderly). Based on these studies should be noted that the deficit or imbalance ME mothers and newborns is a common cause of intrauterine fetal growth retardation, anemia and disorders adaptation of the newborn in the early neonatal period.

Conclusion. Thus, between the ME exists some interaction, wherein the individual ME with respect to each other and to the metabolic processes come as synergists or antagonists. Studies have also proved some interaction between some of the ME. A competent separation of vitamin and mineral components, as well as the use time of reception is a prerequisite for efficiency of their application. In this case it is convenient to use vitamin and mineral complexes that provide separate intake of iron and calcium.

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Clinic-biological features of alcoholism in patients with deviant behavior

Abstract: We studied the clinical features of alcohol dependence in patients with behavioral disturbance and psychological conditions that contribute to their formation. The study involved 200 patients with alcoholism with deviant behavior and without any indications of behavioral disorders. The results may indicate that the presence of premorbid comorbidity, family history, and personality characteristics have an important influence on the formation of alcohol dependence and the presence of deviant behavior in these patients.

Keywords: alcoholism, deviant behavior, genetic predisposition, personality disorder.

In the analysis of English literature quite often possible to meet opinion that patients with alcohol dependence comorbid with personality disorders have a low level of social functioning, low motivation for treatment, a high risk of relapse addiction, and hence the poor results of treatment [1; 3; 4; 6; 7].

It is known that in recent years more and more interest takes the study of deviant behavior, which is widely covered in the foreign literature [2; 5].

The objective is to study clinical features of alcohol dependence in patients with deviant behavior.

Materials and methods: In accordance with the object and purpose all the patients were divided into two comparison groups: main group (MG) — with deviant behavior (150 persons) and a control group (CG) — with no signs of deviant behavior (50 people).

Comparative analysis was carried out regarding the features of the development and course of alcohol dependence, family history, and qualitative analysis of the studied contingent in the context of their personal typology in the two groups.

Results of the research. The most commonly in patients of MG revealed signs of emotional instability (24.0%), dissocial (28.0%), dependent (18.0%), personality types, in patients with CG met most alarming (22.0%) and anancast personality types (14.0%). This distribution shows that about 1/3 of the patients had signs of comorbid disease, that means that they combined 2 diseases — alcohol dependence and personality disorder.

32% of patients in the control group did not reveal any accentuation or personality disorders.

A comparative analysis of the frequencies of occurrence of different personality types in the groups with MG and KG were found statistically significant differences. Emotionally unstable, antisocial and dependent personality types are often detected in patients with alcohol dependence with deviant behavior (MG), while anxious types and anancastic longer met in patients with alcohol dependence without deviant behavior (KG).

For detection of the frequency of occurrence of various types and levels of operation of the individual patients comparative analysis of the two groups was conducted.

Patients with emotionally unstable personality type distinguished by a reduced ability to volitional regulation of their actions, the lack of it commitment in behavior, rapid change and inconsistency of the interests and hobbies. They prefer to have more friends that are more “authoritative” than themselves, they obeyed them,

they easily fall under the influence of the environment. Implementation of their desires, motivations and aspirations are not determined by internal target but with random and external circumstances.

Most often dissocial personality type patients differed callous indifference to the feelings of others; gross and persistent attitude of irresponsibility and disregard for social rules; inability to maintain relationships in the absence of difficulties in their establishment; pronounced tendency to blame others and the inability to feel guilt and benefit from life experience, particularly punishment.

Dependent personality is characterized by: the desire to pass on to other important decisions in their lives; submission to their own needs to the needs of others; unwillingness to make demands of people from whom the individual is dependent; discomfort or helplessness alone; the fear of being abandoned by the person with whom there is a close connection; limited ability to make decisions without encouragement from others.

Anxious personality distinguished: permanent general feeling of tension and heavy forebodings; perceptions of their social and personal failure unattractiveness; increased concern criticism in his address; reluctance to enter into a relationship without no guarantees to be liked; avoidance of social activities associated with significant interpersonal contact and high sensitivity with respect to criticism.

Obsessive-compulsive personality disorder is characterized by: excessive tendency to doubt and caution; concern about details; excessive diligence and thoroughness; pedantry and increased commitment to social conventions; rigidity and stubbornness; unreasonable insistence that others are doing exactly as he does, and the emergence of persistent and unwanted thoughts and impulses.

Thus, almost 30% of the patients had evidence of the alcohol dependence and personality disorders, whereas this figure occurs only in 10% of patients with CG. Indicators of family history are displayed in Table 1.

Table 1. – Comparative analysis of the clinical features of alcohol dependence in patients (n = 200)

Indicators		MG (n = 150)		CG (n = 50)		P
		Abs.	%	Abs.	%	
Family history	Father alcoholism	65	43.3	5	10.0	> 0.05
	Alcoholism of 2 parents	19	12.5	1	2.0	> 0.05
	Alcoholism and drug addiction in relatives	32	21.3	3	6.0	> 0.05
	Mental illness in relatives	38	25.3	5	10.0	> 0.05
The age of onset of use of alcohol	16 years	74	49.3	4	8.0	> 0.05
	16–20 years	58	38.6	8	16.0	< 0.01
	after 20 years	18	12.0	38	76.0	< 0.05
The age of onset of alcohol abuse	20 years	48	32.0	4	8.0	< 0.001
	20–25 years	73	48.7	21	42.0	> 0.05
	After 25 years	29	19.3	25	50.0	< 0.001
Age of generating of alcohol withdrawal syndrome	20 years	40	26.7	0	0	< 0.001
	20–25	82	54.7	2	4.0	< 0.001
	after 25 years	28	18.7	48	96.0	< 0.001
Aggression in state of intoxication		88	58.7	8	16.0	< 0.001
Aggression in sober state		62	41.3	0	0	< 0.001
The tolerance of the organism to alcohol (ml/day)	less than 500	25	16.7	9	18.0	> 0.05
	500–750	73	48.7	32	64.0	> 0.05
	1000 and more	52	34.7	9	18.0	< 0.01
The use of alcohol surrogate		31	20.7	2	4.0	< 0.001
Systematic abuse of alcohol		14	9.3	22	44.0	< 0.001
Drunken form of alcohol abuse		110	73.3	18	36.0	< 0.001
Paroxysmal disorders in AWS		24	16.0	1	2.0	< 0.001
Alcoholic psychosis in the anamnesis		26	17.3	3	6.0	< 0.05
Poisoning with alcohol		12	8.0	0	0	< 0.001
A significant loss of weight after binge		58	38.7	7	14.0	< 0.001
Therapeutic remission disruption		71	47.3	12	24.0	< 0.01

It was found that family history of substance dependence and mental disorders may contribute to alcohol abuse and deviation of the patient.

Conclusion. Thus, the above results of the comparative analysis of the clinical features of alcohol dependence demon-

strates that patients with behavioral problems have earlier and rapid development of alcohol dependence, as well as the more malignant it over, accompanied by a variety of complications and were more frequent and faster breakdowns of therapeutic remission.

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Experience of the optimum exposition of enterosgel establishment for treatment of the periodontal disease at patients with vesicular disease

Abstract: Based on clinical studies it was found that the optimum mode enterosgelya exposure to the area affected by periodontal pockets is 2 hours. During this period it was observed decrease in the total microbial contamination gingival fluid in more than 25,000 times; restores the balance of gram-negative and gram-positive microorganisms.

Keywords: Enterosgel, periodontal disease, vesicular disease, gram-negative and gram-positive microorganisms.

From the clinical point of view vesicular disease belongs to difficult multifactorial diseases and is bound to development and persistence of processes of endogenic intoxication which is shown by essential augmentation in a blood of molecules of average weight and activation of proteolytic processes [4, 22–25; 6, 28].

It is known that emergence and advance of a periodontal disease is caused by activation of constantly present microorganisms, development of clinically defined inflammatory reaction which appointment consists in neutralizing the toxins and enzymes blasting tissues is a consequence of that, and also to destroy and microbial cells.

At synchronization of an inflammation in tissues in a large number the substances which are initially protecting, and as a result actively striking these tissues accumulate. Accumulation of the toxins formed by infectious agents aggravates metabolic disorders, leads to development of various pathological states. As a result in liquid of the parodontal pockets (PP) and other biological

liquids (stomatic liquid, a blood) products of a destruction of tissues collect, causing intoxication syndrome. Among bonds of this sort the important role belongs to middlemolecular peptides (MP) [2, 52–54; 5, 22].

In complex treatment of generalized periodontitis (GP) as an agent of detoxication therapy the sorbent of “Enterosgel” is widely applied. Enterosgel — a silicon organic compound — is made by JSC Silma (Russia). It is used inside, in a dose of 15 g. 2–3 times a day between meals, washing down with a glass of water. It is shown that reception of enterosgel in the specified dosage leads to depression at sick with GP of symptoms and indicators of endogenic intoxication [3, 22–25].

It is obvious that local application of sorbents for treatment of diseases of a parodont especially significantly at patients with vesicular disease at whom endogenic intoxication is one of the main pathogenetic mechanisms of development of a basic disease.

In this regard establishment of an optimum exposition of enterogel local application for treatment of a parodontal disease at patients with vasicular disease is actual.

All above defined is considered as the purpose of researches: development of an optimum regimen of local use of enterogel for treatment of a parodont.

Materials and methods

Object of studying were 30 people with the verified diagnosis of an exacerbation of an akantolic vesicular disease and a periodontal disease. The group of comparison was made by 10 people of a comparable floor and age who don't have dermal pathology and clinical implications of an inflammatory and destructive lesion of a parodont.

Prior to treatment all patients were trained in rules of hygiene of an oral cavity, refusal of smoking is recommended. Mechanical therapy was carried out: excision of plaques, curettage of parodontal pockets (PP); elimination of the factors leading to microtraumatizing of a parodont. Then under a protective retentive bandage on area of the struck pockets enterogel was imposed. Various methods of a local exposition of enterogel are studied. Depending on an exposition regimen all patients are divided into 3 groups: 1st group (10 people) the preparation for 1 hour was imposed; 2nd group (10 people) — on 2 hours and the 3rd group (10 people) imposed a preparation for 3 hours. A basis of local therapy is elimination of the etiological factor associated with tooth plaques, promoting the striking effect on a tissue.

In this regard before applying of enterogel the total of microorganisms in the separated PP (Total bacterial count — TBC in 1 ml.), and also balance of gram — negative and gram — positive microorganisms in smears from the separated PP was studied by the standard methods in microbiological researches.

As markers of endogenic intoxication concentration of Middle Molecules (MM)²⁶⁰ and MM²⁸⁰ was estimated by a spectrometer method [1, 138–140]. The quantity of MM was calculated on Kalkar's method [2, 52–54].

Crevicular fluids for researches were received via using methods applied by Zakharova N. and Ivanova I. [9, 1–3].

Results of statistical researches processed through computer programs as "Microsoft Excel" and "Statistics". Correlation between parameters was defined by coefficient of correlation of Student. Differences were considered reliable at $P \leq 0.05$.

Results and discussion

The analysis of the obtained data revealed increasing of the maintenance of microorganisms in the separated PP at all examined patients. The total of microorganisms exceeded indicators of conditionally healthy faces on 3 and more orders (> 1000 times). In bacterial structure of the separated PP at sick with GP the imbalance of gram-negative and gram-positive forms with prevalence of gram-negative rods which specific gravity in the compared groups fluctuated

within 60.8–63.6%. Microbiological researches showed value of gram-negative microflora in a lesion of a parodont. Our researches will be compounded with data of other authors who proved value of gram-negative microflora in development of pathology of a parodont. In the PP a huge variety of microorganisms accumulates, thus the leading role is assigned to the gram-negative bacteria pathogens starting processes of a destructive lesion [7, 213–238; 8, 498–510].

Appreciable depression of the general microbial content of the PP at all studied exposition regimens is established. So, at an exposition within 1 hour of TBC decreases by 15 830 times; within 2 hours — by 25 700 times and during 3 hours — by 25 400 times.

It is necessary to notice that after Enterogel's exposition the ratio of the studied forms of microorganisms that consisted in depression of specific gravity of gram-negative forms significantly changed positively. Thus, after an exposition within 1 hour specific gravity of gram-negative rods decreased by 1.76 times; gram — negative coccuses — by 1.57 times; and specific gravity of gram — positive forms on the contrary grew in 3.16 and 4.03 times, respectively.

Maximum efficiency of restoration of balance of bacterial flora is installed in the separated PP when using an exposition 2 and 3 hours. So, specific gravity of gram — negative rods went down in 3.32 and 3.23 times respectively at 2 and 3rd hour of exposition; the corresponding depressions for gram — negative coccuses made — by 1.75 times and 1.91 times; and augmentation of gram — positive rods and coccuses — in 4.58–4.70 and 3.44–3.75 times, respectively.

In groups of comparison to an exposition of enterogel essential augmentation of MM²⁶⁰ and MM²⁸⁰ is registered (by 2.64–2.13 times). Local application of enterogel within 1 hour led to depression of MM²⁶⁰ for 21.43% ($P < 0.01$) and MM²⁸⁰ — for 22.39% ($P < 0.01$). Results of expositions within 2–3 hours didn't tap essential differences in MM sorption; depression of concentration of MM²⁶⁰ made 46.55–47.37%; MM²⁸⁰ — 48.48–48.53%, respectively.

The syndrome of endogenic intoxication accompanies many diseases and pathological states, defining their severity of progression and the forecast [5, 22]. It is obvious that depression of markers of endogenic intoxication in a periodontal can render an essential contribution in cupping of local inflammatory and destructive process gives the chance of rational correction of the taped disturbances by preparations of sorption action.

Including of local sorption therapy in complex treatment of a periodontal disease promotes essential decrease of a microbial content of the parodontal pockets, restores balance of gram-negative and the gram-positive microorganisms, significantly reduces the level of endogenic intoxication.

Taking into account efficiency of restoration of PP microbial associations and fall of indicators of endogenic intoxication the exposition of enterogel for a period of 2 hours is optimum.

Table 1. — Dynamics of the bacterial structure of a microflora of separated parodontal pockets

Group	Term of exposition	Research period	TBC in m. k./1 ml	Balance of gram-negative and gram-positive forms, %			
				rods		coccus	
				Negative	positive	negative	positive
Conditionally healthy, n = 20	—	—	$1.2 \cdot 10^3 \pm 0.05 \cdot 10^3$	8.0	40.5	9.0	42.5
1 st group, n = 10	1 hour	Before treatment	$8.31 \cdot 10^8 \pm 0.35 \cdot 10^3$	63.6	7.4	22.8	6.2
		After treatment	$5.25 \cdot 10^4 \pm 0.21 \cdot 10^4$ °	36.2	24.3	14.5	25.0
2 nd group, n = 10	2 hours	Before treatment	$8.25 \cdot 10^8 \pm 0.37 \cdot 10^4$	60.8	8.0	21.7	9.5
		After treatment	$3.21 \cdot 10^3 \pm 0.11 \cdot 10^3$ °,*	18.3	36.6	12.4	32.7
3 rd group, n = 10	3 hours	Before treatment	$8.33 \cdot 10^8 \pm 0.31 \cdot 10^8$	61.4	7.7	22.0	8.9
		After treatment	$3.28 \cdot 10^3 \pm 0.06 \cdot 10^3$ °,*	19.0	36.2	11.5	33.3

Note: ° — $P < 0,05$ in relation to size before treatment; * — $P < 0.05$ in relation to the 1st group.

Table 2. – Dynamics of middle molecular peptides in separated parodontal pockets (g/l)

Group	Term of exposition	Research period	MM ²⁶⁰	MM ²⁸⁰
Healthy, n = 20	–	–	0.22 ± 0.01	0.32 ± 0.01
1 st group, n = 10	1 hour	Before treatment	0.56 ± 0.02	0.67 ± 0.01
		After treatment	0.44 ± 0.01*	0.52 ± 0.02*
2 nd group, n = 10	2 hours	Before treatment	0.58 ± 0.02	0.66 ± 0.03
		After treatment	0.31 ± 0.01*	0.34 ± 0.01*
3 rd group, n = 10	3 hours	Before treatment	0.57 ± 0.02	0.68 ± 0.03
		After treatment	0.30 ± 0.01*	0.35 ± 0.01*

Note: * — $P < 0.05$ in relation to size before treatment.

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Value of lymphocytes antigen-binding indicators to the cellular antigen of the different organs in patients with congenital heart failure, complicated pulmonary hypertension on stages of the surgical treatment

Abstract: On 52 patients between the ages of 3 to 14 with congenital heart failure, complicated pulmonary hypertension on 3rd degree are learned dynamic of Antigen binding lymphocytes (ABL), specific to sensibility to the Tissue Antigen (TA) of brain, heart, lungs, and kidneys depend on different methods of insertion. By adding to traditional treatment of iPDE-5 showed noticeable decrease of the ABL to TA of the lungs, endocardium, and myocardium in patients the

high effect of the medication. Studies of the indicators of ABL to TA of organs in these patients allow objectively assess the intensity of destruction process and necrosis of this structures in these organs, and also, show the effect of iPDE-5 on this process.

Keywords: congenital heart failure, lungs hypertension, antigen binding lymphocytes, tissue antigen, iPDE-5.

Frequency of congenital heart failure (CHF) among all malformations is high enough and composes of 30%. In different authors, assessment of the frequency of occurrence is varies, but on average it is consist of 0,8-1,2 % of all newborns. Congenital heart failure in more then 5-% cases accompanied by hypervolemia (fluid overload) of pulmonary circulation (PC) with formation of pulmonary hypertension (PH)[2, 64; 4, 9]. PH is the main cause of development different in the expression hypoxia and hypoxemia, accompanied by an imbalance almost all chains non specific and cellular immunity. Development of the immunological insufficiency is causing high susceptibility to the variety infections and exposure to the development of multiple organ disorders, allergic and autoimmune processes, and high risk complications during cardio surgical involvement. With defeat of various genes in any kind of organs causing their cell damaging intracellular process leads to dystrophy of the cell. The increase in the degree of the dystrophy causes destruction and necrosis of the cell. In the inter environment enter molecules and fragments of structural and functional proteins, that specify as organic. Tissue protein and molecules are "foreign" for inner environment, and take place as tissue antigen (TA), which activates immune reaction for neutralizing and elimination. As TA are located in inner environment in any kind of organs, they are differentiate and circulate in the blood antigen binding lymphocytes (ABL) that have ability specifically bind to TA only to this specific organ. Level of ABL to TA reflects the intensity of the destruction process and necrosis of organ's structures: increasing ABL in dynamic show on increasing, and decreasing ABL- on extinction intensity these process, which allow assess the degree of the damage of this organs and also effectiveness of the therapy. The value of the method for determining ABL to TA is its high sensitivity and specificity: containing ABL to TA reaches the diagnostic level on the early stages and appears way before clinical symptoms of the damaged organ that create possibility for earlier prognosis of risk development of the organic insufficiency. Statement of the reaction ABL with TA for several organs allow detect multiple organic damage of body during development of the pathology [1, 22-24; 3,115-118; 5, 13-17]. Pharmacotherapy (Drug treatment) of the PH is crucial and in most cases is the main correction method directed on central formation of pathophysiological mechanism. Nowadays, the scheme of the combine therapy is the subject of intensive studies (for example, analog of prostacyclin + antagonist endotelin-1 + inhibitors phosphodiesterase-5 (iPDE-5). The literature suggests successful using (iPDE-5) in patient with primary and secondary pulmonary hypertension. However, information about using inhibitors phosphodiesterase-5 (iPDE-5) in early childhood time is not much and it indicates a selective reduction of pressure in pulmonary artery [6,110-118; 7,110-118; 8, 55-56].

Purpose of research : Evaluate the significance of the indicators ABL to TA of different organs for identify the level of damage in brain tissue, heart, lungs and kidney in patients with CHF with PH based on treatment with inhibitors phosphodiesterase-5 (iPDE-5) and inhibitors AFP (iAFP).

Materials and methods of studies. In total, 52 patients between the ages of 3 to 14 with congenital heart failure such as VCD-43 (82, 7%) and PDA-9 (17, 3%) with pulmonary hyperten-

sion (PH) on 3rd degree (medium pressure in pulmonary artery 70-100 mm Hg).

All patients depend on treatment after the surgery has been divided into 2 groups: 1st group (24 patients) - comparative group, that was giving traditional therapy during surgical treatment (cardiac glycosides, metabolic therapy, diuretics are as indicated, cardio tonics); 2nd group (28 patients) — main group, patients to whom was added (iFDE-5) (Revatio, Pfizer) 3 mg/kg/day and iAFP as additional to traditional therapy. All the results was comparing with control group- indicators of almost all healthy people (n=22).

To all the patients on admission to hospital, after preparation for the surgery, after 10-14 days and 3 month after surgery together with general blood count analyses and special clinical studies measure the level of antigen binding lymphocytes (ABL) to tissue antigen (TA) of the brain, to TA of the heart-endocardium and myocardium, TA lungs and kidneys [1, 22-24; 3,115-118; 5, 13-17].

The essence of the method lies in the fact that lymphocytes of the patient incubate with erythrocytes that fixed on the surface of the tissue membrane with specific Antigen. Receptors of the surface on lymphocytes specifically bind with antigen on the surface of erythrocytes, and form "outlet" from binding lymphocytes and erythrocytes. Next, on the stained smears are calculate the percentage amount of binding lymphocytes in relation to the total pool. Determination of the antigen binding lymphocytes based on method Garib F.Yu with coauthors [1, 22-24] with using specific tissue antigen of different organs.

Results and their discussion. Studies of the ABL specific to sensibility to the tissue antigen of the brain, endocardium, myocardium, lungs and kidneys, reflecting the depth of the destructive changes of tissues, CHF patients with PH on admission showed noticeable changes comparative to the value of the control group.

Thus, the content of the blood in ABL to TA of the brain in average 4,8 times higher than in healthy person, endocardium- 5,9, myocardium as well as to TA of the brain in 4,8 times higher than healthy people, lungs- 5,87 and ABL to TA of kidney higher that in healthy people into 2,6 times as it showed on diagram (fig.1).

Accordingly, we examined patients revealed the presence of the significant destructive pathological process in organs, that obviously the reason that causing a consequence of long-term functional overvoltage of the heart and lungs with development of hypoxia and destruction of metabolism in tissues.

We have also studied the dynamics of the immune system and level of ABL in these patients after 10-14 days before surgical preparation, and after 14 days and 3 month after surgical interaction.

Analysis comparing the level of ABL, specific to sensibility to the tissue antigen of the brain, heart, lungs and kidneys, on patients of comparison group, where have been used traditional before surgery preparation during 12-14 days, showed a significant decrease in relative performance on admission only ABL to TA of lungs (5,96±0,16 and 6,16= 0,20%, while the norm range are 1,18±0,25, respectively, P<0,05) and kidneys (4,54±0,14 and 5,02±0,14%, when normal range is 1,93±0,33, respectively, P<0,05), maintaining high significant difference with performance of healthy people (P<0,001) (Table №1).

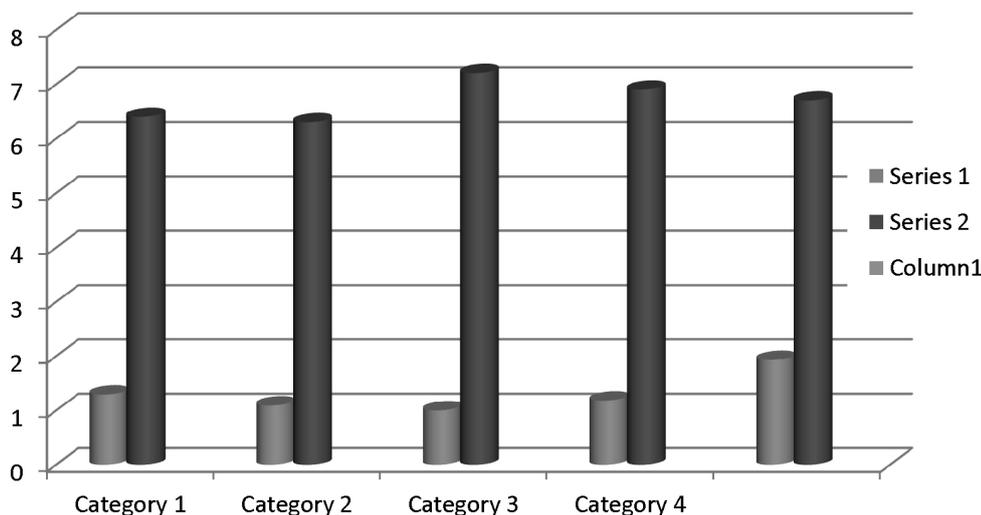


Fig. 1. Antigen binding lymphocytes of CHF patients with PH on admission to clinic (%)

Table 1. – Dynamic of antigen binding lymphocytes in patients of comparison group (without iPDE-5 intake)

ABL to TA	Control n = 22	On admission n = 52	Before surgery n = 24	After surgery	
				On 12–14 days	after 3 month
Brain	1.29 ± 0.13	6.14 ± 0.26*	5.71 ± 0.19*	5.29 ± 0.18***	3.47 ± 0.12****
Endocardium	1.09 ± 0.25	6.32 ± 0.30*	6.08 ± 0.22*	5.71 ± 0.20***	4.18 ± 0.21****
Myocardium	1.00 ± 0.28	4.57 ± 0.19*	4.46 ± 0.19*	3.96 ± 0.16***	3.29 ± 0.17****
Lungs	1.18 ± 0.25	6.93 ± 0.26*	5.96 ± 0.16***	5.58 ± 0.17***	3.76 ± 0.14****
Liver	1.93 ± 0.33	5.04 ± 0.19*	4.54 ± 0.14***	4.63 ± 0.12***	3.88 ± 0.19****

Note:

- * — $P < 0.05$: The accuracy of the performance in comparison with control group;
- ** — $P < 0.05$: The accuracy of the performance in comparison with on admission;
- *** — $P < 0.05$: The accuracy of the performance in comparison with before surgery;
- **** — $P < 0.05$: The accuracy of the performance in comparison with all studies and controls.

After 12–14 days after surgery in this group of patients there is further reduction from baseline ABL to TA of the brain, heart, lungs and kidneys, but multiplicity reduction slightly higher figures only on ABL to TA of brain, myocardium and lungs (in 1.2 times, $P < 0.05$), remained meaningfully higher compared to the control group — in 4.1; 3.96 and 4.7 times ($P < 0.05$).

In this group of patients after surgery there is a slight increase ABL to TA of kidneys compare to previous survey, that possible connect to the own cardio surgical interventions and complicated process of functional recovery of organs and systems of children organism (Table 2).

Dynamic od ABL to TA studied organs in this particular group of patients after 3 month after surgery show significantly decrease of indicators compare on admission, multiplicity reduction in this slightly higher on ABL to TA of brain and lungs – 1.8 times slightly decrease ABL to TA of endocardium – 1.5 times, TA of myocard – 1.4 times, and kidneys – 1.3 times. In this, even after 3 month normalization of parameters is not happening yet. Thus, the level of the ABL to TA of the brain 2.7 times, endocardium and lungs – 3.8 times, myocardium – 3.3 times, kidney – 2.0 times remain higher compare to control signs.

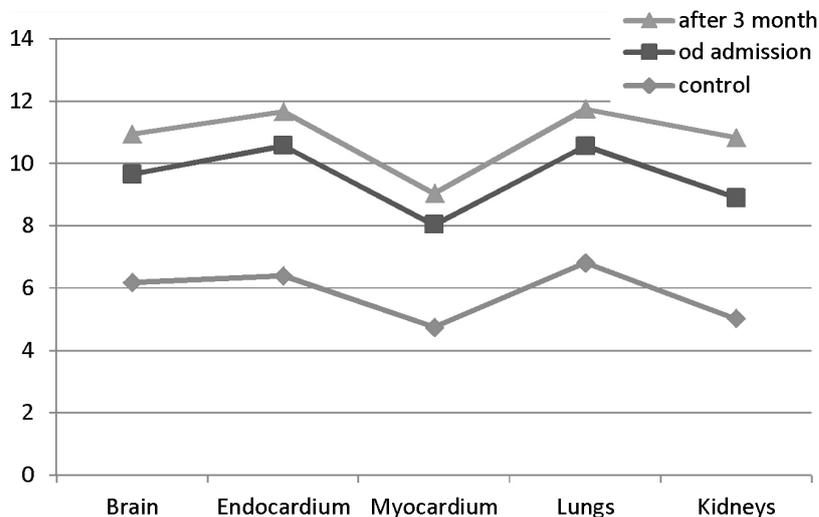


Fig. 2. Dynamic indicators of ABL to TA in patients with traditional before surgery preparation (%)

Table 2. – Dynamic of antigen binding lymphocytes in CHF patients with PH of 3rd degree (%)

ABL to TA	Control n = 22	On admission n = 52	Before surgery n = 24	After surgery	
				On 12–14 days	after 3 month
Brain	1.29 ± 0.13	6.14 ± 0.26*	5.71 ± 0.19* 4.93 ± 0.21*	5.29 ± 0.18* ^{**,*} 3.21 ± 0.15*	3.47 ± 0.12 ^{****} 2.48 ± 0.13*
Endocardium	1.09 ± 0.25	6.32 ± 0.30*	6.08 ± 0.22* 5.14 ± 0.18*	5.71 ± 0.20* ^{**,*} 4.86 ± 0.21*	4.18 ± 0.21 ^{****} 2.71 ± 0.14*
Myocardium	1.00 ± 0.28	4.57 ± 0.19*	4.46 ± 0.19* 4.14 ± 0.16*	3.96 ± 0.16* ^{**,*} 3.71 ± 0.18*	3.29 ± 0.17 ^{****} 2.33 ± 0.11*
Lungs	1.18 ± 0.25	6.93 ± 0.26*	5.96 ± 0.16* ^{**,*} 5.25 ± 0.21*	5.58 ± 0.17* ^{**,*} 4.75 ± 0.18*	3.76 ± 0.14 ^{****} 3.00 ± 0.14*
Liver	1.93 ± 0.33	5.04 ± 0.19*	4.54 ± 0.14* ^{**,*} 3.89 ± 0.19*	4.63 ± 0.12* ^{**,*,***} 4.82 ± 0.15*	3.88 ± 0.19 ^{****} 2.71 ± 0.14*

Note:

* — $P < 0.05$: The accuracy of the performance in comparison with control group;

** — $P < 0.05$: The accuracy of the performance in comparison with on admission;

*** — $P < 0.05$: The accuracy of the performance in comparison with before surgery;

**** — $P < 0.05$: The accuracy of the performance in comparison with all studies and controls.

In numerous there is indicators of the 1st group, and in dominant-indicators of the 2nd group.

Based on results of dynamic ABL to TA of the organs such as (brain, endocardium, myocardium, lungs, kidneys) in patients during pre-surgical period we may conclude that iPDA-5 intake show effective results (Table 2). The results as showed in diagram illustrate that the most effect noticeable in dynamic of indicators ABL to TA of lungs, endocardium and kidneys as compared

to initial parameters, and the relative performance of the 1st groups (Table 2, Fig. 3).

Analysis of the results that take place on 12–14 days after the surgery, showed the positive dynamic of indicators ABL to TA of the studied organs, exceeding in severity in 2nd groups of patients, except for the ABL to TA of the kidneys, where is show slight increase with respect to preoperative data as in the 1st and 2nd groups, possibly associated with the after surgery period (Table 2, Fig. 4).

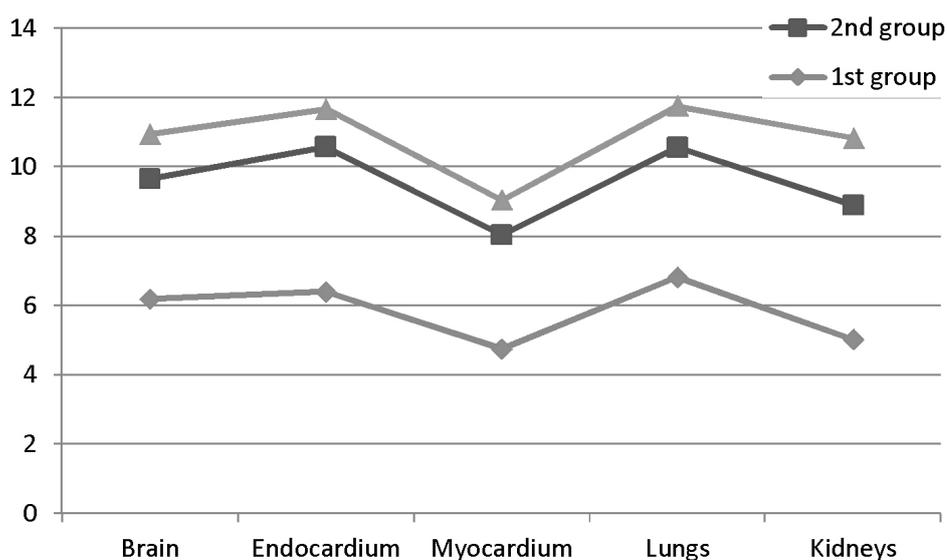


Fig. 3. Dynamic of indicators Antigen binding lymphocytes before surgery of the 1st and 2nd groups (%)

A comparative analysis of the results ABL to TA of the organs (brain, endocardium, myocardium, lungs, and kidneys) was complete in patients that during 3 month continue to get traditional therapy (1st group, n = 17) and in patients which was added iPDA-5 to traditional therapy (2nd group, n = 21).

The results of the studies showed that indicators of ABL to tissue antigen of all named organs statistically (significantly) reduced with respect to all previous studies as in 1st and 2nd groups, but reduction of the severity differs significantly in 2nd group. So, if the indicators ABL to TA of the brain in 1st group in 1.8 times below baseline values, then in 2nd it will be 2.5 times; shows in 1.5 times decrease from baseline ABL to TA of the endocardium in 1st group and in 2.3 times in 2nd; in 1.4 times in 1st, 2.0 in 2nd in ABL to TA of the myocardium; in 1.8 and 2.3 times in ABL to TA of the lungs,

respectively 1.3 and 1.9 times below the degree of the ABL to TA of the kidneys in patients of the 1st and 2nd group, respectively relative to baseline values (Table 2, Fig. 5).

The results of the studies, as showed above, demonstrate that all values have tendency to normal, more it seen in 2nd group of patients, but continue to stay statistically (significant) high respectively to control values.

Therefore, immunological research studies on ABL in patients of CHF (Congenital Heart Failure) with PH (Pulmonary Hypertension) shows the present of the multiple organic lesions. A disorder of homeostasis and endogen intoxication of the organs contributes significantly to the development of the processes of destructions and necrosis of the structures; significantly — in tissues of the heart, lungs, kidneys, and in moderate degree — in tissue of the brain.

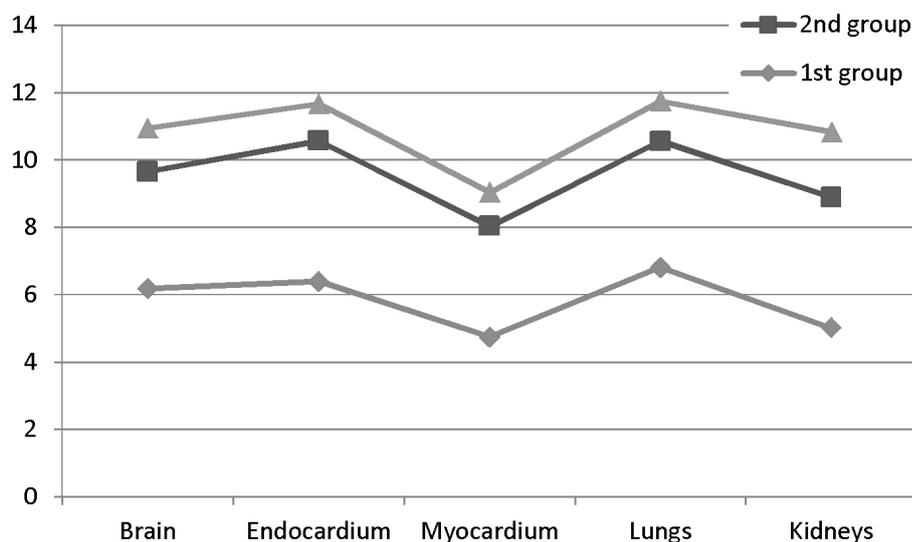


Fig. 4. Dynamic of indicators of the antigen binding lymphocytes on 12–14th day after the surgery in 1st and 2nd groups (%)

Meanwhile, sets the significant positive dynamic of the indicators of ABL to TA of organs, particularly, lungs and endocardium, patients of the main group (with iPDA-5 intake) on all the levels of the studies (during surgery preparation, after 12–14 days after the surgery and after 3 month after the surgery), with significant tendency to normalization, probably due to the mechanism of action, resulting in a decrease in pulmonary hypertension, improving homeostasis and significant decrease of the ABL level, specifically sensitized to tissue antigen of the inner organs, shows rapid decrease of the intensity of destructive processes.

Conclusions:

1. High level of ABL, specifically sensitized to TA of the brain, endocardium, myocardium and kidneys in patients with CHF with PH shows development of multi organic lesions, (ABL to TA of the brain and myocardium in average in 4.8 times, endocardium in 5.9 times,

lungs in 5.87 times and ABL to TA of kidneys in 2.6 times higher than in healthy individuals, $P < 0.05$)

2. Significant decrease ABL, specifically sensitized to TA of the lungs, endocardium, myocardium in patients with adding iPDA-5 in traditional treatment shows high effectively of medication (ABL to TA of the brain in 2.5 times; ABL to TA of endocardium in 2.3 times; in 2.0 times of ABL to TA of myocardium, 2.3 times ABL to TA of lungs, in 1.9 times decrease the level of the ABL to TA of kidneys relative to baseline values).
3. Studies of the ABL to TA of the lungs, heart, kidneys, and brain in patients with CHF with PH allows objectively evaluate intensity of the destruction process and necrosis of the structures in these organs, and also effect of iPDA-5 on this processes.

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The quality of life of women with Graves' disease after radioiodine therapy

Abstract:

Objective: To estimate the quality of life of women undergone radioiodine therapy for Grave's disease.

Materials and Methods: the study included 79 women with Graves' disease treated with radioiodine (RIT) at the department of nuclear medicine of the RSSPMCE. According to the functional state of the thyroid gland, women were divided into 2 groups. The first group included 23 patients in stage of euthyroidism, the 2nd — 56 women in stage of hypothyroidism, and a control group consisted of 15 women without thyroid pathology. Results: marked decline in physical and mental components of QoL was observed in women with Graves' disease before RIT compared with the control group. Improvement in the quality of life of women with Graves' disease was observed after RIT. Conclusions: RIT significantly improved physical (overall score increased by 38.2%) and psychological (by 33.4%) components of quality of life, which became closer to those of the control group.

Keywords: Graves' disease, quality of life, radioiodine therapy.

Toxic diffuse goiter (Graves' disease, GD) is a system autoimmune disease occurring due to production of antibodies to thyroid stimulating hormone (TSH) receptor, clinically shown by thyroid gland affection with thyrotoxicosis syndrome. GD is the reason of thyrotoxicosis in 80–85% of cases [4; 7].

Options of treatment of GD are antithyroid medicines, radioactive iodine, and also surgery (thyroidectomy). Radioactive iodine is effective, noninvasive, rather inexpensive method, with none of those complications which can develop during the surgery on thyroid. Radio iodine therapy (RIT) is used as the basic method of treatment of GD by the majority of endocrinologists in the USA and other countries [2; 8; 9].

There is a number of papers where authors assessed QoL of patients with nodular goiter and GD undergone surgery, but the results of these studies were inconsistent [1; 3; 5; 8]. There are not so many studies of quality of life of patients with GD after radio iodine therapy though the given direction has the important medical and social value.

The objective of the study is an estimation of quality of life of women after radio iodine therapy for Graves' disease.

Materials and methods. 79 women with GD undergone radio iodine therapy at the nuclear medicine department of the RSSPMCE are included into the study. After RIT, all women were divided into 2 groups according to the functional condition of thyroid. The first group included 23 patients in euthyroid stage (average age 33.1 ± 5.74 years; Me 34.0; IQR 28.5–36.5); the second group consisted of 56 women in hypothyroid stage (average age 35.5 ± 5.93 ; Me 38.0; IQR 32.7–40.0). Control group included 15 women without thyroid disorders (average age 30.5 ± 5.04 years;

Me 29.0; IQR 27.0–34.5). Of total number ($n=79$) of women with GD undergone radio iodine therapy were on standard doses of NaI-131 (300 MBK). 69 (87.4%) patients received one course of radio iodine therapy, 10 (12%) people received two courses. Radio iodine therapy was performed with 4 months intervals after initial doses of NaI-131.

Levels of hormones (free thyroxin (T_4), free triiodothyronine (T_3), thyroid stimulating hormone (TSH)) were defined by radio immune method using the commercial sets of "Immunotech" (Czechia) on the basis of RSSPMCE. Quality of life of patients was defined by means of questionnaire SF 36 (The MOS 36-item Short Form Health Survey).

The obtained data were processed using the computer programs Microsoft Excel, STATISTICA 6 and Biostat. Quantitative indicators are presented in the form of $M \pm SD$, medians (Me), and 25th and 75th percentiles (IQR). Differences between groups considered statistically significant at $P < 0.05$.

Results. The study showed euthyroidism within 1 year after single intake of radioactive iodine in more than a half (12; 52.2%) of patients of the 1st group. 34.5% (8) of women have reached euthyroid state within the period of 1–5 years, and only 13.0% (3) women — within 5–10 years after RIT. It 6 (10.7%) women of the 2nd group hypothyroidism was diagnosed within 1 year after RIT, in 24 (42.9%) — in 1–5 years, in 26 (46.4%) patients — within 5–10 years after therapy with iodine.

Secretion of TSH, fT_3 and fT_4 in groups with euthyroid state and compensated hypothyroidism slightly differed from the control indicators. Levels of hormones of women with decom-

compensated hypothyroidism statistically significantly differed from indicators in all studied groups.

The analysis of indicators of quality of life of patients before radio iodine therapy revealed presence of significant decrease in quality of life in comparison with the control. Women with GD before intake of radio iodine had the lowest indicators of QoL on the scale "Role physical functioning" which did not exceed 50 points. The most expressed decrease was observed on scales "Role func-

tioning" (35.2%) and "The general health" (31.0%). Patients of the both groups had significant increase in all indicators of physical component of health of QoL after RIT. Thus, at patients, who reached euthyroid state, increase on scale PF was 39.1%, RP — 50.4%, BP — 29.3%, and GH — 35.4%. In group of women with hypothyroidism significant growth of indicators of physical component of health of QoL (PF by 35.3%, RP by 35.0%, BP — by 23.1%, and GH — by 28.0%) was also observed (Fig 1).

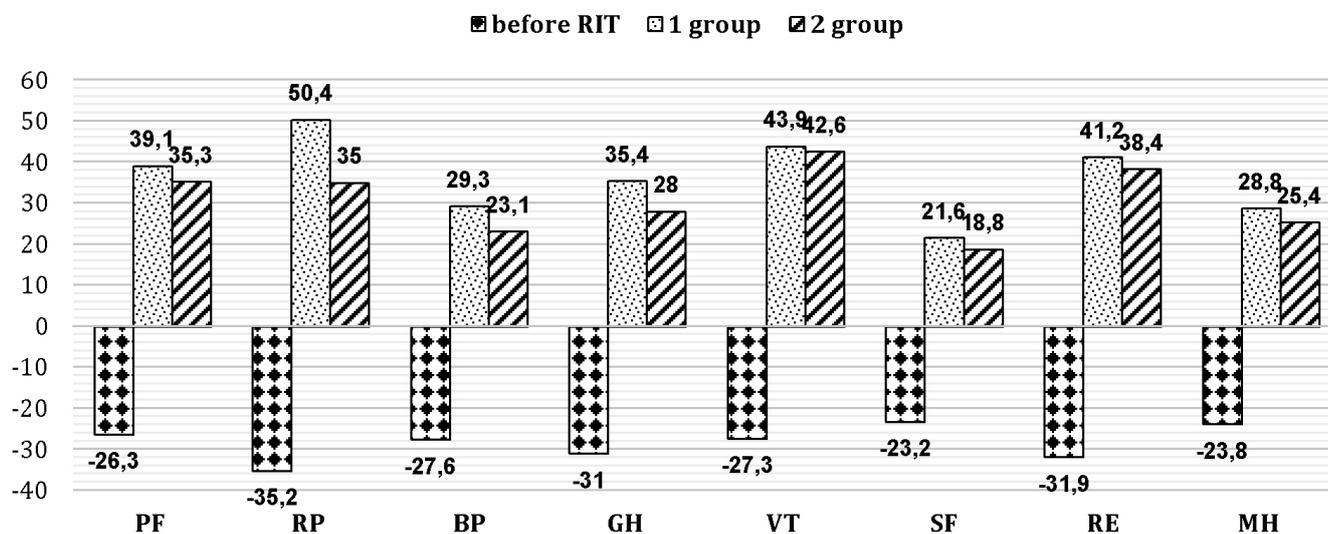


Fig. 1. Dynamics of indicators of physical and psychological components of health of quality of life of patients with GD after RIT, in percentage in relation to the control and the reference value

The comparative analysis showed that indicators of QoL of patients who reached euthyroid state are higher than those at women with hypothyroidism. Improvement of indicators of physical component of health testifies the increase in ability of women to be engaged in daily activity, including work on the house and out of the house.

At the analysis of psychological component of health, the lowest, comparing to the clinical control, was the level of the role functioning caused by the emotional condition of patients.

Indicators of vital activity (by 27.3%), psychological health (by 23.8%) and social functioning (by 23.2%) were also significantly lower comparing to the control group. In patients who reached euthyroid state, increase on scale VT was 43.9%, RE — 41.2%, MH — 28.8%, and SF — 21.6%. In group of women with hypothyroidism, significant growth of indicators of psychological component of health of QoL (VT by 42.6%, RE — by 38.4%, MH — by 25.4%, and SF — by 18.8%) was also observed.

The general physical component of health was lower before treatment by 30.3% being equal to 52.1 ± 10.7 points (vs the control 74.7 ± 5.5 points). After RIT, indicator of QoL among women of the 1st group has increased by 38.2% comparing to the values before treatment being equal to 72.0 ± 6.5 points. Among patients of the 2nd group, the physical component of health also raised by 30.3% being equal to 67.9 ± 4.4 points. The general psychological component of health of women with GD was lower comparing to the control (77.9 ± 5.4 points) by 26.6% being 57.2 ± 9.4 points. In patients who reached euthyroid state, indicator of QoL has increased by 33.4% comparing to the values before treatment and was 76.3 ± 7.1 points. In group of patients with hypothyroidism, the psychological component of health has raised by 30.9% and was equal to 74.9 ± 7.6 points.

Discussion. According to Ismailov S. I. [4], majority of patients who were exposed to surgical interventions concerning thyroid pathology, have decrease in QoL. The combined therapy with thyroxin

and triiodothyronine provides significantly higher level of QoL in patients undergone total thyroidectomy for Graves' disease.

At the analysis of quality of a life of patients with GD it has appeared, that patients undergone surgery with preservation of thyroid tissue had significantly higher indicators of QoL comparing to the patients undergone thyroidectomy or subtotal resection with preservation of less than 2 cm^3 of thyroid tissue ($p < 0.05$), despite the greater number of postoperative complications in patients with nodular non-toxic goiter [5].

Scerrino G. et al. have estimated QoL of 57 patients after total thyroidectomy for GD. During the period from April, 2002 till December, 2009 questionnaires containing four blocks of questions were distributed: organic changes and clinical features, disorders of autonomous nervous system, disorders in daily activity, and psychosocial problems. The analysis of the given questionnaires showed, that about 70% of patients had noticed significant improvement in QoL after thyroidectomy.

The objective of the research by Bukvic B et al. was the analysis of influence of various surgical methods of treatment on quality of life of patients with benign pathology of thyroid gland. Quality of life of patients has considerably improved after surgical treatment, irrespective of degree of the operation. Improvement in QoL was significant among women in all domains of the questionnaire, while among men it was significant only in three domains (symptoms of goiter, emotional susceptibility, and cosmetic complaints) and the general health. Analysis of QoL of 64 patients with relapse of nodular goiter after thyroid surgery showed unsatisfactory result at primary examination (the average level of quality of life was 8.4 ± 0.9 points). After repeated questioning in 2–3 years of follow-up, the estimation of the life by patients became much more optimistic: average index of QoL corresponded to good result (10.1 ± 0.4 points). Distinctions were statistically significant ($U = 921$; $p = 0.042$) [6].

Conclusions:

1. Within 1 year after single intake of radioactive iodine 52.2% of patients of the 1st group were diagnosed euthyroid. 34.5% of women have reached euthyrosis during the period of 1–5 years, 13.0% within 5–10 years after RIT.

2. In 10.7% of women of the 2nd group, hypothyroidism was diagnosed within 1 year after RIT, in 42.9% — in 1–5 years, in 46.4% of patients — within 5–10 years after therapy with iodine.

3. Women with GD have decreased quality of life, as shown by low indicators of physical (by 30.3%), and psychological (by 26.6%) components of health.

4. After RIT, physical (the general count has increased by 38.2%) and psychological (by 33.4%) components of quality of life considerably improved and became closer to the similar indicators of the group of clinical comparison. Patients in euthyroid state are characterized by the better indicators of quality of life.

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The clinical manifestations of recurrence of genital herpes

Abstract: The clinical manifestations of genital herpes (GH) was characterized as vesicular in 67.3% cases, in 18.2% erosive, in 10% erosive- ulcer and in 4.5% cases as a ulcer lesion of the skin and mucous membranes of the genitals by predisposing a massive discharge of herpes viruses into the environment and which is epidemiologically unfavorable factor due to the spreading of these viruses among the population.

Keywords: genital herpes, symptom, new approaches.

The main clinical evidence of genital herpes has been vesicobullous and erosive — ulcerative elements, affecting the skin and mucous membranes of the genitals [1; 3; 4]. Destructive elements transpire as the main symptoms of herpes infection lead to dissemination of herpes viruses into the environment as well as being a gateway for other STIs and especially for HIV infection [3].

Material and methods. 220 patients had been observed with symptomatic recurrence of genital herpes. Exploring of the duration of disease relapse revealed that the clinical manifestations of genital herpes in 15.5% of patients was up to 6 months, 12.7% — up to 1 year, at 29.1% and 20.0% up to 2 and 3 years, respectively; 10.9% of patients herpes symptoms recurred within 5 years and in 11.8% the disease relapsed more than 5 years. The basic amount of 66 patients (60.0%) had disease duration from 1 year to 5 years.

Results and discussions

Studying the frequency of recurrences of genital herpes showed that core group of 86 (39.1%) patients with a frequency relapse was from 6 to 8 times per year. 32 (14.5%) patients had two relapses per year, 58 (26.4%) patients 4 relapses per year. In 36 (16.4%)

cases of relapse were established 9–12 times per annum. 8 (3.6%) patients — from 1 to 2 times a month, which was accounted more than 12 recurrences per year.

Changes in localization of the lesion elements in each new relapse of genital herpes was diagnosed in 64 (29.1%) patients. Compare to the 70.9% of cases (156 patients) rash relapse which was observed at the primary place of the initial lesion.

In 41.8% of cases patients indicated repeated recrudescence of GH after sexual contact, frigoris or cold-related diseases, intake of alcohol, to be more detailed, women had GH often in the period before or after menstruation. The majority — 58.2% of the patients were not able to specify the obvious reasons for the recurrence of the disease.

The study of the clinical manifestations of genital herpes in the examined group of patients admitted to determine some appropriate characteristics in the clinical course of the disease. In the study of lesions of genital herpes was found that of 178 male patients in 100 of them (56.2%) lesions were observed on the skin of phallus with a common site elements in the bridle or coronal sulcus. In 60 (33.7%) patients localized on the skin of the pubis or at the root of the coles,

in 18 (10.1 %) cases were different combinations of focalization of the lesion (genitals, pubic area skin, the inner surface of the skin thigh).

Among the 42 patients 20 (47.6 %) members of genital herpes distributed on the skin of the labia majora, even in 8 (19.0 %) with the transition to the mucosa of the labia minora, 6 (14.3 %) cases, isolation of the mucous shell inner surface of the labia minora, skin of pubis in 4 (9.5 %) cases. Combinations of the lesions on the skin of the labia majora and the inner surface of the skin of the hips were examined in 4 (9.5 %) patients.

In the study of clinical manifestations in a group of tested patients, 67.3 % (148 patients) were diagnosed with vesicular form of GH, which was represented by small bubble elements (from single (1–3 pcs.) In addition, the multiple types of lesion, from 12 to 30–40 pcs. with serous, serous-purulent contents, grouped character, positioning the modest swelling on the hyperemic skin and mucous of the genitals. Among 4 cases of manifestations of bullous form transformations of GH with bubbles from the larger size of 1.0 cm. to 3–4 cm. Accompanying by subjective symptoms namely itching (67.3 %), burning (56.4 %) and hyperesthesia as a feeling of tingling at 62.0 % of patients. Regression of lesions was on average in 7–8 days.

Erosive form of GH was defined in 18.2 % (40 patients) and patients had superficial defect of skin and mucous membranes of the genitals with a scalloped form, unclear edges follow the contours of the former bubble elements on the wet hypermetric surface with the character of serous exudation. Epithelialization was performed average within 9–10 days. Erosive form of GH in the majority of cases have been presented with subjective symptoms such as burning (18.2 %) and pain (15.4 %) in the local lesions.

Among the observed patients in 10 % of cases was erosive and ulcerative form GH, which was presented as a profound lesions (dermal tissue of skin), in combination with a surface defect of skin and

mucous membranes of the genitals. Along with this, 4.5 % of the patients had ulcerative lesions GH presented deep lesions of the skin of the genitals. Ulcers form GH was presented sweepingly-oval form, ranging in size from 0.5 to 1.0 cm. in diameter with irregular, slightly infiltrated eminence as well as with hyperemic edges. The bottom is covered with serous-hemorrhagic exudate with local granulation tissue. Subjective symptoms of ulcerous and erosive ulcerous forms of GH was pain in the lesions. The course of these forms of the disease was prolonged, averages 14–16 days with a slow epithelialization of lesions and cicatrice tissue.

In the studied group of patients, local subjective symptoms in 30 patients (13.6 %) has been neuralgic pains radiating to the groin and lower limbs along the sciatic nerve, weakness, aches, headache, and increasing body t° from 37 to 5–38°C. In 20 (18.2 %) patients had complications in the form of a unilateral inguinal lymphadenitis (32 patients), with an increasing size of a hazelnut and tenderness as well as in 8 patients was defined the accession of secondary pyogenic infection.

Thus, based on the study of clinical materials has been found that 60 % of patients with recurrent disease GH was prolonged in a duration from 1 to 5 years, with the frequency of recurrence of genital herpes in 55.5 % of patients between 6 and 12 relapses in a year. The clinical manifestations of GH characterized in 67.3 % cases of vesicular, erosive 18.2 %, 10 % erosive peptic ulcer and 4.5 % forms of skin lesions and mucous membranes of the genitals, which predispose a massive eruption of herpes viruses in the environment and which was an epidemiologically unfavorable factor in the spread of these viruses among population.

Conclusion. Taking into account the peculiarities of the clinical course of GH, it is necessary to assign the new approaches in therapy. Hence, for the possibility to contribute to more rapid epithelialization of destructive lesions which could be considered as prevention of the epidemiological spread of the viral etio-agent and reducing the number of relapses of the disease.

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Indicators psychological status in patients with chronic heart failure

Abstract: In patients with heart failure to study the psychological status of the relationship between indicators of psychological status and progression of the disease: patients with FC III identified more often more severe disorders with prevalence of depressive disorders.

Keywords: chronic heart failure, psychological state, depression, anxiety.

Chronic heart failure (CHF) — progressive and unfavorable prognosis disease of the cardiovascular system, a major cause of disability and violation of reduced life expectancy in developed countries. According to the Framingham study, its frequency doubles every decade, and in the next 20–30 years, it will increase by 40–60 %. The disease worsens the quality of life of patients is 4 times increases

the risk of mortality, and the mortality rate of patients in amounts of 15–50 % throughout the year. The problem is closely related mental and physical health does not cease to be relevant for many thousands of years [1; 2; 3]. In recent years greatly increased interest in the study of psychosomatic aspects, reflecting the rise and for cardiovascular disease. Multicenter study INTERHEART Study involving 52 coun-

tries, 29 thousand. Surveyed showed that the incidence of myocardial infarction nine determine independent risk factors, among which are the third most important anxiety and depression [4]. Despite the fact that depression in cardiovascular diseases, the subject of many studies, only some of them have studied the relationship affective disorders with chronic heart failure [5; 6]. Psychological status is of great importance in the course and progression of heart failure and determine the quality of life of these patients [8; 9]. In patients with heart failure in the presence of depressive disorders significantly increases the risk of recurrent hospitalizations and deaths [1; 4].

Objective. To investigate the psychological state of patients with post-infarction atherosclerosis complicated FC I–III chronic heart failure.

Materials and Methods. The study included 62 men with coronary artery disease postinfarction atherosclerosis complicated with chronic heart failure (CHF) I–III by NYHA FC. Assessment of psychological status was performed using the method of The Zung self-rating depression scale, reactive and personal anxiety — Spielberger questionnaire, adapted Khanin. To assess the psychological defense used the technique of Life Style Index (LSI) — Plutchik-Kellerman. Statistical processing of results of research carried out on a personal computer type IBM PC/AT using packet spread-

sheets EXCEL 6.0 Windows-95 parameters are described in the form $M \pm SD$. The statistical significance measurements obtained by comparing the average values determined by Student (*t*) with the computation of the error probability (*P*) for testing normality (by kurtosis criterion) and the equality of the population variance (*F* — Fisher's exact test). For statistically significant changes have taken confidence level $P < 0.05$. Statistical significance for qualitative variables was calculated using the χ^2 criterion (chi-square) and the *z*-criterion (Glanz). For dependency analysis features calculated the Pearson correlation coefficient of pair (*r*).

Results and Discussion: 6-minute walk test results showed that among the studied patients with FC I constituted 32.6%, with 35.7% FC II and III FC 31.7%. Initial SHOKS indicators in patients with CHF FC I made up 3.5 ± 0.51 , with CHF FC II 5.6 ± 0.62 points, respectively. In patients with heart failure FC III this indicator was 8.6 ± 0.97 that was 147% higher compared to SHOKS in patients with CHF FC I. The patients after the processing and analysis of questionnaires from 42 (55.5%) were identified violations of varying degrees of severity of psychological state. Among the examined patients with FC I CHF patients with depression accounted for 19.4%, with anxiety disorders accounted for 33.5% (Fig. 1).

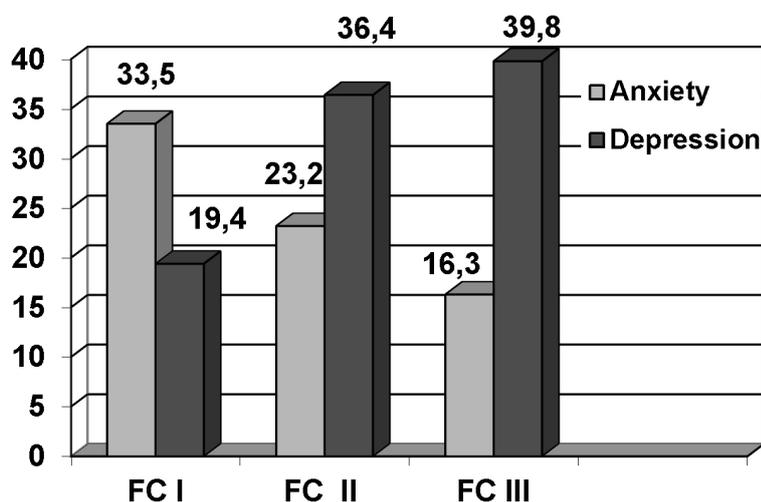


Fig. 1. The incidence of anxiety and depression in patients with chronic heart failure (%)

When FC II patients with depression accounted for 36.4%, the patients with anxiety states accounted for 23.2%. In patients with FC III patients with depression accounted for 39.8%, anxiety was observed in 18.5% of patients. Prospective studies have shown that depression is an independent risk factor for increased mortality and hospitalization rates in patients with chronic heart failure (5). Mild depression occurs in 43.7% of patients, moderate in 31.5% of patients and severe in 24.8% of patients. For patients with CHF has been characterized by an increased degree of denial of existing problems, displacement (with the exception of the idea of consciousness and related emotions), different control emotions and over-reliance on a rational interpretation of the situation. With the denial of the existence of compensation were associated severity: the higher is the rate of denial in patients with CHF, the expressions were anxious and depressive disorders. The combination of these features is sustainable ($R=0.9$; $p < 0.001$). Affective disorders such as anxiety and depression were closely linked ($r=0.50$; $P < 0.001$) and were typical of patients with younger age ($r=-0.46$; $p < 0.05$ and $r=-0.66$; $P < 0.001$, respectively). The emergence of depression was proportional to the severity of clinical symptoms ($r=0.46$;

$P < 0.05$) and decrease in exercise tolerance ($r=0.49$; $P < 0.05$). Depression has a negative impact not only on the forecast of the patients, but also on the clinical course of the disease (1). As a favorable factor was considered as presence of intellectualization of patients with heart failure with this type of psychological defense mechanism we have not been characterized by affective disorders ($R=0.59$; $F=2.9$; $p < 0.05$). Established relationship between psychological defense mechanisms and severity of clinical symptoms such as palpitations (connection with the denial of $r=0.42$; $P < 0.05$), pain (dependent on the severity of the regression $r=0.46$; $P < 0.05$). The relationship of depression and the severity of the physical condition of patients are sustainable ($P < 0.05$).

Conclusions. Thus, in patients with heart failure to study the psychological status of the relationship between indicators of psychological status and progression of the disease: patients with FC III identified more often more severe disorders with prevalence of depressive disorders (39.8%) than with FC I (19.4%). For patients with chronic heart failure has also been characterized by an increased degree of denial of the problems with controlling emotions, and over-reliance on a rational interpretation of the situation.

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Structural-functional state and feature remodeling of left ventricle in patients with coronary artery disease after revascularization

Abstract: The article estimated the dynamics of systolic and diastolic function in patients with acute myocardial infarction after myocardial revascularization. The study involved 42 patients with acute myocardial infarction with ST segment elevation up to 6 hours of onset. Primary stenting of the infarct-related artery in patients with acute myocardial infarction with ST segment elevation allows most early as possible to prevent the development of pathological remodeling of the left ventricle compared with patients who underwent thrombolytic therapy as an effective and subsequent endovascular intervention.

Key words: acute myocardial infarction, revascularization, remodeling.

Rapid restoration of the vessel patency (reperfusion therapy) — the most effective way to reduce the risk of death and other adverse outcomes in patients with acute coronary artery occlusion occurred, regardless of the manner in which this is achieved [1]. Successful application of thrombolytic therapy has reduced mortality from acute myocardial infarction (AMI) to 20%. However, lack of adequate restoration of antegrade flow in 45% of cases, as well as a large number of contraindications to thrombolytic therapy and a high risk of bleeding complications contributed to the development and widespread use of an effective recovery method of endovascular coronary blood flow [2; 3].

Over the past decade it has increased the share of endovascular treatment of coronary heart disease (CHD) in the world. The choice of this treatment strategy of CHD, to counterbalance the surgical treatment in combination with conservative therapy caused the immediate efficacy and safety of the endovascular procedure to achieve adequate restoration of coronary blood flow in the majority of cases [4; 5; 6].

Primary endovascular restoration of coronary blood flow has several advantages over thrombolytic therapy. There is evidence that

reperfusion of the myocardium using the endovascular procedure is more than 95% of patients with acute ST-segment elevation myocardial infarction (STEMI), then thrombolytic therapy restoration of blood flow is achieved only 70–75% [7; 8].

A major randomized trial, which compared the results of angioplasty and thrombolytic therapy was the PAMI (Primary Angioplasty in Myocardial Infarction), which included 359 patients with acute myocardial infarction. 195 patients underwent angioplasty with the immediate success of 97.1%. Interestingly, despite the minimal time from chest pain and ST-segment elevation before thrombolytic therapy than before PTCA restore myocardial perfusion disappearance of chest pain and normalization of the ST segment occurred rapidly after angioplasty than after thrombolytic therapy (mean 290 and 354 minutes, respectively; $p = 0.004$).

Endovascular method promotes effective limitation of the size of the damaged myocardium in the early stages of the onset of the disease, prevents the development of residual stenosis in the infarct-related artery (IRA) and pathological remodeling of the left ventricle (LV)

and as a result, leads to a reduction not only in-hospital mortality, but and improved survival of patients in distant periods [9; 10].

After the restoration of blood flow in some way in the area of the IRA is a change in contractility parameters, the geometry of the myocardium and central hemodynamics in general, which in turn determine the future course of the disease and the tactics of treatment. Today, in connection with the development and widespread use of modern methods of restoring coronary blood flow in AMIST, great attention is paid to the prevention of early pathological LV remodeling, which allows to influence the prognosis and survival of patients [11; 12].

Objective: To assess the dynamics of changes in systolic and diastolic function in patients with acute myocardial infarction after endovascular intervention.

Material and Methods: The study included 42 patients with STEMI up to 6 hours from the onset of the disease, of which 39 men and 3 women. The average age of patients was 52.8 ± 3 years. Exclusion criteria included patients with stroke in anamnesis, with peripheral arterial disease, persistent atrial fibrillation, diabetes.

All patients were divided into 2 groups: the first group included 22 patients with STEMI who underwent stenting of the IRA after the effective thrombolytic therapy within 24 hours of the onset of acute myocardial infarction, that identified like subocclusion defeat of the IRA during the control coronary angiography; the second group consisted of 20 patients with STEMI who underwent only thrombolytic therapy in the first 6 hours after the onset of myocardial infarction with a positive effect, without subsequent endovascular intervention. The effectiveness of the restoration of coronary blood flow was assessed by the degree of ST-segment to the contour in lead with a maximum rise to 7 days course of myocardial infarction using electrocardiographic (ECG) method.

All patients underwent echocardiography and doppler echocardiography study with the assessment of systolic and diastolic function of the left ventricle (LV) on the ultrasound machine Samsung medison «Accuvix.V20» (Korea) with a sector transducer with color mode and pulsed wave, continuous-wave mode with 2–4 MHz. frequency standard echocardiographic positions. It measured next size: the end-diastolic dimension (EDD LV), left ventricular end-systolic dimension (ESD LV), left ventricular end-diastolic volume (EDV LV), left ventricular end-systolic volume (ESV LV), stroke volume (SV) and ejection fraction (EF) of the left ventricle.

To evaluate the diastolic function of LV it was identified the maximum speeds used by the early and late LV filling (E/A), IVRT — isovolumetric relaxation time LV, DT — deceleration time of early diastolic filling. The analysis of dynamics of linear and volumetric parameters of the left ventricle in the study was carried out in the “B” — mode, the left ventricular ejection fraction was calculated by the method of Simpson disks, segmental myocardial contractility was assessed by calculating the wall motion score index (WMSi) of LV at 1 and 7 days after the coronary flow recovery.

Statistical analysis was performed by parametric and non-parametric statistics using Student’s t-test. Were considered statistically significant deviation at $p < 0.05$.

Results and Discussion: Results of the study found that the patients in group I to 7 days of flow infarction showed a significant increase in end-diastolic left ventricular size (EDD LV), ESD LV ($p < 0.05$) EDV LV ($p < 0.05$), SV ($p < 0.05$), except for ESV LV ($p > 0.05$). In group II patients after thrombolytic therapy showed a significant increase of ESD LV ($p < 0.05$), EDV LV, ESV LV, SV ($p < 0.05$) to 7 days of myocardial infarction, but the ESV LV did not undergo significant changes ($p > 0.05$) (Tab. 1).

Table 1. – Dynamics of left ventricular systolic function

Indicator	I group		P1	II group		P2
	1 day	Day 7		1 day	Day 7	
EDD LV, mm	4.9 ± 0.13	5.4 ± 0.13	< 0.05	4.9 ± 0.09	5 ± 0.08	> 0.05
ESV LV, mm	3.6 ± 0.11	4.2 ± 0.01	< 0.05	3.6 ± 0.07	3.9 ± 0.07	< 0.05
EDV LV, ml	109.8 ± 3.3	125.4 ± 3.8	< 0.05	97.2 ± 2.9	128.3 ± 3.9	< 0.05
ESV LV, ml	55.6 ± 3.2	57.3 ± 4.4	> 0.05	50.2 ± 2.4	61.5 ± 4.2	< 0.05
SV, ml	47 ± 2.7	73 ± 2.4	< 0.05	50 ± 2.1	64 ± 1.9	< 0.05
EF, %	50.5 ± 1.3	55.9 ± 1.1	< 0.05	51.2 ± 1.3	51.2 ± 1.2	> 0.05

Table 2. – Dynamics of left ventricular diastolic function

Indicator	I group		P1	II group		P2
	1 day	Day 7		1 day	Day 7	
E/A	1.1 ± 0.06	1.2 ± 0.05	> 0.05	1 ± 0.05	1.7 ± 0.2	< 0.05
DT, ms	133 ± 11	127 ± 6.5	> 0.05	131 ± 11.9	131 ± 4.9	> 0.05
IVRT, ms	93.3 ± 5.8	99.9 ± 6.5	> 0.05	105 ± 8.9	105 ± 8.9	< 0.05
WMSi	1.2 ± 0.17	1.1 ± 0.02	> 0.05	1.6 ± 0.04	1.2 ± 0.04	< 0.05

Reduced ejection fraction (EF) below normal by the end of the first day mentioned in I, and in II group of patients. On day 7, the flow of MI there was a significant increase in ejection fraction — 6 % of baseline ($p < 0.05$) in group I. EF in group II remained consistently low ($p > 0.05$) from 1 to 7 day of myocardial infarction.

In patients of I ($E/A = 1.1 \pm 0.06$) and II ($E/A = 1.1 \pm 0.05$) groups by the end of the first day of myocardial infarction, despite the efficacy of thrombolytic therapy, formed pseudonormalization diastolic filling (Type 2). On day 7 research I ($E/A = 1.2 \pm 0.05$),

($p < 0.05$) patients also recorded pseudonormalization diastolic filling, which is probably due to the routine use of β -blockers in all patients from the second day of treatment, and only in II group of patients on day 7 of AMI detected diastolic dysfunction of the left ventricle myocardium by restrictive type ($E/A = 1.7 \pm 0.2$), ($p < 0.05$) (Tab. 2).

The deceleration time of early diastolic filling (DT) in both groups of patients on day 7 of MI did not undergo significant changes ($p > 0.05$). The wall motion score index of LV (WMSi LV) significantly decreased to 7 days of myocardial infarction only in

group II patients ($p < 0.05$). At the same time, the WMSi LV in group II significantly reduced from the first day of MI and significantly increased to day 7 ($p < 0.05$).

Thus, in II group of patients, despite effective thrombolytic therapy and subsequent endovascular treatment within the first to day 7 of the onset of the disease formed the early signs of pathological LV remodeling as increasing of EDD LV and ESD LV, SV and EDV LV. Thus, by the end of day 1, the development of myocardial infarction was noted pseudonormalization diastolic filling. For Group II, in addition to increasing EDV LV, ESV LV, SV and ESD LV, and initially the most high of WMSi LV is characterized by the formation of prognostically unfavorable in relation to the development of pathological LV remodeling and heart failure as restrictive LV diastolic dysfunction, and persistent decrease in LV EF at compared with patients in group I.

The percentage of the degree of the ST- segment normalization regress, dilatation of the heart cavities, decreased left ventricular ejection fraction, high WMSi LV, early pseudonormalization of diastolic dysfunction of the left ventricular myocardium, reducing the time isovolumetric relaxation of the left ventricle and the subsequent diastolic dysfunction LV myocardium of the restrictive type in the subacute phase of myocardial infarction, can serve as indepen-

dent predictors of adverse pathological criteria for the development of early postinfarction LV remodeling.

Conclusions. Stenting of the infarct-related artery in patients with STEMI maximizes prevent the development of early pathological LV remodeling in acute and subacute myocardial infarction flow period. Delayed endovascular procedure within a period of 6 to 24 hours after the completion of an effective thrombolytic therapy to be an additional improvement in intracardiac hemodynamics to 7 days course of myocardial infarction. Despite the effectiveness of thrombolytic therapy and even subsequent endovascular treatment within the first days of onset to 7 days form the first signs of early pathological LV remodeling in the form of increased end-systolic and end-diastolic dimensions of the left ventricle of the heart, stroke and end-diastolic volume of the left ventricle, and pseudonormalization the development of diastolic filling by the end of day 1 of myocardial infarction. Patients with effective thrombolysis without subsequent endovascular intervention within 24 hours from the onset of anginal attack have a poor prognosis in the development of early pathological ventricular remodeling and heart failure, as evidenced by the formation of restrictive diastolic dysfunction, and a characteristic statistically significant decrease in the isovolumetric relaxation time of LV myocardium.

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Development and optimization of pharmacotherapy for chronic heart failure with regards to kidney functional state

Abstract: the aim of the study was to estimate the effect of losartan on kidney function and renal blood flow in 78 patients with chronic heart failure (CHF) in the II–III functional class (FC). The treatment during 6 months with inclusion of losartan resulted in improvement of the parameters of kidney functional state with reliable increase in GFR and improvement of parameters of the renal blood flow.

Keywords: chronic heart failure, kidney dysfunction, glomerular filtration rate, renal hemodynamics.

Prognosis in the patients with chronic heart failure (CHF) is extremely unfavorable. In the patients with CHF functional class (FC) IV (NYHA) the mortality rate during half a year achieved 44%. In cases of mild form of CHF during 4 years after the establishment of diagnosis only a half of patients survive. In the recent studies devoted to kidney dysfunctions in CHF the significant increase in creatinin serum concentration and reduction of the glomerular filtration rate were noted in the majority of patients over the last years [1; 2]. The previous changes of the kidney functional state and renal hemodynamics have been studied insufficiently, and the methods, precise and accessible for clinical practice, allowing determination of early disturbances of the kidney functions in CHF have not been developed yet. The kidney nitrogen excretory function and the state of glomerular filtration have been poorly studied [3]. The state of renal hemodynamics and its prognostic role in this pathology has been also less studied. The association of the kidney dysfunction in the patients with CHF creates the crucial problems in relation to determination of the therapeutic strategy which in these two comorbid states should be combined. In this connection the performed investigation with purpose to develop and optimize the combined pharmacotherapy for CHF taking into account of their nephroprotective properties would be prospective and having scientific-practical value.

Purpose of research was to study the effect of losartan on the kidney functional state and renal blood flow in the patients with CHF in functional classes I–III CHF.

Material and Methods. This investigation included 65 males with ischemic heart disease (IHD) associated with FC I (19), FC II (24) and III (22) CHF (mean age 63.3 ± 5.8 years). Control group comprised of 10 healthy persons (mean age 42.3 ± 2.1 years).

The patients were randomized into groups in relation to FC CHF by classification of New-York Association of cardiologists on the basis of findings of the six-minute walk test (SWT) and by scale for evaluation of clinical state of the patients (SECS). The patients received additionally to the standard therapy (spironolacton, beta-blockers, antiagregants) the losartan, dose of losartan titrated to 50–100 mg. a day (mean dose of this preparation was 66.3 ± 25.6 mg/day).

The kidney functional state was evaluated by the level of serum creatinin (Cr), GFR (by calculation there were determined GFR by formula MDRD (Modification of Diet in Renal Disease Study)

in ml/min/1.73 m². The renal blood flow assessment was performed with use of the device of ultrasound examination SONOACEX6 (Korea) by color Doppler mapping as well as pulse-wave dopplerography and energy mapping with sector sensor 3.5 MHz. with scanning angle not more than 60°. The following parameters were used: peak blood flow systolic velocity (Vs characterizes amplitude of the systolic flow), blood flow maximum end-diastolic velocity (Vd characterizes blood flow velocity at the end of diastole), mean by time blood flow velocity (V mean is a result of mean values of all spectrum components of one or some cardiac cycles), Resistive index (RI characterizes the peripheral vascular resistance), pulse index (PI characterizes the state of peripheral resistance in the vascular bed). The velocity (Vs, Vd, Vmean) and parameters (RI, PI) were studied at the level of right and left renal artery, as well as of intraorgan (segment) arteries [4].

The statistic processing of the data obtained was performed with use of the package of electronic tables EXCEL 6.0 Windows-95. The parameters were described as mean arithmetic \pm standard deviation ($M \pm SD$), between group comparisons of quantitative values were made with use of criteria (t) Student. For evaluation of difference of mean values between two groups in not corresponding values with normal rule of the distribution there was used range criterion of Wilcoxon. The analysis of the dependence of indications was performed with calculation of the coefficient of pair correlation of Pirson (r). The evaluation of the quantitative and qualitative indications was calculated by the coefficient of range correlation of Spirman (R). The criteria of reliability was $p < 0.05$.

Results and Discussion. The results of investigation show that in the patients with FC I, FC II and III CHF the initial parameters of Cr were 71.8 ± 25.35 , 80.13 ± 18.52 and 85.0 ± 19.59 micromol/l, GFR by formula MDRD was 71.4 ± 11.3 , 77.7 ± 21.87 and 70.57 ± 13 ml/min/1.73 m² respectively.

The GFR (MDRD) < 60 ml/min in the patients with FC I–III CHF was observed in 24% (16) patients. Analysis of data of renal hemodynamics showed that in all patients with FC I–III CHF at the level of right and left renal arteries there was noted increase in resistive index by 11.9% and 7% ($p < 0.001$ and $p < 0.005$) and pulse index — by 20% and 13.5% ($p < 0.001$ and $p < 0.005$), respectively, in comparison with control. The blood flow velocity during the diastole period at the level of right and left renal arteries was lower by 91.3% and 43.2% ($p < 0.001$ and $p < 0.001$), respectively in comparison with the control. The velocity parameters during systole period were

lower by 45.6% and 40.5% ($p < 0.001$) at the level of right and left arteries, respectively in contrast to control parameters (Tab. 1). During lowering of the artery levels there was noted reduction of the velocity parameters at the level of right and left segment arteries in the systole by 38.4% and 30.7% ($p < 0.001$), in the diastole by 77.9%

and 66.8% ($p < 0.001$), respectively in comparison with control. And at the level of right and left segment renal arteries there was noted increase in resistive index by 16.9% and 15.3% ($p < 0.001$) and pulse index — by 25.6% and 24.1% ($p < 0.001$ and $p < 0.005$), respectively in comparison with control.

Table 1. – Characteristic of the parameters of renal hemodynamics (renal and segment arteries) in the patients with FC II–III CHF (M ± SD)

Parameters	Renal right artery		Renal left artery		Segmental right renal artery		Segmental left renal artery	
	Control	CHF I–III FC	Control	CHF I–III FC	Control	CHF I–III FC	Control	CHF I–III FC
Vs cm/sec	59.7 ± 1.91	41.0 ± 5.03**	59.8 ± 1.91	42.47 ± 5.74**	42.07 ± 1.8	30.4 ± 5.65**	42.1 ± 1.8	32.2 ± 4.29**
RI	0.67 ± 0.016	0.749 ± 0.044**	0.71 ± 0.01	0.77 ± 0.056*	0.58 ± 0.016	0.68 ± 0.62**	0.59 ± 0.01	0.68 ± 0.068**
Vd cm/sec	19.7 ± 0.5	10.34 ± 2.45**	17.33 ± 0.87	9.85 ± 2.58*	17.6 ± 0.85	9.89 ± 3.1**	17.35 ± 0.89	10.41 ± 3.0**
Vmean, cm/sec	39.7 ± 0.89	25.67 ± 3.45**	35.5 ± 3.67	26.16 ± 3.67**	29.85 ± 1.2	20.14 ± 4.15**	29.7 ± 1.2	21.31 ± 3.4**
PI	1.0 ± 0.03	1.2 ± 0.11**	1.1 ± 0.02	1.25 ± 0.145**	0.82 ± 0.03	1.03 ± 0.15**	0.83 ± 0.035	1.04 ± 0.17*

Note: ** — reliability $p < 0.001$; * — $p < 0.005$ in relation to the control group.

We studied the kidney functional state in the patients with CHF, there was examined group of patients with CHF with minimum quantity of the additional factors having ability to result in kidney lesion. However even in spite on this fact in two third of the examined patients there was revealed reduction in GFR lower than 90, almost in 39% of patients — lower than 60 ml/min/1.73 m². In our opinion, this indicates that even “isolated” CHF can results in disturbance of the kidney functional state. These data are correlated to the results of that investigation in which there was performed strong selection of the patients [5; 6; 7].

The treatment during 6 months with inclusion of losartan in the patients with FC I–III CHF led to the improvement of the parameters of the renal blood flow at the level of right and left renal artery, as well as segment renal arteries. During dynamics of treatment of the patients with CHF at the level of right and left renal arteries there was noted tendency to reduction of the parameters of resistive index by 9.9% and 7% and pulse — by 15.5% and 13.5% ($p < 0.05$) index, at the time of decrease in indices of resistive and pulse parameters there was noted increase in velocity parameters during systole period by 9.9% and 11.9% and diastole by 13.5%

and 11.5% ($p < 0.05$) in comparison with initial parameters. There was also found improvement of parameters of the renal blood flow at the level of segment arteries while not achieved of reliable values [8].

Conclusions

In the patients with CHF during progressing disease there was noted subclinical disturbance of the kidney function characterized by decrease in GFR, worsening of the parameters of renal blood flow and they may be considered as predictors of the kidney dysfunctions in the patients with CHF.

In the patients with FC I–III CHF at the level of renal and segment renal arteries there was noted additionally to the increase in parameters of resistive and pulse indices with reduction of velocity parameters during systole and diastole periods also increase in comparison with control parameters.

The treatment during 6 months with inclusion of losartan resulted in improvement of the parameters of kidney functional state with reliable increase in GFR and improvement of parameters of the renal blood flow at the level of renal and segment renal arteries that characterizes nephroprotective effect of the therapy performed.

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Videassisted thoracoscopic fixation of floating rib fragments

Abstract: We examined the results of videoassisted thoracoscopic (VATS) fixation of floating rib fractures in 16 patients with blunt chest traumas. The method, which was used, was described by K. G. Zhestkov and improved by the authors of this article. Indications for ribs fixation were prolapse of ribs fragments into the pleural cavity with the lung injury (7 patients) and functionally significant abnormal mobility of multiple rib fractures (9 patients). It is shown that the proposed method of VATS ribs fixation at pathological mobility can reliably stabilize the chest wall without wide dissection of injured soft tissue.

Keywords: chest injury, fractured ribs, abnormal mobility, videothoracoscopy.

In recent years there has been a significant increase in road accidents, that defines the appearance of a large number of patients with severe traumatic injuries in general and injuries of the chest, in particular. In peacetime injuries of the chest are the third most common, and blunt chest trauma account for up to 90 % of cases Vagner E. A. [4]; Wanek S., Mayberry J. C. [5].

Despite improvements in diagnostic techniques, infusion-transfusion therapy, modern methods of mechanical ventilation, mortality in presence of severe injuries to the chest reaches 35–45 %, and with concomitant injury chest, accompanied by shock, reaches to 63–68 % Korotkov N. I., Kutirev E. A., Kukushkin A. V. [2]; Ahmed N., Jones D. [1].

The leading role in the development of complications and deaths in case of blunt chest trauma belongs to severe progressive respiratory disorders. One of the causes of such condition is a violation of the integrity of the rib frame associated with broken ribs. The frequency of rib fractures at patients with a closed chest trauma varies from 35 to 92 %, and deaths from injuries to the chest with a floating rib fractures are occurred in 52.1–63.6 % of cases Zhestkov K. G., Barskiy B. V., Voskresenskiy O. V. [7]; Korotkov N. I., Kutirev E. A., Kukushkin A. V. [2]; Moore F. O., Goslar P. W., Coimbra R. et al. [3]; Wilson H., Ellsmere J., Tallon J., Kirkpatrick A. [6]. Therefore the search for ways to reduce disordered breathing is an important part of pathogenetic therapy at these patients.

Existing methods of stabilization the floating rib fractures (fixation of bone fragments surgically and “internal pneumatic” stabilization by a prolonged mechanical ventilation (AV/1) with positive expiratory pressure) do not fully satisfy clinicians, as they are related with a lot of inflammatory complications of breast tissue during surgical stabilization, and at artificial lung ventilation — broncho-pulmonary and intrapleural complications. All this makes it necessary to find other approaches Zhestkov K. G.,

Barskiy B. V., Voskresenskiy O. V. [7]; Korotkov N. I., Kutirev E. A., Kukushkin A. V. [2].

So, that's why methods of fixation of floating rib fractures performed during VATS procedures.

Material and Methods

VATS interventions at blunt chest trauma in the 2nd clinic of the Tashkent Medical Academy are applied since 2006. Among patients with blunt chest injury indications for its implementation are determined at 146. Frequently blunt chest trauma is occurred at men — 102 (69.9 %). The age of patients ranged from 16 to 82 years (mean age 37.8 ± 1.5 years). The most common injury was transport — in 69 (47.3 %) patients, then household injuries — in 58 cases (39.7 %). 68 % of the patients were taken to the hospital through the emergency room, 32 % of the patients came themselves. Mainly patients were delivered during the first six hours after the trauma, although there have been cases of late treatment: for example, 9.7 % of patients were hospitalized a day after the injury.

Traumatic injuries of the chest from the right and left sides were occurred at approximately the same rate (respectively 48 and 52 %), 12 % of damages were bilateral.

Blunt chest injury were combined with cranial trauma in 85 (58.2 %) cases, with fractures of the long bones — in 38 (26.0 %), pelvic bones — in 19 (13.0 %), injuries of the abdominal cavity — 28 (19.2 %), retroperitoneal space — in 23 (15.8 %).

In a state close to satisfactory, we received 57 (39.0 %) patients, moderate — 65 (44.5 %), in heavy — 25 (17.1 %).

On the basis of X-ray investigation hemothorax was detected in 30 (20.5 %) patients, pneumothorax — in 24 (16.4 %), hemopneumothorax — in 91 (62.3 %).

Rib fractures were observed in 91 (62.3 %) patients: single rib fracture was observed in 66 (45.2 %), multiple — in 80 (54.8 %), including the formation of the rib valve — 9 (6.2 %).

The indications for VATS with closed chest trauma were medium and large (with late treatment of the patient) hemothorax, hemopneumothorax, unresolved pneumothorax, clotted hemothorax. Videothoracoscopy was not been performed in case of hemodynamic instability, reliable signs of the tracheal and large bronchi rupture, as well as the previous thoracotomy on the affected side.

Videothoracoscopy was carried out usually under anesthesia with separate tracheal intubation. Detectable traumatic injuries requiring surgical correction were eliminated with the VATS.

So, VATS stop of bleeding from intermuscular vessels and parietal pleura was performed in 75 (51.4%) patients, bone fragments of ribs — in 43 (29.5%), from the intercostal artery — in 12 (8.2%), suturing of ruptures of lung tissue — in 13 (8.9%), electrocoagulation of ruptures — in 19 (13.0%), suturing of bull — in 2 (1.4%), the elimination of coagulated hemothorax — 11 [7; 5].

It should be noted that all these interventions were often performed in patients with a blunt chest trauma with broken ribs, especially with multiple. Typically, in such cases, there was marked a rupture of the parietal pleura at rib fracture site, which became a source of intrapleural bleeding. In 7 patients with prolapse of bone fragment into the pleural cavity, there was a necessity to fix the ribs.

In these cases, and in 9 patients with functionally significant floating ribs during VATS intervention was made a fixation of them.

Criteria for fixing the ribs were the following: involving in the act of breathing of skeletal muscles (superficial muscles of the chest and neck), respiratory rate more than 30 in 1 minute, PaCO₂ — more than 40 mm. Hg., PaO₂ — less than 92% in 30–40 minutes after intramuscular administration of analgesics and local anesthetics. It should be noted that the expressed respiratory insufficiency (Breath rate more than 35, PaCO₂ — more than 50 mm. Hg., PaO₂ — less than 90%) were indication for pneumatic fixation during mechanical ventilation. As a rule, the latter was observed in bilateral fractures of the ribs with flotation of the sternum.

Fixation of ribs was carried by the method, which was described by Zhestkov K. G. and improved by us. During a thoracoscopy there was made an external finger pressure on the chest to determine the most mobile segments of floating ribs or fragments, perforating parietal pleura. To carry out the fixing material (absorbable suture material "Vicryl 0") under the front and back-stable segments and on both sides of the floating ribs segment was used Fur needle. Then we performed a small skin incision over the site of the stable edges in 3–4 cm. from the fracture and through

this incision subfascially to the fracture line summed spoke. With the help of superimposed suture material we pulled up with a view to reposition the floating segment. Spoke was carried out along the floating segment to another stable segment of the rib. After this we tightened pre-imposed pericostal seams, fixing stable segments and the floating segment to the spoke. In the same manner we fixed the remaining edges.

It should be noted that patients with broken ribs for the purpose to relief pain intraoperatively under controlled videothoracoscopy we introduced catheters for postoperative novocaine blockade into intramuscular subfascial space.

All 16 patients VATS fixation has eliminated paradoxical movement, as well as stabilized the rib.

8 (50%) patients were extubated in the first day, 3 (18.8%) — on the second, 2 (12.5%) — in the third, 3 (18.8%) patients due to the severity of associated trauma mechanic ventilation was conducted for 11–13 days.

Lethal outcome occurred in 2 (12.5%) patients due to the increase of respiratory failure associated with a massive injury of the lung tissue [1] and progression of cerebral coma due to a brain injury [1].

In 2 (12.5%) patients in the postoperative period after the imposition of the spokes was marked suppuration of intramuscular hematoma. In the remaining patients the postoperative period was uneventful.

The duration of hospital stay ranged from 8 to 22 days. Spokes were removed on the 30–40th day in the outpatient department.

Thus, in addition to a high diagnostic efficiency videothoracoscopy can be used as therapeutically. It allows you to solve one of the very complex problems — to remove floating broken ribs in violation of the integrity of the skeleton of the chest wall. The advantage of the proposed method is the possibility of simultaneous execution of all necessary procedures to remove lesions from minimally invasive thoracic access.

Conclusions:

1. Videothoracoscopy at chest trauma allows us accurately set the topical diagnosis. Furthermore, in contrast to existing methods of diagnosis, allowing simultaneously remove these injury with minimally invasive surgery, especially at patients with floating rib fractures.
2. The applied technique of restoring the integrity of the chest in case of floating rib fracture under VATS control allows to securely stabilize the chest wall without resorting to a wide dissection of injured soft tissue.

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Influence of various forms chitosan on microsomal oxidation in the liver and metabolic syndrome

Abstract: Chitosan derivatives, to a greater extent chitosan nano, positive impact on the recovery of impaired activity of microsomal enzyme systems that can be considered to be one of the reasons for reduction factors for MS in experimental animals.

Keywords: metabolic syndrome, liver, microsomal and mitochondrial oxidation, chitosan.

The clinical significance of metabolic syndrome (MS), the combined framework syndrome is the presence of a whole range of risk factors, which are formed long before its development. An important place in this case takes the liver [1]. In clinical practice, the connection MS with impaired liver function is defined as the term “diabetic steatosis» (Canadian Diabetes Association, 2003). Despite the importance of the liver disorders in the development of MS many aspects of pathogenesis of this disease with hepatocytes, in particular molecular-cellular mechanisms remain unclear. Especially there is no clear clarity of microsomal oxidation in the liver with the formation of MS.

Of particular interest is the study of the effect on the liver microsomal oxidation membrane protectors. There is some evidence that chitosan and its isoforms may positively affect the functional activity of the liver in acute and chronic hepatitis [2]. However, it remains unclear how does chitosan and its isoforms at the subcellular level in the liver with the formation of MS.

The aim of this study was to investigate the microsomal oxidation in the liver and the impact of various forms of chitosan on these processes.

Material and methods. Experiments were carried out on 60 male rabbits, weighing from 2050 to 3400. The metabolic syndrome in rabbits is caused by the method S. A. Saidov [3]. To create a model of metabolic syndrome in animals through added 5% sugar solution and mixed in a daily feed crystalline cholesterol of 250 mg/kg body weight. Animals were subcutaneously injected insulin dose of 0.1 units./100 g, a day. The duration of 2 months. Animals were divided into 5 groups: Group 1 (intact) contained in natural vivarium conditions (12 rabbits); 2 group — caused metabolic syndrome (12 rabbits); Group 3 — correction of metabolic syndrome chitosan sulfate (12 rabbits); Group 4 — correction of metabolic syndrome with nano form of chitosan sulfate (12 rabbits); Group 5 — the comparison group, where the correction of the metabolic syndrome was performed with glucophage. Chitosan is a deacetylation product of chitin. The chemical structure of chitosan is a copolymer of D-glucosamine and N-acetyl-D-glucosamine. Chitosan is a universal sorbent capable of binding a huge range of substances of organic and inorganic nature, which defines the broadest possible application in human life. The study examined the effect of chitosan sulfate and Nano form synthesized based on chitosan *Bombyx mori*, represented by the Institute of Physics and Chemistry of the Academy of Sciences of Uzbekistan (Head of Laboratory, c. c. s. Dr. R. Y. Milusheva).

For correction MS used sulphate chitosan Chitosan obtained sulfation reaction medium in chlorosulfonic acid. Orally aqueous solution of chitosan and its sulfate nano form administered 25 mg/kg over 20 days after receiving a model of metabolic

syndrome. Glucophage, according to the instructions of the drug was administered orally at the rate of — 7.14 mg/kg body weight.

Isolation of liver microsomal fractions was performed by differential centrifugation on a refrigerated centrifuge RL-6 and VAC-601. The contents of cytochrome P-450 in the microsomal suspension was determined with a spectrophotometer UV/VIS (LTD, China) by the method of Omura T., Sato R. [4]. The content of cytochrome b5 were determined after recovery experienced microsomal suspension samples by the addition of NADH. Activity amidopyrine demethylase-N-method Bast A., Nordhook J. [5] anilingidroksilazy — by A. I. Archakov et al. [6], NADPH-cytochrome C reductase (NADPH cyt. P-ed) by the method Williams C. H., Kamin H. [7] and microsomal protein of O. N. Lowry [8].

Results and discussion

Studies have shown that after 2 months from the beginning of the simulation of the experimental MS in liver microsomes of cytochrome P450 and b5 was significantly reduced by 28.6 ($P < 0.01$) and 17.2% ($P < 0.05$), respectively, compared with the intact group (Table 1). Activity-NADPH-cytochrome c reductase, amidopyrine demethylase-N-, anilingidroksilazy animals of this group decreased 2.48; 1.93 and 2.14 times, respectively, compared to the intact group. This enzyme system plays an important role in metabolizing both endogenous (steroid hormones, cholesterol, fatty acids and bile acids, prostaglandins) or exogenous (xenobiotic majority) substrates, it is fully functional condition depends on the integrity of the endoplasmic reticulum membrane structures.

Therefore, these results indicate a marked inhibition of microsomal oxidation in liver at metabolic syndrome.

NADPH-cytochrome P450 microsomal electron transport system is in constant renewal de novo protein enzyme complexes, metabolic activity which is largely dependent on the varying conditions of physiological and pathological processes in the cells [9]. Thus protein synthesis de novo enzyme complexes requires considerable use of ATP and NADPH. Mitochondrial and microsomal system compete for connection to the NADPH in the process of using it for free in the mitochondrial respiration and with the mating operation of the cytochrome P-450 systems, the smooth endoplasmic reticulum [9].

Inhibition of the activity of the liver MOS at the metabolic syndrome may be due to a deficiency of NADPH — as the main source for the functioning of NADPH — cytochrome c reductase in microsomes, as noted in our research. Currently offers a variety of methods to restore the microsomal oxidation processes, including chitosan derivatives.

The literature suggests that the chitosan, providing sorption, lipotropic, and lipid-lowering effect and stimulating the motility of the gastrointestinal tract and biliary tract, promotes the normalization of metabolic processes.

Table 1. – Effect of chitosan derivatives on microsomal oxidation in the liver of rabbits with the metabolic syndrome (M ± m)

Group	Microsomes				
	P-450, nmol/mg	b5, nmol/mg	NADPN – cyt.- c. red. nmol/min/mg	AN, nmolHCHO/ min/mg	AG, nmolaminofen/ min/mg
Intact	0.985 ± 0.030	0.593 ± 0.021	94.4 ± 8.48	7.0 ± 0.492	1.09 ± 0.06
MS	0.703 ± 0.024*	0.491 ± 0.004*	38.0 ± 2.94*	3.6 ± 0.28*	0.51 ± 0.026*
MS + chito-san sulfate	0.775 ± 0.033*	0.484 ± 0.024*	49.6 ± 3.27*	4.4 ± 0.30*,**	0.57 ± 0.024*
MS+chitosan sulfate nano	0.837 ± 0.026*,**,***	0.518 ± 0.019*	53.8 ± 2.48*,**,***	5.5 ± 0.177*,**,***	0.67 ± 0.034*,**,***
MS+glyuko fazh	0.706 ± 0.032*	0.497 ± 0.021*	45.7 ± 1.76*	3.6 ± 0.28*	0.54 ± 0.032*

Note: * — differences with respect to the data of the control group significant: * — $P < 0.05$; ** — $P < 0.01$; *** — $P < 0.001$.

Investigating the effects of two forms of chitosan — chitosan sulfate and its nano forms on monooxygenase system showed a significant increase in the content of cytochrome P-450. When administered chitosan and its sulfate form nano levels of cytochrome P-450 exceeded by 10.2 and 19.1 % ($P < 0.05$ and $P < 0.05$, respectively) compared to those animals with MS parameters. Chitosan Sulfate and its nano form of significant changes in the content of cytochrome b5 causes. Chitosan Sulfate significantly to 30.45 % ($P < 0.01$) increases the activity of only NADPH-cytochrome c-red. compared to the untreated group. At the same time nano form of chitosan sulfate increases more significantly as the activity of NADPH-cytochrome c-red and aminopyrine demethylase-N-

anilingidroksilazy 41.6; 53.6; 31.7 % ($P < 0.001$), respectively, compared with the untreated group.

A study comparing the action of the drug — Glucophage has shown that it is not sufficiently active to enhance the functional activity of the microsomes. Glucophage is widely used as a means of correction dismetabolic disorders in MS development. Perhaps it is not related to the effect of the influence on the processes oxidase and oxygenase way of oxidation.

Conclusions

Thus, studies have shown that the development of MS is observed pronounced inhibition of the functional activity of cytochrome P-450 system in the liver microsomes.

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Precancerous diseases in the structure of oral mucosa pathology

Abstract: The study presents the results of the research on the structure, local and systemic risk factors, peculiarities of the clinical manifestation, quality of primary diagnosis of precancerous oral mucosa lesions and red border of the lip. The high percentage of diagnostic errors and lack of oncological awareness of dentists, as well as the necessity of inclusion of precancer early detection techniques are noted.

Keywords: precancerous oral mucosa diseases, early diagnosis, the occurrence of diseases of oral mucosa diseases.

Many forms of oral mucosa diseases and red border of the lips characterized by chronic relapsing course, occur with severe clinical symptoms, can provoke the development of systemic diseases, and lead to a reduction of dental quality of life [2; 3]. Many chronic diseases of the oral mucosa have a high oncogenic potential [4].

According to experts [5; 8], the share of oncological diseases of the maxillofacial region is accounted for 2.4 % of all malignant neoplasms, and “coarse” and standardized mortality rates from malignant tumors of the maxillofacial area (lip, tongue, salivary glands, other and unspecified parts of the oral cavity, oropharynx) in

Ukraine are amounted to 8.88 and 5.64 per 100 000 population [6]. A high percentage of detection of malignant tumors of the maxillofacial region in the III and IV stages of cancer indicates a lack of alertness at the dentists. Early detection of precancerous lesions of the maxillofacial region should become an integral part of medical and dental checkups [1].

An analysis of the prevalence and clinical structure of precancerous diseases of the oral cavity allows us to identify the need for the provision of specialized dental care, identify priority tasks to improve the quality of diagnosis and treatment of patients with this profile.

The aim of this study was to examine the prevalence of precancerous diseases of the oral mucosa in the adult population.

Material and methods

In the period from 2010 to 2015 at the Department of Operative Dentistry of A. A. Bogomolets National Medical University a comprehensive dental examination and treatment was conducted for 423 patients aged 20 to 87 years with precancerous diseases.

Clinical examination oral mucosa was conducted according to the WHO recommendations [2]. The examination included the elucidation of the major complaints and medical history, objective assessment of oral mucosa and red border of the lips according to the visual, stomatoskopia, luminescent analysis, cytosine, histological studies.

The evaluation of the quality of primary diagnosis of disease oral mucosa was conducted based on the copies of the case histories of dental patients, references from dentists and/or doctors, internists, case history data. The levels (I–IV) diagnosis of primary disease, complete the formulation of clinical diagnosis, reflecting the diversity of the patient revealed diseases oral cavity, maxillofacial area; calculated the percentage of patients without survey, cases of overdiagnosis, direct diagnostic errors [7].

We analyzed the answers to the questionnaire on the following clusters of issues: dental uptake, adherence to treatment and attitudes to dental care; clinical manifestations of precancerous diseases oral mucosa; presence and types of orthopedic structures in the oral cavity; the consistency and the temperature of food intake; the nature of tooth brushing; bad habits; the level of knowledge on the prevention of dental diseases.

Results of the study were treated by variational statistics using the index method ϕ the angular conversion Fisher.

Results of the study

In a cohort of surveyed 79.5% residents of Kyiv dominated, 20.5% of the patients lived in various regions of Ukraine. Patients received a reference to state dentists (45.5%) or private (23.9%) dental clinics (surgeries), specialists of medical institutions (15.3%); self-addressed for medical advice — 15.3% of patients.

The structure and the prevalence of precancerous diseases oral mucosa, identified on the basis of a comprehensive survey of patients was as follows: cheilitis Manganotti — 3.55% of patients, erosive and ulcerative form of leukoplakia — 16.55%, papilloma — 1.42%, flat shape of leukoplakia — 24.82%, chronic ulceration of mucous membrane — 4.26%, and the erosive and hyperkeratotic form of lichen ruber planus — 44.21%, post radiography cheilitis and stomatitis — 1.64% and the meteorological and actinic cheilites — 3.55%.

Noteworthy is the prevalence of precancerous diseases among patients with leukoplakia — 41.37% and lichen ruber planus — 44.21%. The level of detection precancerous diseases oral mucosa for current and prior medical history of the individual nosiform almost identical ($t=2.03$; $p<0.05$), which testifies to the truth of the above indicators.

The incidence of pre-cancerous diseases oral mucosa averages $29.2 \pm 1.0\%$. These diseases have an adverse effect on the dental status of city dwellers. In particular, the light, not causing concern forms, diseases of oral mucosa proceeded in 118 of 423 patients ($28.4 \pm 1.8\%$), they were not referred for dental care, they use different dental rinses of mouth.

The remaining 305 patients with pre-cancerous diseases proceeded to clinical forms, accompanied by a variety of ailments (pain, mucous roughness, dryness and other), difficult chewing, difficult oral hygiene, duration of the disease (up to 14 days). All respondents asked for dental care, but it was usually late. However, 224 of the 423 patients were dissatisfied with the quality and efficacy of their treatment ($52.7 \pm 2.4\%$).

Firstly, they have subsequently developed recurrences diseases oral mucosa and their development in other areas of the mucosa. And this leads to the re-uptake of dental help and disability. Secondly, dentists are less attentive to diseases oral mucosa than to teeth and periodontal diseases, proposing antiseptic mouthwash. Thus, this requires testing methods for differentiated and effective treatment of precancerous diseases oral mucosa.

Between age and the level of mental retardation of patients observed a strong positive correlation ($r=+0.95 \pm 0.04$). For example, if a group patients, whose age does not exceed 20 years, the rate level oral mucosa equal to $16.3 \pm 2.5\%$, then with increasing age, it has been consistently increased, reaching $37.7 \pm 4.0\%$ among patients over 70 years ($t=4.53$; $p<0.001$). The analysis of all data obtained by questionnaire, allows us to interpret these regularities.

The first of these is the fact that 266 of the 423 patients in the oral examination have different types of prosthetic ($62.6 \pm 1.0\%$). The remaining 157 cases of precancerous diseases oral mucosa were observed in patients without prosthetic ($19.3 \pm 1.4\%$; $t=8.22$; $p<0.001$). Therefore, with all probability it can be assumed that the orthopedic design injures oral mucosa, violates its integrity and thus creates the possibility of the development of precancerous diseases.

The second pattern is the fact that although men and women with increasing age equally increases the level of precancerous diseases oral mucosa, but incidence among the first total significantly higher than the latter. Thus, cases of precancerous diseases oral mucosa were detected in 229 of 423 men ($54.1 \pm 1.4\%$) and 194 women from 423 ($45.9 \pm 1.4\%$; $t=4.65$; $P<0.001$).

Conclusion

These data allow us to recognize that precancerous diseases oral mucosa is one of the factors that worsen the dental status of the adult population. For the etiology of these diseases are important age and sex structure of the population, the presence of harmful habits, as well as technological quality of prosthetic and restorations. Increasing public commitment to timely dental uptake of precancerous diseases of oral mucosa and the use of technology in their radical treatment will both improve treatment and limit the malignancy of the disease among the population.

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Geographic distribution and differential diagnosis of cases with suspect hemorrhagic fever in Albania

Abstract: Viral hemorrhagic fevers refer to a group of illnesses that are caused by several distinct families of viruses. In general, the term “viral hemorrhagic fever” is used to describe a severe multisystem syndrome. Specific signs and symptoms vary by the type of virus of hemorrhagic fever; signs and symptom include marked fever, fatigue, dizziness, muscle pain, loss of strength, and exhaustion. Patients with severe cases show signs of bleeding under the skin, in internal organs, or mouth, eyes and ears. The aim of this study is to identify the etiology of the cases suspected of hemorrhagic fever and to create the geographic distribution of different virus in Albania. The study analysis the 128 cases suspected of hemorrhagic fever for a period of January 2013 to December 2015. The result show that only 21 % were positive for Crimea Congo hemorrhagic fever, 9 % for Hantan and 3 % for Leptospirosis, and others results negative. The differential diagnosis was made by Elisa methods. The mean age of the patients that were positive for IgG and IgM by Elisa, was 45.7 ± 22.9 years. The distribution of the patients was in different part of Albania, most frequently in north Albania, especially for Crimea Congo hemorrhagic fever. The distribution was correlated with the seasonality and profession of patients.

Keywords: Geographic distribution, hemorrhagic fever, differential diagnosis, Albania.

Introduction

Viral hemorrhagic fevers refer to a group of illnesses that are caused by several distinct families of viruses. In general, the term “viral hemorrhagic fever” is used to describe a severe multisystem syndrome. Specific signs and symptoms vary by the type of virus of hemorrhagic fever; signs and symptom include marked fever, fatigue, dizziness, muscle pain, loss of strength, and exhaustion. Patients with severe cases show signs of bleeding under the skin, in internal organs, or mouth, eyes and ears [1].

Viruses associated with most Viral Hemorrhagic Fevers are zoonotic. This means that these viruses naturally reside in an animal reservoir host or arthropod vector. The cotton rat, deer mouse, house mouse, and other field rodents are examples of reservoir hosts. Arthropod ticks and mosquitoes serve as vectors for some of the illnesses [2].

The viruses that cause Viral Hemorrhagic Fevers are distributed over much of the globe. Because the virus is associated with a particular host species, the virus and the disease it causes are seen only where the host live [3].

Viruses causing hemorrhagic fever are initially transmitted to humans when the activities of infected reservoir hosts or vectors and humans overlap. The viruses carried in rodent reservoirs are transmitted when humans have contact with urine, fecal matter, saliva, or other body excretions from infected rodents. The viruses associated with arthropod vectors are spread most often

when the vector mosquito or tick bites a human, or when a human crushes a tick [4].

The aim of this study is to identify the virus of the cases suspected of hemorrhagic fever and to evaluate the geographic distribution of the virus in Albania.

Material and Methods

The 128 patients, presented from January 2013 to December 2015 at the Department of Infection disease in Tirana and suspected for hemorrhagic fever, were taken in this study. 128 blood serum samples were taken from the Institute of Public Health of Tirana to confirm the diagnosis. We performed immunoglobulin IgM and IgG enzyme-linked immunosorbent assay (ELISA).

All of the patients had similar clinical and laboratory findings, including fever, petechiae, headache, abdominal pain, nausea, vomiting and liver enzyme elevations.

Data as gender, age, occupation, settlement, time of symptoms and relation with vectors, hosts or humans who were sick was collected from the patients. The data was analyzed by SPSS program. The continued variables were presented as mean and standard deviation; categorized variables were presented as percentage.

Results. From 128 blood serum sample, only 34 % ($n = 43$) were positive for IgG and IgM by Elisa methods for hemorrhagic fever. In 43 (34 %) patents with hemorrhagic fever, 63 % was positive for Crimea Congo Hemorrhagic Fever, 28 % was positive for Hantan and 9 % for Leptospirosis.

Table 1. – Demographic data of cases with hemorrhagic fever

	Crimea Congo Hemorrhagic Fever	Hantan	Leptospirosis	Total
Nr	27	12	4	43
Male (%)	12 (44%)	12 (100%)	3 (75%)	27 (63%)
Age	44.8 ± 16.4	41.8 ± 18.5	50.5 ± 33.7	45.7 ± 22.9
Occupation				
Farmer	1 (4%)	3 (25%)	1 (25%)	5 (12%)
Housewife	16 (59%)	5 (42%)	2 (50%)	23 (54%)
Student	7 (26%)	2 (17%)	1 (25%)	10 (23%)
Other	3 (11%)	2 (17%)	0	5 (12%)

Table 2. – The Geographic distribution of cases with hemorrhagic fever

Settlement	Crimea Congo Hemorrhagic Fever	Hantan	Leptospirosis	Total
Has	17 (63%)	0	0	17 (40%)
Kukes	5 (19%)	0	0	5 (12%)
Gjirokaster	3 (11%)	0	0	3 (7%)
Burrel	1 (4%)	0	0	1 (2%)
Tropoje	1 (4%)	4 (33%)	0	5 (12%)
Kavaje	0	1 (8%)	0	1 (2%)
Korce	0	2 (17%)	0	2 (5%)
Peshkopi	0	2 (17%)	0	2 (5%)
Shkoder	0	1 (8%)	0	1 (2%)
Skrapar	0	1 (8%)	1 (25%)	2 (5%)
Tirane	0	1 (8%)	2 (50%)	3 (7%)
Fier	0	0	1 (25%)	1 (2%)

The mean age and standard deviation of the patient positive for hemorrhagic fever was 45.7 ± 22.9 years old. The mean age of the cases with Crimea Congo hemorrhagic fever was 44.8 ± 16.4, for Hantan was 41.8 ± 18.5 and for Leptospirosis was 50.5 ± 33.7.

The frequency of patents with Crimea Congo hemorrhagic fever was higher than the patient with Hantan and Leptospirosis.

In cases the prevalence of male (63%) was higher than female.

Regarding the occupation of the cases, the majority 23 (54%) were housewife, were 16 (59%) were diagnosed with Crimea Congo Hemorrhagic Fever, 5 (42%) with Hantan and 2 (50%) with Leptospirosis.

The majority of cases was seen more in north Albania; 40% (n = 17) in Has city, and all of this cases were with Crimea Congo Hemorrhagic Fever. The 12% (n = 5) of cases was seen in Kukes and Tropoja cities, were in Kukes all the cases were with Crimea Congo Hemorrhagic Fever, and in Tropoja we had one case with Crimea Congo Hemorrhagic Fever and 4 cases with Hantan. Cases with Leptospirosis were seen more in the cities of Tirana (n = 2), Skrapar (n = 1) and Fier (n = 1).

Discussion

Viral hemorrhagic fevers are caused by several families of enveloped RNA viruses: Arenaviridae (Lassa fever, Junin and Machupo), Bunyaviridae (Crimean-Congo hemorrhagic fever, Rift Valley Fever, Hantan hemorrhagic fevers), Filoviridae (Ebola and Marburg) and Flaviviridae (yellow fever, dengue, Omsk hemorrhagic fever, Kyasanur forest disease) [5].

Some Viral hemorrhagic fevers are spread person to person through direct contact with symptomatic patients, body fluids, or cadavers or through inadequate infection control in a hospital. Zoonotic spread may occur from contact with livestock, rodent, bats, mosquito and infected ticks [6].

In Europe, hemorrhagic fever is seen in different countries in the region such as Albania, Kosovo, Turkey, and the Ukraine as well as

south-western regions of the Russian Federation [7]. During the last decade, CCHF outbreaks have also been noted in Albania in 2001 and 2003, and in Kosovo in 2001 [8]. Has and Kukes is situated in north part of Albania, which is close to Kosovo boarder, and has an environment for ticks spreading CCHF due to its geographic structure, climate and lifestyle of people living there. In our study is seen that north Albania has the higher frequency of cases with Crimea Congo Hemorrhagic Fever in Has and Kukes. the incidence of CCHF increased with increasing mean temperature in areas with CCHF cases [9]. In our study most cases were reported between April and September.

Hantaviruses are enzootic viruses that maintain persistent infections in their rodent hosts without apparent disease symptoms. The ecology of Hantaviruses in their rodent reservoirs depends upon complex interactions among competing drivers, including climate and landscape/habitat [10]. In our study the economic condition and habitat had an important role in the distribution of the infection in different areas of Albania. Endemic areas have been re-infected. The distribution was in different part of Albania and it was correlated with the seasonality and profession of patients.

Leptospirosis is a direct zoonotic disease caused by spirochetes belonging to different pathogenic species of the genus *Leptospira*, Large number of animal's acts as carriers or vectors. Human infection results from accidental contact with carrier animals or environment contaminated with leptospire. The primary source of leptospire is the excretory animal [11]. In our study the epidemiology of leptospire is seen in Tirana, Skrapar and Fier. The majority of cases occur among livestock farm workers and meat processing workers.

Conclusion

The majority of cases with hemorrhagic fever in Albania in the period of time from January 2013 to December 2015 were represented with a higher prevalence of Crimea Congo Hemorrhagic Fever.

The distribution of hemorrhagic fever was in different part of Albania, Crimea Congo Hemorrhagic Fever was seen only

in north Albania. The geographic distribution was correlated with the seasonality and profession of patients. The diseases

caused by these viruses are seen in people living in or having visited these areas.

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The influence of sulfaporine on indicators of nitric oxide system at experimental hypercholesterolemia

Abstract: At the heart of the development of endothelial dysfunction at HCS an important role plays decrease of the synthesis of endothelial nitric oxide and increase its active radicals, causing a modification of low density lipoproteins. Sulfated chitosan reduces high levels of peroxynitrite and endothelin-1, increase the activity of eNOS and nitric oxide.

Keywords: Nitric oxide system, sulfaporine, hypercholesterolemia.

So far, cardiovascular disease remains the leading cause of death in most developed countries in Europe, accounting for 40 % of all deaths. To date, set a number of factors of different nature [1], contributing to the development and progression of coronary heart disease — dyslipidemia, hypertension, overweight tala, smoking, physical inactivity, diabetes. Much attention is paid to the cellular and molecular bases of endothelial dysfunction [4; 5]. An important role in endothelial dysfunction belongs nitrogen oxide [6; 7].

The pathogenesis of atherosclerosis is quite difficult, but important role in this belongs to, is dyslipidemia that defines initiation of inflammation cascade mechanism. Therefore, an important role in the development of therapeutic measures belongs to lower cholesterol and other saturated fats [2; 7]. Last years much attention is paid to a natural biodegradable compounds, in particular chitosan and its derivatives. The Institute of Polymer Chemistry and Physics, Academy of Sciences of Uzbekistan under the leadership of SS Rashidova developed various chitosan derivatives.

Research objective: to evaluate the impact of sulfaporina on the system nitric oxide at experimental hypercholesterolemia (HCS).

Materials and research methods. To solve the problems, experiments were performed on 46 rabbits Chinchilla average weight of 2.5–3.0 kg, contained in the standard power mode. Experimental

Model HCS at experimental animals is reproduced by introduction by orally dissolved cholesterol (LDL) in sunflower oil in the ratio 0.2 g. per 1 kg. of body weight per day for 3 months. On the development of HCS was judged by the increase in total cholesterol and LDL (LDL) and high (HDL) density, which is determined on a biochemical analyzer.

After 2 months from the start of the experiment rabbits were divided into five groups:

- Group 1 — intact (rabbit 6), which through the mouth daily entered sunflower oil 1.0 ml/kg;
- Group 2 — HCS + H₂O — control (8 rabbit);
- Group 3 — HCS + gemfibrazil on 100 mg/kg (8 rabbits);
- Group 4 — GCN + chitosan sulfate 25 mg/kg (rabbit 8);
- Group 5 — HCS + chitosan sulfate 50 mg/kg (rabbit 8).

Action of preparations is investigated in dynamics: an initial 3-month's condition and after one month of introduction of preparations. On the state of NO-ergic system judged by the level of nitric oxide metabolites [9], the activity of nitric oxide synthase (eNOS), the activity of nitrate reductase (NR) [10] and the level of peroxynitrite (ONOO) [9].

Results of investigation and discussion

The most important role in the implementation of vascular endothelium function and dysfunction is plays a NO-ergic system.

During the development of the pathology of the vascular system is disturbed intracellular signaling system involving the synthesis of NOx eNOS. Actually carried out in this respect, the study showed a significant decrease in the content of the end products of nitric oxide, which corresponds to the progression of the severity of hypercholesterolemia. So, the content of the nitric oxide, as measured by the number of end products, on the 30th, 60th and 90th day of the experiment is reduced to 1.29 ($P < 0.05$); 1.53 ($P < 0.01$) and 2.11 ($P < 0.001$) times, respectively, the values of intact rabbits.

Such changes of nitrogen oxide levels in the blood serum may be due to the inhibition of endothelial nitric oxide synthase.

Indeed, the definition of eNOS activity showed its progressive decline of 1.25 ($P < 0.05$); 1.36 ($P < 0.05$) and 1.94 ($P < 0.001$) times, respectively, relative values of intact animals. Overall, we detected changes in the activity of the enzyme NOS consistent with shifts from the NO-ergic system level product — NO_x. Thus, the lower the NOS enzyme activity, the lower the level of NO_x.

In contrast to the content of NO_x, in the serum of rabbits with hypercholesterolemia observed increase in NO_x bioconversion product — ONOO-. So, if the level of the latter on the 30th day of entering exogenous cholesterol increases of 1.33 ($P < 0.05$) times the value of intact rabbits, then on the 60th and 90th day of the experiment — respectively 1.93 ($P < 0.001$) and 2.47 ($P < 0.001$) times.

Given that the conditions of HCS level of ONOO in the serum is significantly higher than in intact rabbits, we also determined the activity of another enzyme NO-ergic system involved in the bioconversion of nitric oxide to NR. At HCS NR enzyme activity in blood serum at 30 hours administration of exogenous cholesterol increased only 1.15 ($P < 0.05$) times, on the 60th and 90th day of administration — 1.3 ($P < 0.05$), and 1.76 ($P < 0.01$) times.

At HCS occur noticeable disturbances in NO-ergic blood system. Given that NO is involved in blood serum, especially in the realization of a fur-organisms maintain the functional activity of the vascular endothelium, it becomes in-understand the genesis of hypertension in the studied pathologies. This is proved by the decrease in blood serum levels of NO_x experimental animals due to their inhibition activity of the enzyme eNOS. And raising peroxynitrite evidence of the negative role of the implementation of NO-ergic system and indicates a pathological role of these disorders in the genesis and progression of atherosclerosis.

Studies have shown that at level of cholesterol in LDL 2.38 ± 0.27 mmol/l, the content of nitrogen oxide and the activity of the enzyme constitute 16.68 ± 0.28 pg/ml and 35.05 ± 0.76 mmol/min × mg. protein.

At the level of cholesterol in LDL 4.08 ± 0.10 ; 5.97 ± 0.09 and 6.48 ± 0.11 mmol/l of nitrogen oxide is progressively decreased to 12.94 ± 0.10 ; 10.91 ± 0.15 and 7.89 ± 0.31 mmol/l, respectively, nitric oxide synthase activity to 28.29 ± 0.49 ; 25.80 ± 0.73 and 18.05 ± 0.70 mmol/min × mg. protein, respectively, the concentration of cholesterol in LDL.

Analysis of the level of peroxynitrite and HF activity depending on the content of cholesterol in LDL showed that the cholesterol level in LDL 2.38 ± 0.27 mmol/L, content and activity of peroxynitrite constitute NR 0.15 ± 0.01 mmol/l and 2.72 ± 0.19 mu. mol/min × mg. protein, respectively. At the level of LDL cholesterol and 4.08 ± 0.10 ; 5.97 ± 0.09 and 6.48 ± 0.11 mmol/l peroxynitrite content increased to 0.20 ± 0.01 ; 0.29 ± 0.02 and 0.37 ± 0.01 mmol/l and the HF activity – up to 3.12 ± 0.11 ; 3.54 ± 0.10 and 4.78 ± 0.14 mmol/min × mg. protein, respectively, shall drop in LDL cholesterol.

Therefore, the progression of hypercholesterolemia and hyper-beta lipoproteinemia production of nitric oxide and its synthase

activity in endothelial cells is inhibited, the content of his active radicals increases progressively. In the dynamics of serum HCS occur noticeable disturbances in NO-ergic system. These disorders are characterized by a deficiency of NO_x, due to low activity of NOS, as well as the accumulation in them bioconversion product of nitric oxide-peroxynitrite by increasing the activity of nitrate reductase and probably insolvent antioxidant defense system. Undoubtedly, the definition of nitric oxide in the blood serum followed by defective functioning of mechanisms to regulate the functional activity of not only the vascular endothelium, but also blood cells, contribute to the launch of the corresponding endothelial mechanisms of feedback, which negatively affects the course and outcome of the study of pathology. This circumstance requires consideration by us of violations in the choice of strategy and tactics of the treatment of hypercholesterolemia.

Pharmacotherapy gemfibrazil for 1 month resulted in a significant increase in the level of the end products of nitric oxide to 1.18 times the value of the control group of animals. However, despite this increase, their content remained low (reduced to 1.79 times, $P < 0.001$), indicating that the low activity of endothelial cells that produce nitric oxide. Proofs of this are the low values of eNOS activity. The values it increased only 1.24 ($P < 0.05$) times compared to the control group values, but remained significantly lower than in intact rabbits to 1.57 ($P < 0.01$) times.

Pharmacotherapy by sulfaporin at doses of 25 and 50 mg/kg was significantly increased the value of the control group the level of nitric oxide in the 1.56 and 2.26 times, respectively. If the dose of 25 mg/kg nitric oxide levels remained low at 1.36 ($P < 0.05$) times as compared with the intact rabbits, using the dose of 50 mg/kg, it was not different from the above parameters. At the same time, compared with gemfibrozil was more effective in correction of nitric oxide. Nitric oxide was 1.32 ($P < 0.05$) and 1.92 ($P < 0.001$) times higher than in the group of rabbits treated with gemfibrazil.

Along with this, we also observed activation of nitric oxide synthase. So, activity of eNOS significantly increased 1.37 ($P < 0.05$) and 1.41 ($P < 0.05$) times relative control group values doses respectively of 25 and 50 mg/kg. These figures remained below the guideline values of 1.42 ($P < 0.05$) and 1.38 ($P < 0.05$) times, respectively. It should be noted that these values are only slightly exceeded the indicators of the group of rabbits treated with gemfibrazil.

Experimental hypercholesterolemia pharmacotherapy with gemfibrazil peroxynitrite leads to a decrease in the level of 1.21 times the NR activity and 1.2 times the values of untreated group of animals. The studied indicators remained high, exceeding the values of intact rabbits to 2.07 ($P < 0.001$) and 1.47 ($P < 0.01$) times, respectively. Pharmacotherapy sulfaporin hypercholesterolemia in doses 25 and 50 mg/kg reduced the high values of peroxynitrite in 1.38 and 1.73 times, respectively, relative to the values of untreated group. Compared to the group receiving gemfibrozil, this reduction amounted to 1.15 and 1.45 times, respectively doses.

However, it should be noted that the relative values of intact rabbits peroxynitrite levels using sulfaporina 1.81 and 1.43 times higher than, respectively, the doses 25 and 50 mg/kg. Pharmacotherapy sulfaporinom at doses 25 and 50 mg/kg reduced the high activity of nitrate and 2.05 to 1.64 times the values of the untreated animal group. In this respect values animals treated with gemfibrozil, this reduction amounted to 1.37 and 1.71 times, respectively doses.

From these data it is evident that the HCS pharmacotherapy Sulfargin more effectively corrects the violations of nitric oxide system. Its effect is more pronounced manifested in the correction level of nitric oxide and nitrate. At the same time, the nitric oxide synthase

activity remained low. Apparently, a significant decrease in the level of nitric oxide in the background of continuing high activity of nitric oxide synthase, is associated with accelerated its interaction with active forms of oxygen and the formation of peroxynitrite. This is confirmed by peroxynitrite maintaining high values in the blood serum of experimental animals. In our view, a more efficient system in terms of nitrogen oxide correction it is advisable to use a dose of 25 mcg/kg.

The following conclusions can be drawn from the data:

1. On the basis of the development of endothelial dysfunction at HCS play an important role decrease the synthesis of endothelial nitric oxide and increase its active radicals, stipulated modification of low density lipoproteins.
2. Sulfated chitosan reduces high levels of peroxynitrite and endothelin-1, increase the activity of eNOS and nitric oxide.

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Integrated immunotherapy when nosocomial pneumonia in infants

Abstract: In the present study we examined 150 patients, including 110 children with NoP and 40 children with community-acquired pneumonia. There was a significant decrease in CD3⁺ lymphocytes to 43.4 ± 0.8 % (61.5 ± 1.2 %) (P < 0.001), CD4⁺ lymphocytes to 27.1 ± 0.7 % (39.1 ± 0.5 %), CD8⁺ lymphocytes to 15.2 ± 0.5 % as compared to the indices CAP 19.5 ± 1.1 % (P < 0.01), a significant increase in the relative number of CD20⁺ lymphocytes, which amounted to 28.6 ± 0.5 % compared with CAP index — 16.4 ± 1.1 % (P < 0.01) and CD16⁺ lymphocytes to the 16.8 ± 0.4 % compared with the CAP 10.2 ± 0.5 (P < 0.001). From the humoral immunity, which is expressed in a decrease in the level of serum IgA and IgM, which amounted to 44.5 ± 2.5 mg, %; 92.4 ± 3.1 mg, % respectively, compared with CAP (78.4 ± 3.2 mg, %; 121.4 ± 4.9 mg, %, P < 0.01).

Differentiated methods of treatment potentiate the efficacy of antibiotic treatment of NoP, allowing faster return to normal changes in laboratory and immunological parameters of blood, reducing the number of bed-days, reduced the risk of severe and protracted forms of adverse outcomes NoP.

Keywords: nosocomial pneumonia, immunology, cytokines.

Actuality

The nosocomial pneumonia (NoP), which develops against the background of secondary immunodeficiency states, worsens the prognosis and creates threat to a child's life. It is known that the immune response includes multidirectional types of effector mechanisms, each of which is optimal in respect of certain pathogens. Analysis of published data shows that in the children's NoP dysfunction of the immune system are varied, complex, contradictory and not fully understood.

The purpose of study is to develop treatment regimen of nosocomial pneumonia in young children based on interdependence received clinical and laboratory data.

Material and methods

In the present study we examined 150 patients, including 110 children with NoP and 40 children with community-acquired pneumonia (CAP) who treated at the intensive care units and intensive therapy, pulmonology of infants departments of RSPMC Pediatrics MoHRoUz. Conducted clinical, laboratory methods of research, studied in detail immunological methods by immunofluorescent method.

Depending on the type of therapy examined children were divided into three groups: I — group consisted of 40 children patients with NoP which had received basic therapy. II — group consisted of 35 children patients with NoP which had received with basic therapy

полиоксидоны 3 мг. on scheme. Group III consisted of 35 patients with NoP of children which had received basic therapy included полиоксидоны and Vitrum baby.

The results of study. Analysis of the study showed that 60 children (54.5%) admitted to the department of pulmonology on 3–4 day after discharge from the other hospitals (after acute bronchitis, laryngitis and intestinal infection), and 50 (45.4%) admitted to the RITD with hyperthermia and respiratory failure of varying severity. The main clinical manifestations of the disease were: severe respiratory and cardio — vascular insufficiency in 100% resistant, study hyperthermia to 38.5°C was observed in 35 (31.8%), above 38.5°C — in 40 (36.3%), persistent dry — 62 (56.3%) participated, and sometimes wet cough observed in 38 (34.5%) participated, involvement in the act of respiration auxiliary muscles was observed 100.0% cases. The children received from other hospitals in the form of complicated and protracted course of pneumonia plated *Pseudomonas aeruginosa*. The characteristic features of NoP caused by *Pseudomonas aeruginosa* and Enterobacteriaceae, had steady progression and high percent for death (30%).

The results of X-ray examination showed the following character of lung disease in children with NoP: localization of infiltration — two-sided in 74 (67.2%) patients, one-sided — in 36 (32.7%); infiltrate allocation — in the upper right lobe — in 45 (40.9%), in the middle lobe — in 22 (20%) patients. Sufficiently frequent complications have been destruction of lung tissue in 6 (5.4%) as a form of pulmonary edema in 11 (10%). It should be noted at the NoP, caused by *Pseudomonas aeruginosa* and Enterobacteriaceae, in more than half of the cases there is bilateral lung damage, while increasingly involved in the process right upper lobe.

In previous publications were presented immunological data: there was a significant decrease in the relative number of CD3⁺ lymphocytes to 43.4 ± 0.8% (61.5 ± 1.2%) (P < 0.001), CD4⁺ lymphocytes to 27.1 ± 0.7% (39.1 ± 0.5%) of CD8⁺ lymphocytes to 15.2 ± 0.5% compared with CAP index 19.5 ± 1.1% (P < 0.01), a significant increase in the relative number of CD20⁺ lymphocytes, which amounted to 28.6 ± 0.5% compared with CAP index — 16.4 ± 1.1% (P < 0.01) and CD16⁺ lymphocytes to 16.8 ± 0.4% compared with CAP index 10.2 ± 0.5 (P < 0.001). From the humoral immunity, which is expressed in a decrease in the level of serum IgA and IgM, which amounted to 44.5 ± 2.5 mg, %; 92.4 ± 3.1 mg, % respectively, compared with CAP (78.4 ± 3.2 mg, %; 121.4 ± 4.9 mg, %, P < 0.01).

In the present study discusses analysis results of the various therapeutic approaches in the treatment of children with NoP.

It was traced the dynamics of changes in immune system influenced by differential treatment of patients with NoP. The children of group II was observed activation of cellular immunity, as evidenced by increase in the relative number of CD3⁺ lymphocytes, 52.5 ± 1.8% at a norm (61.5 ± 1.2%), valid with respect to the I group patients (P < 0.01). Subpopulations CD4⁺ lymphocytes were increased in children in group II after treatment relative indicators of group I patients (P < 0.01).

Lymphocyte subpopulation bearing markers CD8⁺ were have also positive dynamics influenced combined therapy, while in group I in terms of significant changes were no observed (P > 0.05). A similar trend is occurring at the initial stage of humoral immunity, there is an increase of CD20⁺ lymphocytes in comparison with group I (P < 0.01), which was in a relative value of 19.5 ± 0.58%.

There was positive dynamics of natural killer cells — CD16⁺ lymphocytes. Moreover, the difference in terms of CD16⁺ before and after treatment was significant in group II patients (P < 0.01), while in group I, these indices had no reliable trend (P > 0.05). After treatment in children treated with conventional therapy in combination полиоксидоны and Vitrum baby, (group III) observed activation of cellular immunity, as evidenced by the increase in the relative number of CD3⁺ lymphocytes, constituting 62.1 ± 1.8%, a reliable performance against group I patients (P < 0.001). Subpopulation of CD4⁺ and CD8⁺ also increases after treatment in group III, in relation to the initial data (P < 0.001), and indicators of group II patients (P < 0.01). Subpopulations of lymphocytes bearing markers CD8⁺, also had positive dynamics under the influence of combined therapy, while in group II significant changes in performance was no observed. Accordingly, the immunoregulatory index in the group of patients who had receive differentiated treatment approaching the normal range, in contrast to the performance of IRI in group II, where it's remained consistently low. The IRI in patients with NoP after treatment was 1.8 ± 0.08 and 1.6 ± 0.04 respectively (P < 0.05). In group III patients who received differential treatment, the level of CD20⁺ lymphocytes decreased to 16.4 ± 0.9%, whereas in group II after treatment it was 10.6 ± 0.8% (P < 0.01). Differential treatment has had a positive effect on blood levels of natural killer cells — CD16⁺ lymphocytes. The differences in CD16⁺ before and after treatment was significant only in the group III patients (P < 0.01), while in group II patients these indices had no reliable differences (P > 0.05). The positive impact of the complex therapy on the activity of humoral immunity in children their contents II and III groups, more significantly closer to standard indicators and it was 801.0 ± 20.0 mg, %; 1 mg. of 60.0 ± 5.0%; 100.0 ± 5.0 mg, % and 990.0 ± 14.0 mg, %; 120.0 mg. ± 5.0%; 121.0 mg. ± 6.0% respectively, in contrast to the group I (from P < 0.05 and P < 0.01).

Analysis of the cytokine profile in differential treatment showed that children of groups II and III there is a decrease in IL-1β and IL-4. Levels IL-1β decreased after treatment in both groups is on average 125.6 ± 10.5 pg/ml and 120.1 ± 9.6 pg/ml, respectively (P < 0.01; P < 0.001), while in group I, these indices had no reliable differences (P > 0.05). The concentration of IL-4 in children groups II and III after the combined treatment was 70.1 ± 0.8 pg/ml and 69.4 ± 4.4 pg/ml, respectively, relative to the group I (P < 0.05). Thus, the differentiated treatments potentiate the efficacy of antibiotic treatment of NoP, so quickly normalize altered laboratory and immunological parameters of blood, reducing the number of bed days, reduced the risk of severe and protracted forms of adverse outcomes NoP.

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The comparative analysis of surgical treatment of mediastinal tumors in children oncology

Abstract: The analysis of the surgical treatment of the mediastinal tumors has been performed in 41 patients. In 23 cases there are carried out diagnostic and medical thorascopies, the standard approaches (thoracotomy, sternotomy) in 18 patients. The main parameters for comparison included duration of the operative intervention, staying of children in the department of rehabilitation of the hospital, duration of the use of anesthetic agents, terms of the pleural cavity drainage, bed-days after intervention, where there was revealed reliable improvement of results.

Keywords: thoracoscopy, mediastinal tumors, oncopediatrics.

The surgical method remains to be extremely important in the structure of the current multimodal strategy for treatment of children with tumor pathology of the mediastinal organs. Actually the majority of patients with solid tumor cannot be treated without surgical stage [2, 199-203; 8; 14, 12-15; 15, 1243-1750].

The surgery in children oncology has changed significantly due to the progress in the chemo- and radiotherapy over the last years. The character of surgery changes owing to coming of all modern surgical technologies including endosurgery, microsurgery and organ transplantation to the oncopediatrics. The safety and adequacy of the oncological intervention depends to a large extent on the appropriate choice of the surgical approach. The critical moments at the choice of the approach seem to be such moments as tumor size, morphology and tumor response to the ambient structures [4, 562-576; 5; 6, 37-38; 8, 1725-1728; 12; 13-19; 14, 12-15].

The role of the current thoracoscopic techniques in mediastinal tumors and cysts is not a subject to doubt. The standard surgical approaches at removal of the tumors and cyst of the mediastinum preents by mediastinoscopy, thoracotomy, sternotomy. All the open (standard) approaches are characterized by great traumaticity of the operation, heavy postoperative development and prolonged restoration period. At the present stage of development of medicine the children's surgery is difficult for presenting without endoscopic operations. The surgeons efforts to the reduction of traumaticity of operations resulted in wide use of minimally invasive interventions in the children's surgery. The main advantages of the thoracoscopic operations include reduction of the postoperative pain; absence of requirement in narcotic analgetics; shortening of bed-days, excellent cosmetic outcome; possibility of the repeated interventions in recurrence of disease, as well as after the open operations. The thoracoscopic operations at mediastinal tumors have a number of advantages in comparison with traditional operations and combine minimal traumaticity and radical necessity [1, 335-343; 3, 2893-2909; 7, 1086-1090; 9, 725-727; 10, 304-305; 15, 1243-1750].

At the large masses in the chest, in particular tumors of anterior and posterior mediastinum, top of the thoracic aperture, standard

surgical approaches — thoracotomy, sternotomy have not lost their importance [2, 199-203; 4, 562-576; 13, 252; 14, 12-15].

On the basis of experience of a combination of endosurgery and open surgery in the adults at the esophageal cancer, thymus gland tumors, pulmonary neoplasms, neurogenic tumors of the posterior mediastinum, there are data of the combined use of endosurgery and open surgery during one operation, at the "complex" localizations of the tumor, such as posterior mediastinum with involvement of the peritoneal space, zone of aperture of the chest involving to the neck and anterior mdiastinum with distribution into both hemithorax [5, 138-148; 12, 13-19].

On the basis of the literature data, analysis of the work performed, the purpose of our research was to study the results of surgical treatment of children with mediastinal tumors removal by thoracoscopic and standard access.

Material and methods

During the period from 2000 to 2014, there were treated 114 patients with mediastinal tumors. Of them the boys were 70 (61.41%), girls — 44 (38.59%). The age fluctuated from 1 year till 19 years, the average age was 8.89 ± 2.34 years. Terms of the admission to the hospital were from 1 months to 3 months — 9 patients, to 6 months — 12 patients, more than 6 months — in 13 patients.

From 114 patients 41 (35.9%) underwent operative interventions. 23 (67.64%) patient were performed thoracoscopic operations: on the right — in 15 (65.3%), at the left — 8 (34.7%). In 7 (20.5%) cases diagnostic thoracoscopy was ended by biopsy taken from the tumor. For comparative analysis there was formed control group of 18 children with mediastinal tumors, operated by open method: tumor removal by thoracotomy access in 12 patients, by sternotomy — in 5 patients, neck approach in one case

Variants of the cysts location: in 5 cases — paratracheally, in one — parabronchially.

Distribution of the patients the histological structure was as follows: thymus gland tumors in 8 cases (3 malignant thymoma, 5 benign thymoma), lymphoma — 4, intrathoracic goiter — 1 case, mesenchyma — 5, (fibrolypoma, desmoid by type of fibromatosis),

mature teratoma — 7, bronchial cysts — 7, benign neurogenic-tumors, tuberculous lymphadenitis in 2 children. Thoracoscopic operations were performed in patients with bronchogenic cysts, one extragonadal germinogenic tumor of mediastinum (mature teratoma) in 3, nevrinoma of the posterior mediastinum in 4, and fobrolipoma in 2 patients.

At extended and extended – combined interventions there were additionally used resected following structures: decortication and pleurectomy in one case, rib resected with spinal islands in two cases, and in one cases during involvement of the malignant thymoma into the lung the pulmonectoniain the lung was performed.

Multispiral computed tomography (MSCT) and magneto-resonance tomography (MRT) have the most informativity in the diagnosis of the mediastinal tumors. For more precise visualization, differentiation of the tissues and anatomic interrelations with the thoracic organs and blood vessels in 19 (56.8%) patients were performed investigation with contrast intensification of the mediastinal vessels. The investigation also included ultrasound examination with duplex scanning of the mediastinal organs, functional methods of investigations, clinical blood analysis, biochemical blood analysis. Fibroezophagostroduadenoscopy (FEGDS) was carried out in 3 (8.9%) children with features of dysphagia; bronchoscopy — in 14 (41.2%). In 22 (54.5%) of children were studied the level of tumor markers, such as neurospecific enolase, alpha-fetoprotein, ferritin. At suggestion of the extragonadal germinogenic tumor of the mediastinum there was included ultrasound investigation of the testicles, as well as measurement of the level of serum markers — α -fetoprotein (AFP), β -chorionic gonadotropin (β CG) and lactatdehydrogenase (LDG). The increase of the levels of markers was not noted in the operated patients.

The quantitative variables were described by the following statistical data: by number of the patients, average arithmetic meaning, standard deviation from average arithmetic meaning, the 25th and 75th percentiles, median. The qualitative variables were presented by absolute (numbers) and relative frequencies (percents). The distinctions were considered statistically significant at a level of mistake $p < 0.05$. The calculations were performed on the personal computer with use of the application Microsoft Excel and package of the statistical analysis of the data Statistica 5.1 for Windows (“Stat Inc.”, USA).

We present an example of thoracoscopic removal of the bronchogenic cyst of the superior mediastinum: The patient of 13 years of age. At preventive examination at the place of residence there was diagnosed tumor of the anterior-superior mediastinum on the right side. By the data of radiodiagnosis in the paratracheal area on the right, at a level VTh1-VTh3 there was noted mass of sizes $4.2 \times 3.0 \times 5.0$ cm. with contours well defined. The neoplasms is parietal to the lateral trachea wall and thoracic vertebra bodies. The signs of invasion into the mediastinal vessels were not revealed. The bronchoscopy showed constriction of the lower third of tracheal wall on the right side of the trachea wall mucosa, the picture of catarhal endopronchitis. There was performed thoracoscopic removal of the cystic tumor of the anterior-superior mediastinum. Histological conclusion: bronchogenic cyst.

The technique of the thoracoscopic operations:

The patients was in lateral position. Into the pleural cavity there were administered 3–4 trochars. After introduction of the 1-st trochar the insufflation of CO₂ began into the pleural cavity under pressure 6–8 mm. Hg. Then there were entered the rest 2 trochars of diameter 5 mm. for endoscopic instruments.

The arrangement of the trochars:

- In VII intercostal in the middle auxillary line for telescope introduction;

In V or VI intercostals in the anterior auxillary line for instruments;

- In VI intercostals in the posterior auxillary line for instruments and aspirator.

If necessary the 4th trochar is located in the VII intercostals in the posterior auxillary line. At the first stage of the thoracoscopic removal there was made revision of the pleural cavity and lung. There was studied diaphragm, anterior and posterior surfaces of the lung and presence of adhesions, cysts or bulla. At presence of adhesions in the pleural cavity the division of the adhesions was performed with use of monopolar coagulation and scissors that provided careful examination of the lung surface for specification of the localization, character and size of mass. Before opening of the cyst membrane the hydropreparation was performed with the consequence coagulation of its surface. Then the cyst was open with monopolar coagulator. The contents of cyst was evacuated with help of electroaspirator and the cyst membranes were dissected. After evacuation of the cyst contents its membranes stuck together that created additional free volume of the pleural cavity. Then there was performed dissection of the membranes of the cysts with use of bi- and monopolar coagulation. Postoperative period was without events. The patient was discharged on the 6th day after operation. The time of operation was 90 min. Blood loss — 50 ml. The term of observation was 24 months — remission.

There is presented the sample of the removal of mesenchial tumor of the lower mediastinum.

The patient of the age 15 years She addressed with the complaints on a pain and presence of swelling on the posterior surface of the right half of the chest. The pains in the chest disturbed within one year. 2 months prior to admission to the stationary the roentgenological examination showed tumor of the middle mediastinum. At the MSCT there was revealed structural mass in the right hemiothorax and paravertebral area with well-defined contours of sized $135 \times 134 \times 167$ mm., density $+28+35$ un. H. This neoplasm, evidently, located outside from the parietal abdominal leaf, moves diaphragm and liver forward, invades into the soft tissues of the back, XI and XII ribs and VTh11, VTh12 on the right. At MRI: the large mass of the paravertebral area on the right invades into the lumen of the cerebrospinal canal — its lumen of the right side is considerably narrowed. The neoplasm borders on a spinal cord, which is shifted to the left — its contours is differentiated, however on some scans they are some poorly defined. In the preoperative period under the control of USG there was performed tranthoracic sliced biopsy. Histology: desmoid tumor. Together with meurosurgeons there was performed operation of lateroposterior thoracotomy. The removal of the desmoid tumor of the posterior lower mediasnum on the right with resection of IX, X and XI ribs and spinal processes VTh 11, VTh 12, without opening of dural suc. At revision the signs of invasion into the cerebrospinal canal were not revealed. Postoperative period proceeded smoothly. The patient was discharged on 16 day after operation. The time of operation accounted for 220 mines. Blood los was 550 ml. In the postoperative period there was received the course of the chemo-radio-therapy. The time of observation was 6 years — remission.

Results and discussion

In a course of all performed thoracoscopic interventions there were no dangerous complications. At standard interventions the complications were not registered too. The conversion have been performed in 1 (2.9%) child at the initial stages of development of a technique in our clinic. The adhesive process in the pleural cavity has become a reason of conversion in one case.

The basic parameters of comparison were: duration of operative intervention, duration of stay of children in the department of reanimation, duration of analgetics application, terms of drainage

of the pleural cavities, bed-days after interventions. The parameters of comparison between two groups of the patients are summarized in table 1.

Table 1. – Parameters of comparison between open and thoracoscopic operations

Indicator	Thoracoscopic surgeries (n = 23)		Standard operations (n = 18)		P
	n	M ± δ	n	M ± δ	
Operation period, min.	23	80 ± 20	18	110 ± 25	< 0.05
Duration of reanimation, days	16	1.1 ± 0.6	18	1.9 ± 0.9	< 0.05
Duration of anaesthetization, days	23	2 ± 0.6	18	4 ± 1.6	< 0.05
Duration of drainage of the pleural cavity, days	23	2.5 ± 0.8	18	4 ± 1.4	< 0.05
Duration of postoperative hospitalization, days	23	18 ± 2.2	18	28 ± 8.5	< 0.05

Analyzing the received results it has been established, that the duration of operations in the main group was from 30 up to 90 mines (on the average 80 ± 20 mines), in control — from 80 up to 240 mines (on the average 110 ± 25). Thus, the average duration of operations in the main group was reliably lower, than in control ($p < 0.05$). First of all it is explained by reduction of time of access to an operational field, decrease of time spent on hemostasis, absence of necessity in closure of thoracotomy wound. At standard thoracotomy, sternotomy the operational access required from 20 up to 40 mines, at thoracoscopy — 3–5 mines. In connection with development of the postoperative period without events in the main group only 50% of children were in the department of reanimation and intensive therapy, whereas in control group all patients after thoracotomy were transferred in the department of reanimation, that was related to the necessity of realization of the prolonged artificial lung ventilation. At the analysis of the received results there was established reliable reduction of duration of the patients staying in the department of reanimation after thoracoscopic operations in comparison with a similar parameter at standard: 1.1 ± 0.6 and 1.9 ± 0.9 days, respectively ($p < 0.05$).

In the patients, operated by an open way, the application of narcotic and not narcotic analgetic preparations has appeared to be longer. In the main group its duration accounted for 2 ± 0.6 days, in control — 4 ± 1.6 days. The average duration of the period of analgetics application in the main group was significantly lower, than in control ($p < 0.05$). In group with thoracoscopy, beginning from the first day the pains had moderate and weak character, stopping by application of not narcotic analgetics, and after removal of drainage tubes they were very weak or were absent. At the patients in

control group the pain syndrome had fluctuated character and in the first 3 days was defined, mainly by severe and very severe pains requiring prescription of the narcotic analgetics.

Duration of the pleural cavity drainage in the main group was from 1 to 3 days (on the average 2.5 ± 0.8 days), and in the control group — from 2 to 6 days (on the average 4 ± 1.4 days). Thus, the period of drainage of the pleural cavity was, reliably, lower in the group of endoscopy ($p < 0.05$). The period of the postoperative staying of the patients in the hospital in the group of thoracoscopy accounted for from 3 to 27 days (on the average 18 ± 2.2 days), in the group of open operations — from 5 to 42 days (on the average 28 ± 8.5 days), the difference was statistically reliable ($p < 0.05$). Term of supervision of the patients, operated with use of thoracoscopy, was from 2 months till 8 years. Term of supervision after standard approaches was from one year till 9 years.

The results were estimated on the basis of general clinical methods of examination, roentgenological investigation, CT. The good functional and excellent cosmetic results have been achieved in all the patients.

Conclusions

The thoracoscopic operations at the modern stage seem to be complex methods of the surgical treatment requiring the special training combined with learning from the endosurgical technique as well as mastering of skills of the traditional oncosurgery. On the basis of small experience in surgical treatment of tumors and tumor-like mediastinal masses it is possible to conclude, that thoracoscopic interventions differ by radical necessity in a combination with minimal traumaticity that allowed shortening of the patients staying in the hospital, lowering of the economic expenses for treatment.

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Protective and preventive efficiency of «Imnamak» in brucellosis

Abstract: Preclinical study of safety of application of domestic immunostimulating forage preparation “Imnamak” was carried out. Its immunologic, protective and preventive activity for neutralization of the first stage of epidemiological process was investigated. “Clearance test” with experimental animals infected with brucellosis demonstrated protective efficiency of the preparation. Epidemiologic efficiency of «Imnamak» for neutralization of the source of the infection, i. e. “sanitation” of hyperendemic foci of brucellosis induced by *Brucella melitensis* was proved.

Keywords: brucellosis, “Imnamak”, immunostimulation, protection, prevention.

Prevention of brucellosis includes a set of veterinary-sanitation, economical and medical-sanitation measures, the ultimate aim is the elimination of infection among animals and termination of diseases among the population. Taking into consideration that brucellosis is zoonotic infection, on the basis for epidemic safety are prevention measures of infections among animals and hotbeds elimination of epizootic diseases when they occur [2; 8].

Our study investigated the protective efficacy of the drug “Imnamak”, which is a balanced blend of natural active biological substances (immunofor, fodder salt and etc.), the effect of which is aimed at activation immune system of farm animals organism.

The drug “Imnamak” is used for small cattle (SC) in order to prevent brucellosis. It is recommended that one course per year in the parturition period. One dose of the drug “Imnamak” three grams a day (daily dose of the need for fodder salt small ruminants) within 30 days, two months before parturition company among the sheep. If brucellosis drug used for the first time since the pathogenesis features of brucellosis infection include immunological mechanisms that are targeted by the drug “Imnamak” [1; 3].

The aim of the study was to evaluate the protective activity of the drug “Imnamak” in the experiment and evaluation of its effectiveness in preventive hyperendemic hearth of brucellosis goat – sheep species.

Materials and methods

The experimental materials were white mice and guinea pigs, respectively 30 and 40 animals. We consider the comparative group of the control and experimental animals. In determination the effectiveness of the drug were used indicators “clearance-test”, and white mice and experimental infection of guinea pigs.

To assess the effectiveness of preventive parturition during the campaign over two years was treated drug “Imnamak” 183 thousand heads SC in the “H”. In the first year of treatment it was covered only public livestock, while in the second year — both public and agricultural livestock small cattle held by individual owners.

There was a retrospective epidemiological analysis and the analysis of own research results about epidemic situation of brucellosis for 1998–2002 years. Serological screening for brucellosis among the population was conducted by classical serological testing by Hedderson, Wright reactions and passive hemagglutination.

Statistical processing of the results was carried out on the computer IBM PC using the Excel program.

The results of research and its discussion. To study the protective activity of the drug “Imnamak” performed experimental infection of laboratory animals. In “clearance-test” as used experimental model of white mice treated by immunostimulant “Imnamak”.

After 2 days after treatment, all animals were injected intraperitoneally *B.abortus* virulent culture in a volume of 0.5 ml. (100 cells). After 24 hours the mice were sacrificed, the peritoneal cavity was washed with 5 ml of sterile with saline and 0.2 ml. was plated flush to

the Petri dish with the meat-peptone agar. Counting of colonies was performed after 48 hours of incubation at 37°C. The experimental results show ($P < 0.05$) on the activation of the organism's defense mechanisms. The results are shown in Table. 1.

Table 1. – Results of the “clearance-test” on mice

Group	Drug	Dose	Number of animals in the group	Number of colonies in % ($M \pm m$)
1	Imnamak	0.1 mg.	10	21.0 ± 6.4
2	Levamisole	0.5 mg.	10	195.0 ± 41.0*
3	Control	–	10	210.0 ± 38.0*

Note: * — indicators of the significance of differences of the drug levamisole and control to the drug “Imnamak”.

As seen from the table, the number of colonies of microorganisms when administered drug “Imnamak” is 21.0 ± 6.4 ; levamisole — 195.0 ± 41.0 in control group — 210.0 ± 38.0 . It is found that “Imnamak” has a protective efficacy by reducing the number of colonies compared to control by 10 times, and with levamisole — 9.3 times.

To study the ability of “Imnamak” to protect the animals from the experimental infection of guinea pigs (Group 1) was added to the feed preparation “Imnamak”. After 5 days of test and control

groups (2nd) were challenged with virulent culture *B.melitensis* 16M at 10 ID₁₀₀. After 30 days they were opened and parenchymal organs were subjected to bacteriological examination.

The results of the study of protective efficacy “Imnamak” in experimental brucellosis infection of guinea pigs are shown in Table. 2. The experiment found that the use of an immunostimulant “Imnamak” can dramatically reduce ($P < 0.05$) infection (20 times) of guinea pigs with brucellosis, i. e. the drug has a strong protective effect.

Table 2. – The protective effect in guinea pigs infected with the *B. melitensis* 16M

Group	Preparation	Number of animals	Number of animals infected	% ($M \pm m$)
1.	Imnamak	20	1	5.0 ± 4.5*
2.	Control	20	20	100

Note: * — indicators of the significance of differences of the drug «Imnamak» to the control group.

Thus, the drug «Imnamak» provides sufficient protective effect in experimental animals ($P < 0.05$).

Previously we have found that the drug «Imnamak» well tolerated by the animals, does not cause allergenic effects, has no pathological effects on the central nervous system (CNS) and liver, so can be applied to farm animals without limitation [4]. In this connection, further study of the efficacy, we conducted a field on farm animals (in the outbreak of brucellosis goat-sheep species), indirectly assessing the epidemiological situation of brucellosis infection (prophylactic efficacy «Imnamak»).

Zoonothroponotic nature of brucellosis infection causes considerable spread among the employees of livestock farms and meat processing plants. However, the recent brucellosis more (up to 80%) became a registered among the non-professional contingent [5; 6; 7].

We know that for the vast majority of patients with brucellosis, as the source of infection in our country is sick sheep-goat (up to 70–75%), especially in parturition period. It should be stressed that this is especially pronounced in the regions with a developed sheep-Karakul. One of these regions in our country is the area of “H”.

During the past few years, the area “H” was one of dysfunctional brucellosis in Uzbekistan. In the country it was implemented a new system antibrucellar activities, strategic direction which was to neutralize the source of infection. In this case, such a source is a sick with brucellosis small cattle (SC). Scientists of Uzbekistan and Russia had developed a fundamentally new antibrucellar immunizing drug, which for convenience application has been entered in the lickstones. Fed in such way a drug (“Imnamak”) protects the animal from infection and drastically reduces the intensity of the infection process. Such a reduction in the circulation of the pathogen avoids contamination of people in contact with animals. The complexity of this program, taking into account local conditions is minimized. In practice, it consisted in the distribution of the drug “Imnamak” the points of the animals in previous parturition period (1.5–2 months).

Based on small cattle (sheep) physiological needs was calculated in table salt (3–5 grams per day) and the dose of the active

drug, which the sheep ate consumed during the period. In the first year of studies in the area of “H” has been processed by small cattle of the public sector, and in the second — the whole small cattle's of both, the private and public sectors.

Just in previous parturition period campaign has been processed in the first year about 70 thousand small cattle, and the second — 113 thousand small cattle.

The analysis of the epidemic situation has been found that if in the period 1998–2002 the number of cases of people with newly diagnosed brucellosis ranged 17–24 patients per year, in the first year of implementation of the program, this figure fell to 9 cases.

An interesting and somewhat unexpected result was a sharp decline in the number of sick people admitted with recurrent chronic forms of brucellosis. Apparently, superinfection plays an important role in the pathogenesis of chronic brucellosis in hyperendemic foci. By reducing the amount of circulating pathogen causing a superinfection is reduced and the number of exacerbations of chronic disease.

Another interesting indicator of the dynamics of the epidemic process in brucellosis was the causative agent of brucellosis-infected people, which is set based on the results of serological screening population area “H”. If, before the event the number of people reacting positively to tests for brucellosis, was 32.4% in the first year of the partial implementation of activities, this figure fell to 8.2%, with the implementation of measures in full this figure was only 1%. This indicator is most reliably indicates a decline in the epidemic of tension in the region.

Serological screening analysis received in the bacteriological Center of State sanitary-epidemiological surveillance laboratory, allowed to set the amount of change in geometric mean antiorganism titers antibrucellar that is a dynamic characteristic of *Brucella* infection among patients registered in the “H”. For example, in the first year it was a significant decrease in the number of patients with high titers in the Wright reaction and passive hemagglutination, indicating to reducing the intensity of infection in patients.

The results indicate a strong damping of the epidemic process in the “H” and the high efficiency of the activities.

At the same time the part of the veterinary and administrative services area has been a significant economic impact in the livestock sector. For example, as a result of events in the 20–25 % increased safety of young animals increased their weight gain and fatness, and wool clip in the public sector (where, there were activities) increased by 50 % (from 0.8 to 1.2 kg, per head).

Based on the preliminary results it can make number of conclusions:

1. Preparation “Imnamak” has immunostimulatory effects and gives a pronounced protective effect in experimental animals ($P < 0.05$).
2. The proposed method is simple in execution in practice, and well suited to the conditions of the Republic of Uzbekistan.

3. The effectiveness of this method is very high; it can be used in the most disadvantaged regions of the country.
4. The recommended method of epidemiological and environmentally safe, it can be used without any restrictions.
5. Implementation of this method further entails obtaining a positive economic impact for the owners of farm animals.
6. It is appropriate to recognize the application of this method in the form of a comprehensive “Program” in all brucellosis outbreaks with a maximum coverage of events of all livestock small ruminants. It is hoped that this approach will allow for a few (2–3) years, to reduce the incidence of brucellosis in the country to the individual sporadic cases.

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Immunological effectiveness of “Immun-5” in various forms brucellosis

Abstract: Cellular immunity was studied in patients with acute, subacute, primary and secondary chronic forms of brucellosis was studied before and after therapy including domestic preparation “Immune-5” and in healthy persons (as a control group). Effect was not observed in the treatment of acute and subacute brucellosis, but positive immunologic and clinical dynamics was observed in patients with chronic forms of brucellosis.

Keywords: brucellosis, immun-5, T and B lymphocytes, treatment, prevention.

Object of the study to assess the effectiveness of domestic immune stimulator in various forms of brucellosis. A natural product “immun-5” was chosen (production of research and practice firm «Bibinor»). The drug is a balanced mixture of natural active biological substances, activating immune system. A capsule daily for 30 days ius recommended for patients with gastritis, colitis,

hepatitis of various etiologies, gynecological diseases and chronic diseases of the urogenital tract. Prophylactic courses of immuno-5 are recommended twice a year in spring and autumn. In brucellosis the preparation is applied for the first time [1], we suppose that the pathogenic features of brucellosis are corresponded above-mentioned parameters of the properties “immun-5”.

Materials and methods. 86 patients at the age of 19 to 52 years were examined. They were divided into 4 groups: the 1st included 19 patients with acute brucellosis; the 2nd group — 21 patients with subacute brucellosis; the 3rd group — 23 patients with secondary chronic brucellosis; the 4th group — 23 patients with primary chronic brucellosis (n = 23). The control group consisted of 23 clinically healthy subjects (donors) at the age from 20 to 58 years old.

Lymphocytes of peripheral blood were studied by the method of indirect rosettes formation by F.Y. Garib et al. method [3; 4]. Erythrocytes, loaded with monoclonal antibodies to the surface antigens (markers of lymphocytes according to the system CD (Cluster Differentiation) were used as diagnosticum. We used conjugates

of Research Institute of Immunology of the Ministry of Public Health of Russia production (Moscow, "Sorbent"): CD3, CD4, CD8 and CD20 (total pool of T-lymphocytes, T-helpers/inducers, T-cytotoxic cells and B-lymphocytes, respectively). Immunoregulatory index (IRI) (the ratio of CD4/CD8) was calculated. Isolation of lymphocytes from peripheral blood was performed by cells sedimentation by A. Boyum method [2; 5; 6; 7].

Statistical analysis of the results was carried out on the computer IBM PC using the program EXCEL.

Results and discussion. The results obtained in study of cellular immunity parameters in groups of patients with acute and subacute brucellosis are presented in Table 1.

Table 1. – Parameters of cellular immunity factors in healthy persons and patients with brucellosis (before treatment)

Parameters	Groups under examination		
	Healthy (n = 23)	Acute brucellosis (n = 19)	Subacute brucellosis (n = 21)
Leukocytes	7.3 ± 0.6	10.3 ± 1.8*	8.63 ± 2.44
Lymphocytes	29.9 ± 1.5	12.8 ± 1.2*	17.7 ± 7.42
CD 3 ⁺	59.3 ± 2.8	49.95 ± 0.64*	45.24 ± 0.59**
CD 4 ⁺	38.0 ± 2.6	22.37 ± 0.40*	19.62 ± 0.43**
CD 8 ⁺	26.14 ± 0.35	17.58 ± 0.33*	15.62 ± 0.27
Immune regulatory index	1.46 ± 0.03	1.21 ± 0.02	1.22 ± 0.02
CD 20 ⁺	20.26 ± 2.10	15.53 ± 0.14*	15.62 ± 0.11**

Note: * — significant difference between patients with acute brucellosis and healthy individuals; ** — significant difference between patients with subacute brucellosis and healthy individuals.

The table shows, that a number of statistically significant changes were found in patients with acute brucellosis compared with the group clinically healthy individuals (against the background of moderate leukocytosis): decrease in the relative content of total T lymphocytes (CD3⁺) B-lymphocytes (CD20⁺), T cytotoxic (CD8⁺) and helper T (CD 4⁺) subpopulations of T lymphocytes (about 1.2 times). In the analysis of the results obtained in the group of patients with subacute brucellosis, compared with the group clinically healthy persons, against statistically significant lymphopenia increase of immunoregulatory index was

observed: IRI 2.64 in the group of patients compared with 1.9 IRI healthy persons, indicating the imbalance in the composition of immunoregulatory subpopulation of T cells.

Parameters of cellular immunity factors in donors and patients with acute brucellosis after complex therapy are presented in Table 2.

As Table 2 shows, the specific improvement after the treatment with immune-5 in the acute phase of the disease was not observed. A similar phenomenon we observed in patients with subacute brucellosis (Table 3). Apparently, this is due to pathogenic features of the brucellosis course in acute and subacute forms.

Table 2. – Parameters of cellular immunity in patients with acute brucellosis (after treatment with immune-5)

Indicators	Groups under examination		
	Healthy (n = 23)	Patients with acute brucellosis	
		Before treatment	After treatment
Leukocytes	7.3 ± 0.6	10.3 ± 1.8*	9.1 ± 2.6
Lymphocytes	29.9 ± 1.5	12.8 ± 1.2*	16.4 ± 1.2**
CD 3 ⁺	59.3 ± 2.8	49.95 ± 0.64*	46.47 ± 0.41***
CD 4 ⁺	38.0 ± 2.6	22.37 ± 0.40	20.21 ± 0.16
CD 8 ⁺	26.14 ± 0.35	17.58 ± 0.33*	16.32 ± 0.25
IRI	1.46 ± 0.03	1.21 ± 0.02	1.20 ± 0.02
CD 20 ⁺	20.26 ± 2.10	15.53 ± 0.14*	15.89 ± 0.07*

Note: * — significant difference between patients with acute brucellosis before treatment and healthy individual; ** — significant difference in patients after treatment to healthy individuals; *** — significant difference in patients before and after treatment.

Table 3. – Parameters of cellular immunity in health persons and patients with subacute brucellosis (after complex treatment with immun -5)

Indicators	Examined group		
	Healthy (n = 23)	Before treatment	After treatment
1	2	3	4
Leukocytes	7.3 ± 0.6	8.63 ± 2.44*	8.46 ± 2.26
Lymphocytes	29.9 ± 1.5	17.7 ± 7.42*	16.8 ± 7.24**
CD 3 ⁺	59.3 ± 2.8	45.24 ± 0.59*	45.48 ± 0.60***
CD 4 ⁺	38.8 ± 2.6	19.62 ± 0.43	19.62 ± 0.40

1	2	3	4
CD 8 ⁺	26.14 ± 0.35	15.62 ± 0.27*	15.86 ± 0.32
IRI	1.46 ± 0.03	1.22 ± 0.02	1.21 ± 0.02
CD 20 ⁺	20.26 ± 2.10	15.62 ± 0.11*	15.95 ± 0.08*

Note: * — insignificant differences between parameters before treatment and in healthy individuals; ** — insignificant differences between parameters before treatment and in healthy individuals; *** — significant difference in parameters before and after treatment in patients.

In the analysis of lymphocyte phenotype in patients with secondary-chronic brucellosis (table 4) revealed significant changes in the content of white blood cells, lymphocytes (total CD3⁺, CD72⁺). However, the dynamics of such parameters as in helpers/inducers (CD4⁺) and suppressors (CD8⁺) are not significantly differed from control values.

Table 4 also shows the comparative results of the data of the group with primary chronic brucellosis and a group of donors. A number of statistically significant changes was found: an increase of the relative content of total CD3⁺ cells and relative values

of T helper (CD4⁺) lymphocytes, a sharp decline of the number of B-cells (CD20⁺). Statistically significant changes in content of T-suppressor cells immunity have not been identified.

In secondary chronic brucellosis after complex pathogenetic therapy with "immun-5" addition, we noted positive shifts in leukocytosis and lymphopenia to normalization; restoration to normal levels of values of CD3⁺, CD4⁺, CD8⁺, CD20⁺, lymphocytes in comparison with parameters before treatment. Similar results we observed in patients with primary chronic form of the disease (Table. 5, 6).

Table 4. – Parameters of cellular immunity factors in healthy and patients with chronic brucellosis (before treatment)

Parameters	Groups under examination		
	Healthy (n = 23)	Primary chronic (n = 23)	Secondary chronic (n = 23)
Leukocytes	7.3 ± 0.6	7.17 ± 1.02	9.94 ± 0.98***
Lymphocytes	29.9 ± 1.5	26.9 ± 4.0	13.0 ± 1.4***
CD 3 ⁺	59.3 ± 2.8	48.04 ± 0.55*	46.13 ± 0.78***
CD 4 ⁺	38.0 ± 2.6	21.22 ± 0.38*	19.83 ± 0.41***
CD 8 ⁺	26.14 ± 0.35	17.48 ± 0.47	16.48 ± 0.37
IRI	1.46 ± 0.03	1.22 ± 0.02	1.21 ± 0.01
CD 20 ⁺	20.26 ± 2.10	15.52 ± 0.46*	15.65 ± 0.10***

Note: * — significant of differences in parameters of patients with primary chronic form and healthy persons; ** — significant of differences in parameters of patients with secondary chronic form to healthy persons; *** — significant difference in parameters of patients with secondary and primary chronic forms.

Table 5. – Parameters of cellular immunity factors in health and disease is primary chronic brucellosis (after complex treatment with immun-5)

Parameters	Groups under examination		
	Healthy (n = 23)	Before treatment	After treatment
Leukocytes	7.3 ± 0.6	7.17 ± 1.02*	8.16 ± 1.24
Lymphocytes	29.9 ± 1.5	26.9 ± 4.0*	28.4 ± 4.8**
CD 3 ⁺	59.3 ± 2.8	48.04 ± 0.55*	51.09 ± 0.48***
CD 4 ⁺	38.0 ± 2.6	21.22 ± 0.38	23.39 ± 0.30
CD 8 ⁺	26.14 ± 0.35	17.48 ± 0.47*	18.22 ± 0.39
IRI	1.46 ± 0.03	1.22 ± 0.02	1.29 ± 0.03
CD 20 ⁺	20.26 ± 2.10	15.52 ± 0.46*	17.17 ± 0.40*

Note: * — significant differences of parameters in patients before treatment and healthy persons; ** — significant differences of parameters in patients after treatment to healthy persons; *** — significant differences of parameters in patients before and after treatment.

Table 6. – Parameters of cellular immunity in healthy individuals and secondary chronic brucellosis (after complex treatment with immun -5)

Parameters	Groups under examination		
	Healthy individuals	Before treatment	After treatment
Leukocytes	7.3 ± 0.6	9.94 ± 0.98*	8.42 ± 0.8
Lymphocytes	29.9 ± 1.5	13.8 ± 1.4*	26.6 ± 1.6**
CD 3 ⁺	59.6 ± 2.8	46.13 ± 0.78*	49.65 ± 0.46***
CD 4 ⁺	38.0 ± 2.6	19.83 ± 0.41	1.52 ± 0.43
CD 8 ⁺	26.14 ± 0.35	16.48 ± 0.35*	16.48 ± 0.37
IRI	1.46 ± 0.03	1.21 ± 0.01	1.31 ± 0.02
CD 20 ⁺	20.26 ± 2.10	15.65 ± 0.10*	15.65 ± 0.10*

Note: * — significant differences between parameters before treatment and healthy individuals; ** — significant differences between parameters after treatment and healthy individuals; *** — significant differences between parameters before and after treatment.

Thus, use of biological active food additives (activators of the immune system) in acute and subacute forms of brucellosis was ineffective, on the other hand, it resulted in positive dynamics of immunological parameters in patients with chronic (primary and secondary chronic) forms of the disease.

Subpopulations of lymphocytes in patients with various forms of brucellosis disease in an endemic region before and after the standard treatment, in combination with immun-5 were studied. It was found that before treatment significant differences in cellular immunity parameters were obtained. In the acute form a significant reduction of T and B lymphocytes was observed. Most prolonged changes concerned CD3⁺, CD4⁺, CD8⁺, CD20⁺, lymphocytes. We can assume that deep depression of T-cell immunity contributes to development of complications, mainly due to a helper T cells.

The fact that the state of the B-cell immunity is not significantly differed in patients with primary subacute and chronic forms of brucellosis, confirms the viewpoint that the greatest susceptibility of B cells to the action of Brucella toxins compared to other immune cells. This study points to the highest sensitivity of B cells to damaging factors, taking place at the brucellosis infection. However, it is not excluded that the reduction of B cells is mediated by the combined effects of toxins Brucella on the immune system in total.

Conclusions:

1. The use of immune stimulator immun-5 in the complex treatment of acute and subacute brucellosis is inappropriate.
2. Positive immunological effect is observed in immun-5 inclusion in a complex therapy of chronic forms of the disease.

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Evaluating the effectiveness of fructose-1,6-diphosphate in treating of ocular ischemic syndrome

Abstract: The purpose of this study was to evaluate the efficacy and safety of FDP in patients with ocular ischemic syndrome.

Material and methods. The material for this study is based on results of a comprehensive examination and treatment of 53 patients with a diagnosis OIS. The average age of the patients was 57.8 ± 6.82 year. 19 of them women, 34 men. 27 patients entered to the main group (1) which received standard therapy in combination with intravenous FDP (fructose-1,6-bisphosphate). 26 patients in the control group (2) received standard treatment.

Results. In applying the FDP combined with comprehensive therapy in the main group resulted in increased of visual acuity by 32.8%, parameters of retinal sensitivity by 17.8%, reducing the area of scotomas compared with patients of the control group. Optical coherence tomography registered significant changes in the dynamics in patients of the main group — reducing the edema and restoration of RNFL and ONH. Recovery of visual function may have contributed neuroprotective activity of the drug FDP by a protective effect on nerve tissue, reducing the effects of hypoxic stress.

Conclusions. The use of standard therapy in combination with FDP in the treatment of ocular ischemic syndrome has a positive effect on the course of the disease, thereby, increase of visual acuity, a decrease in sectoral loss in vision fields, the positive dynamics OCT parameters, improving hemodynamic parameters at Doppler imaging in dynamics.

Keywords: ocular ischemic syndrome, the treatment of ischemic diseases of the eye, FDP, metabolic therapy of ocular ischemic syndrome.

Introduction

Ocular ischemic syndrome is a rare condition, which is caused by ocular hypoperfusion due to stenosis or occlusion of the common or internal carotid arteries. Atherosclerosis is the major cause of changes in the carotid arteries Kearns & Hollenhorst [4]. OIS occurs

mostly in patients with poor collateral circulation between the internal and external carotid arteries or between the two internal carotid arteries Mendrinos, Machinie & Pournaras [6], Mizener, Podhajsky & Hayreh [7]. Since OIS is associated with atherosclerosis, patients usually have other related co-morbidities. Hypertension is

found in 73 % of the patients and diabetes mellitus in 56 % Sharma & Brown [12]. Myocardial infarction occurs in approximately 4 % of patients with OIS Sharma & Brown [12]. The mortality rate is as high as 40 % within 5 years of onset Sharma & Brown [12]. Cardiovascular disease is the main cause of death (approximately 66 %), followed by stroke as the second leading cause of death Ryan, Hinton & Schachat [11], which is why patients with OIS should be referred to the cardiologist, for imaging studies of the carotid arteries, and to the vascular surgeon Barbara, Terelak-Borys, Katarzyna, Skonieczna, Iwona & Grabska-Liberek [1].

Therefore, during treatment of OIS, to eliminate hypoxic and ischemic processes, and improve metabolic processes should be performed courses of conservative therapy with drugs that improve metabolic processes in the tissues, as well as reduce the hypoxic manifestations in organs and tissues of the eye.

Such drug is the FDP, which is used in cardiology, neurology and pediatric neurology in ischemic processes of organs and tissues (ischemic stroke, myocardial infarction, and others).

Fructose-1,6-diphosphate (FDP) is a key intermediate in anaerobic glycolysis and is the product of the major regulatory enzyme in the pathway (phosphofruktokinase). Preclinical and clinical data suggest that FDP has substantial cytoprotective effects in a variety of ischaemia-reperfusion injury scenarios. Evidence indicates that FDP has a direct effect on ATP pools, reduces ischaemia-induced tissue damage and has positive inotropic effects on heart function. The clinical data suggest that FDP may be a useful drug in a variety of ischaemic and inflammatory clinical settings where acute management of tissue injury is desired Paul J. Marangos, Anthony W. Fox, Bernhard J. Riedel, David Royston & Zofia, E. Dziewanowska [9].

According to the literature, intravenous injection of FDP during cerebral hypoxia and ischemia restores vital energy of brain cells, the ion gradient of neuronal membranes, thereby minimizing damage of the cerebral cells (Karaca, Kilic, Yazici, Demir & Torre [3]). In addition, the "surviving" effect of FDP is also demonstrated in ischemia of the kidneys, small intestine, coronary heart disease, brain disease, as well as with lower limb ischemia Karaca, Kilic, Yazici, Demir & Torre [3], Riedel, Gal, Ellis, Marangos, Fox & Royston [10].

Considering the above we conducted a study, where as an anti-ischemic and neuroprotective drug in patients with ocular ischemic syndrome used FDP.

Purpose

Evaluate the efficacy and safety of fructose-1,6-diphosphate in patients with ocular ischemic syndrome.

Material and methods

The material for this study is based on results of a comprehensive examination and treatment of 53 patients with a diagnosis OIS.

The study was conducted in the Republican Clinical Eye Hospital under the Ministry of Health of the Republic of Uzbekistan (Tashkent) from 2012 to 2014.

The study was conducted with the Declaration of Helsinki, ethical approval of the National Committee of the Republic of Uzbekistan under the Ministry of Health of the Republic of Uzbekistan. Patients are acquainted and signed a written informed consent.

The average age of the patients was 57.8 ± 6.82 year. 19 of them women, 34 men. 27 patients entered to the main group [1] which received standard therapy in combination with intravenous fructose-1,6-bisphosphate (FDP — Medexport, Italy). 26 patients in the control group [2] received standard treatment.

To patients of the main group the drug of FDP was administered intravenously in doses of 5 grams 1 times a day for 7 days. The infusion rate was 10 ml/min. 5 g. of the drug FDP was diluted in

50 ml. sterile applied solvent to obtain 10 % solution. The prepared solution was used once only, the remaining amount after the application had been eliminated. When adverse effects or allergic reactions the drug was discontinued.

Standard treatment consisted of the use of drugs that improve the microcirculation, anticoagulants, antiplatelet agents, neuroprotective agents, as well as drugs stabilizing blood glucose and blood pressure within 3 months.

The criterion for evaluating the effectiveness of therapy was to compare the visual acuity, visual fields, parameters of OCT and hemodynamics in the main vessels of the eye between the two groups.

Safety was evaluated by the number of adverse events during treatment. Adverse events were divided into two groups: a life-threatening events included in group 1, non-threatening in the 2nd group. For life-threatening events attributed conditions leading to disability or death of the patient. To a non-threatening life conditions include: dyspepsia, dizziness, headaches, feeling the tide, pulsation, "tingling" in the limbs, as well as allergic reactions.

The diagnosis OIS was based on the clinical and instrumental investigations and violations of hemodynamic parameters in the internal carotid and ophthalmic arteries, as well as clinical manifestations in the form of anterior ischemic neuropathy, central retinal artery occlusion, ischemic central retinal vein thrombosis and glaucoma. Patients with concomitant diseases of the eye, such as refractive errors, diabetic retinopathy, diseases of the inflammatory genesis of the optic nerve and retina, congenital abnormalities of the optic nerve and retina, as well as patients who underwent surgery on the internal carotid artery is not included in this study.

General examination of patients consisted of complaints, medical history, as well as the measurement of blood pressure, heart rate.

In all patients was performed a comprehensive ophthalmologic examination, including visometry, tonometry, computerized static perimetry, gonioscopy, biomicroscopy, fundus ophthalmoscopy. Special methods of investigation include ultrasound dopplerography of vessels of the organ of vision and the brachiocephalic trunk.

Visometry according to EN ISO 8596 (European standard) conducted on Snellens table (20/200) or Landolt rings. Tonometry was performed by the method of Goldman. Biomicroscopy of the eyeball conducted slit lamp company «Carl Zeiss». Fundus ophthalmoscopy were performed by ophthalmoscope «Heine» and fundus-camera «Carl Zeiss».

Computer static perimetry was performed using the perimeter of Humphrey Field Analyzer 740i (Carl Zeiss Meditec inc.) by programme central threshold test 30–2 and peripheral test 60–4. All results were recorded using a digital marking with the general analysis of indexes MD (mean deviation sensitivity of the retina) and PSD (pattern standard deviation). The distance between the test points was 6.

To estimate the parameters of the optic nerve (optic disk) all patients underwent examination optical coherence tomography (OCT) Cirrus HD — OCT (Zeiss, Spectral Domain Technology). Explored the area of the optic nerve (protocol ONH) and the area of the retina (RNFL).

Ultrasound examination with color Doppler mapping in 3D mode was performed by transpalpebral contact method using multiultrasonic instrument («VOLUSON 730 PROGE»). Doppler of the extracranial and intracranial segments of the main vessels of the brachiocephalic trunk was performed to analyze the state, caliber, patency and hemodynamics at the internal, external and common carotid arteries. In order to visualize blood flow in the ophthalmic artery, central retinal artery and its branches used ophthalmodopplerography.

The studies were conducted in the dynamics: before treatment, after treatment and 3 months after treatment.

All patients were randomized by the method of stratification by diagnosis, age, sex, visual function, and concomitant diseases.

Statistical Methods

We used a variational methods of parametric and nonparametric statistics with the calculation of the arithmetic mean of the studied parameter (M), standard deviation (σ), standard error of the mean (m) and relative values (frequency, %). The statistical significance of the measurements by comparing the mean values was determined by Student's test (t) with the calculation of the probability of error (P) when checking normality of distribution (by the excess) and the equality of the population variance (F — Fisher's exact test). For statistically significant changes have taken level of confidence $P < 0.05$.

Results

According to the study in 12 patients the diagnosis OIS were based on central retinal artery occlusion combined with anterior ischemic optic neuropathy. In 11 patients was observed pseudoexfoliative syndrome in combination with occlusion of the central retinal artery and cataract. In 11 patients central retinal vein thrombosis combined with anterior ischemic neuropathy. In 10 patients occlusion of the central retinal artery developed in conjunction with anterior ischemic neuropathy and open-angle glaucoma. 9 patients had occlusion of the central retinal artery in combination with open-angle glaucoma and cataract. All patients with the above nosologies were evenly divided in the main and control groups for therapeutic measures.

In the main group visual acuity of patients before treatment was 20/340 on average. In the control group the visual acuity of patients before treatment was 20/320 on average.

Ophthalmoscopy of the fundus: optic disk was round shape in 25 (47.16%) patients, oval — in 28 (52.83%) patients, pale — pink in 7 (13.2%) patients, pale — 43 (81.13%) patients, hyperemic — 3 (5.66%) patients.

The boundaries of the optic disc are distinct in 3 (5.66%), indistinct — in 17 (32.07%), were not detected in 33 (62.26%) patients. Papilledema was observed in 45 (84.9%), peripapillary edema in 26 (49.05%) cases. Narrowed artery in 47 (88.67%), normal-caliber veins in 8 (15.09%), the veins are narrowed in 31 (58.49%), expanded in 14 (26.41%) patients. In 23 (43.39%) patients were visualized locuses of hemorrhages. Cotton-like locuses were observed in 17 (32.07%) patients. Spontaneous pulsation of the arteries was observed in 23 (43.39%) patients.

In 47 (88.67%) patients in the OCT before treatment showed an increase in the thickness of the neuroretinal area, high edema ONH and peripapillary zone.

Analysis of the data computed perimetry showed an absolute scotoma in 23 (43.39%), concentric narrowing of the visual field in 21 (39.62%) patients. In the main group the mean deviation of retinal sensitivity (MD) before treatment was — -14.17 ± 1.29 dB ($p < 0.05$), pattern standard deviation (PSD) — 6.24 ± 0.51 dB ($p < 0.05$). In the control group before treatment MD was — -13.93 ± 1.42 dB ($p < 0.05$), PSD — 6.51 ± 0.49 dB ($p < 0.05$).

At Doppler ultrasound of the eyes revealed hemodynamically significant asymmetry of the velocity parameters of blood flow in the central retinal artery in 24 (45.28%) patients, the posterior short ciliary arteries in 28 (52.83%) in the ophthalmic artery in 42 (79.24%) patients. In 47 (88.67%) patients had a decrease in blood flow velocity parameters by ophthalmic artery with signs spasm of the peripheral arterioles.

In these patients the aforementioned changes combined with an increase of resistivity index by the central retinal artery and

posterior short ciliary arteries varying degrees, indicating that the deterioration of the blood supply in the organ of vision.

In the main group before treatment hemodynamic parameters averaged: ophthalmic artery — $V_{max} 36.2 + 2.13$ cm/s, $V_{min} 9.3 + 1.19$ cm/s, $RI 0.42 + 0.017$ ($p < 0.05$); central retinal artery — $V_{max} 8.9 + 0.97$ cm/s, $V_{min} 3.2 + 0.21$ cm/s, $RI 0.43 + 0.021$; posterior short ciliary arteries — $V_{max} 12.4 + 0.78$ cm/s, $V_{min} 5.3 + 0.13$ m/s, $RI 0.47 + 0.071$, while in the control group: ophthalmic artery — $V_{max} 36.7 + 1.91$ cm/s, $V_{min} 10.1 + 1.21$ sm/s, $RI 0.41 + 0.013$; central retinal artery — $V_{max} 9.2 + 0.61$ cm/s, $V_{min} 3.4 + 0.12$ cm/s, $RI 0.4 + 0.053$; posterior short ciliary arteries — $V_{max} 12.1 + 0.81$ cm/s, $V_{min} 5.1 + 0.19$ cm/s, $RI 0.46 + 0.091$.

After the course of the treatment changes in the blood pressure and heart rate were not revealed.

In patients of both groups after treatment was a decrease in edema of the optic disc and peripapillary zones, areas of hemorrhage and cotton-like locuses.

After treatment in the main group visual acuity of patients in the affected eye improved by 32.8% and amounted to 20/60, the intraocular pressure in the normal range. In the control group the visual acuity in the affected eye improved by 9.4%, which was 20/125, intraocular pressure in the normal range.

After treatment in patients of the main group MD and PSD increased by 17.8% and amounted: -9.29 ± 1.182 dB, 3.72 ± 0.176 dB ($p < 0.05$) respectively, while in the control group MD and PSD increased by 9.2% and amounted: -11.18 ± 1.095 dB, 5.38 ± 0.814 dB ($p < 0.05$) (table 1). On the computer perimetry absolute scotoma in dynamics decreased in both groups.

On optical coherence tomography papilledema and peripapillary zone in dynamics decreased in both groups.

After treatment in the main group noted improvement in blood flow in main arteries of eye by 16.57%, after 3 month was 17.95% from the initial level. In the control group hemodynamic parameters in main arteries of eye after treatment was improved by 7.2%, after 3 month 7.4% (tables 1, 2, 3).

In evaluating the safety of the FDP in both groups, adverse events that threaten the patient's life, was not registered. Events that do not threaten the life of the patient in the main group were 12: of these — dyspepsia in 4 patients, headaches in 3, dizziness in 3, feelings the tide in 2. In the control group recorded 13 cases: of these, dyspepsia in 3, headaches in 4, vertigo in 2, feelings the tide in 2, allergic reactions in the form of small rashes in the limbs in 2 patients. This indicate that is not statistically significant incidence of adverse events.

Discussion

Today the OIS is an urgent problem of ophthalmology, despite numerous works on the development of diagnostic and therapeutic measures performed in different countries.

The most frequent clinical manifestations of OIS were combination of anterior ischemic neuropathy, central retinal artery occlusion, ischemic central retinal vein thrombosis and glaucoma. In comparison with literature data the average age of patients was lower than 5.4 years.

In applying the FDP combined with comprehensive therapy in the main group resulted in increased of visual acuity by 32.8%, parameters of retinal sensitivity by 17.8%, reducing the area of scotomas compared with patients of the control group. This is confirmed by computed perimetry. Optical coherence tomography registered significant changes in the dynamics in patients of the main group — reducing the edema and restoration of RNFL and ONH. Recovery of visual function may have contributed neuroprotective activity of the drug FDP by a protective effect on nerve tissue, reducing the effects of hypoxic stress Karaca, Kilic, Yazici, Demir & Torre [3].

Table 1. – Parameters of computed perimetry

Parameters of computed perimetry	Main group			Control group		
	Before treatment	After treatment	After 3 months	Before treatment	After treatment	After 3 months
MD, dB	-14.17 ± 1.293	-10.31 ± 0.957*	-9.29 ± 1.182*	-13.93 ± 1.426	-12.51 ± 1.124*	-11.18 ± 1.095*
PSD, dB	6.24 ± 0.517	4.94 ± 0.1381*	3.72 ± 0.176*	6.51 ± 0.492	6.02 ± 0.131*	5.38 ± 0.814*

Table 2. – Hemodynamic parameters in ophthalmic artery

Hemodynamic parameters in ophthalmic artery	Main group			Control group		
	Before treatment	After treatment	After 3 months	Before treatment	After treatment	After 3 months
V _{max} , cm/s	36.2 ± 1.19	42.2 ± 1.13*	42.7 ± 1.17*	36.7 ± 1.91	39.3 ± 1.97*	39.7 ± 2.13*
V _{min} , cm/s	10.9 ± 1.12	10.3 ± 1.21*	9.4 ± 1.13*	10.1 ± 1.21	9.8 ± 1.29*	9.5 ± 1.37*
RI	0.42 ± 0.017	0.51 ± 0.013*	0.57 ± 0.021*	0.41 ± 0.013	0.44 ± 0.019*	0.44 ± 0.021*

Table 3. – Hemodynamic parameters in central retinal artery

Hemodynamic parameters in central retinal artery	Main group			Control group		
	Before treatment	After treatment	After 3 months	Before treatment	After treatment	After 3 months
V _{max} , cm/s	8.9 ± 0.97	10.7 ± 0.95*	11.6 ± 0.96*	9.2 ± 0.61	9.7 ± 0.74*	9.9 ± 0.47*
V _{min} , cm/s	3.2 ± 0.21	4.81 ± 0.19*	4.97 ± 0.217*	3.4 ± 0.12	3.9 ± 0.21*	3.9 ± 0.59*
RI	0.43 ± 0.021	0.49 ± 0.019*	0.53 ± 0.020*	0.41 ± 0.071	0.46 ± 0.031*	0.47 ± 0.071*

Table 4. – Hemodynamic parameters in posterior short ciliary arteries

Hemodynamic parameters in posterior short ciliary arteries	Main group			Control group		
	Before treatment	After treatment	After 3 months	Before treatment	After treatment	After 3 months
V _{max} , cm/s	12.4 ± 0.78	13.3 ± 0.91*	14.2 ± 0.87*	12.1 ± 0.81	12.8 ± 0.78*	12.9 ± 0.97*
V _{min} , cm/s	5.3 ± 0.13	5.5 ± 0.11*	5.5 ± 0.17*	5.1 ± 0.19	5.3 ± 0.13*	5.3 ± 0.27*
RI	0.47 ± 0.071	0.51 ± 0.078*	0.56 ± 0.051*	0.46 ± 0.091	0.49 ± 0.078*	0.48 ± 0.081*

Note: *— Statistically significant changes are level of confidence $P < 0.05$.

Were registered hemodynamic improvement by 17.95% in the main vessels of eye in patients of the main group, which corresponded to the literature data Cacioli, Clivati, Pelosi, Megevand & Galeone [2].

Odero, Kunkl, Cugnasca, De Amicis & Marchetti [8]; Marchezani, Valerio, Dardes, Viglianti & Sanguinetti [5], also showed a significant recovery of peripheral haemocirculation in patients with lower limb ischemia, improvement of respiratory function in the treatment of malnourished patients with chronic obstructive bronchitis of lung, especially in strengthening the respiratory muscles.

Should be noted that when using this drug in patients of the main group side effects such as changes in blood pressure and heart rate were not detected. In the works of Angel K. et al. 1997, noted anti-ischemic effect FDP without increasing blood pressure and heart rate, because the drug reduced the need for oxygen in ischemic tissues. FDP has been reported as the safe and effective drug Marchezani, Valerio, Dardes, Viglianti & Sanguinetti [5].

Considering the improvement of visual function and hemodynamic parameters in the main vessels of the eye in patients of the main group, as well as statistically insignificant indicators of adverse events in both groups, it may be noted about the safety and efficacy of the drug FDP.

Conclusions

1. The use of standard therapy in combination with FDP in the treatment of ocular ischemic syndrome has a positive effect on the course of the disease, thereby, increase of visual acuity, a decrease in sectoral loss in vision fields, the positive dynamics OCT parameters, improving hemodynamic parameters at Doppler imaging in dynamics.
2. Application FDP in patients with OIS is safe because, in patients of the main group were not recorded statistically significant indicators of adverse events and violations of the blood pressure and heart rate.

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Abdominal typhoid in Uzbekistan (forty year-long observations)

Abstract: Retrospective and prospective studies on the nature of the causative agent of typhoid, clinical presentation and outcome of the disease in the dynamics of a 40 year follow-up (1970–2010 years).

Clinical analysis of case histories of patients with typhoid held for the periods 1979 – 193 patients, 1997 – 61 patients, 2002 – 102 patients and for the period 2007–2010, 112 patients with typhoid fever. Also analyzed hospital records and the results of follow-up for typhoid carriers: 138 carriers in 1973 –1979 years, 52 — bacillicarriers in 1997–2002, and 70 persons in 2003–2010.

It was found that typhoid in Uzbekistan has undergone significant changes in 40 years, which showed an increase in the proportion of cases among children, in the prevalence of antibiotic-resistant pathogens of typhoid, in this regard — weighting of the clinical course of the disease, increasing the formation of acute and chronic bacterial carriage.

During the formation of the various outcomes of typhoid was the most essential dynamics of indicators such as erythrocyte sedimentation rate, immunoregulatory index, the level of antigen-binding lymphocytes, sensitized regarding the specific antigen *S. typhi*.

Keywords: typhoid, resistance to antibiotics, bacteria carriage.

Despite general decrease of typhoid morbidity, this rate in the Republic of Uzbekistan amounts to 0.3–0.2 per 100 000 of population per year [4]. As is known, in nowadays typhoid has been undergone substantial changes. This is the development of *S. Typhi* resistance to the most of commonly used antibiotics (including chloramphenicol) with both chromosome and plasmid strains resistance [1; 5]. Such factors as susceptibility of population to typhoid, alteration of the disease clinical course, increase of incidence of *Salmonella typhi* carriage are also of importance [3; 7].

The recent literature cites numerous data on various aspects of typhoid (etiology, epidemiology, diagnosis, pathogenesis, clinical course and etc.), but to date there had been no extended analysis of typhoid at the present stage in comparison with that of 30–40 years ago. Available publications reflect inadequate or not fully illuminate the nature of the clinical changes in typhoid as compared to the current and the manifestation of the disease in the past years. This was the subject of the present study.

Object of the study: to analyse dynamic development of typhoid and its outcomes in Uzbekistan for forty-year period.

Materials, methods and volume of study. We conducted a retrospective and prospective studies on the temper of the causative agent of typhoid, clinical course and outcomes of the disease in dynamics was carried out for forty-year period, taking into account the properties of *S. typhi* (1970–2010).

Case histories, outpatient's cards of patients with typhoid and convalescents from 1973 up to 2010 were analysed, as well as statistic reports of the Department of State Center of Sanitary and Epidemiological Surveillance for 1970–2010. 193 case histories for 1979, 61 — for 1997, 102 — for 2002 and 112 case histories for 2007–2010 were analysed. Diagnosis of typhoid was based on clinical data, results of bacteriological and/or serological (Vidal reaction, ELISA, etc) examination. Bacteriological examination was carried out by standard methods at bacteriological laboratories at the places of study (Samarkand region, Samarkand city, Kashka-Darya region, Tashkent city) and at microbiological department of Research Institute of epidemiology, microbiology and infectious diseases of the Ministry of Health of the Republic of Uzbekistan.

Detection of antigen-binding lymphocytes (ABL) to *S. typhi* antigen was carried out by the method of Garib F. Yu. et al. (1995) [2].

T-lymphocytes and T-subsets for estimation of immunoregulatory index (II) were detected by the method of Novikov D. K. et al. in 2000 [6].

Outpatient's cards and results of dispensary observation of *S. typhi* carriers were analyzed: 138 individuals in 1973–1979, 52 in 1997–2002 and 70 carriers in 2003–2010.

Statistical analyses were performed using programs “Excel” and R-project.

Results and discussion

The first stage of study was analysis of the temper of the causative agent of typhoid to laevomycetinum (chloramphenicol), especially *S. typhi* susceptibility. It was established, that at the period 1970–1995 most cases of typhoid were caused by laevomycetinum susceptible strains of causative agent but since the end of the nineties up to the present constant increase of the number of laevomycetinum resistant *S. typhi* strains was observed (fig. 2).

Development of *S. typhi* resistance to laevomycetinum followed by more frequency and duration of clinical symptoms of the disease, more frequent complications and forming of acute and chronic carriage of *S. typhi*.

Significant changes were observed in population by typhoid morbidity. If in the seventies individuals at the age 15–45 dominated (94.8%) and children amounted to only 3.7%, at the end of the 20th century children rate became 10 times as high as before: 37.7% of total number of the patients with typhoid ($P < 0.05$)

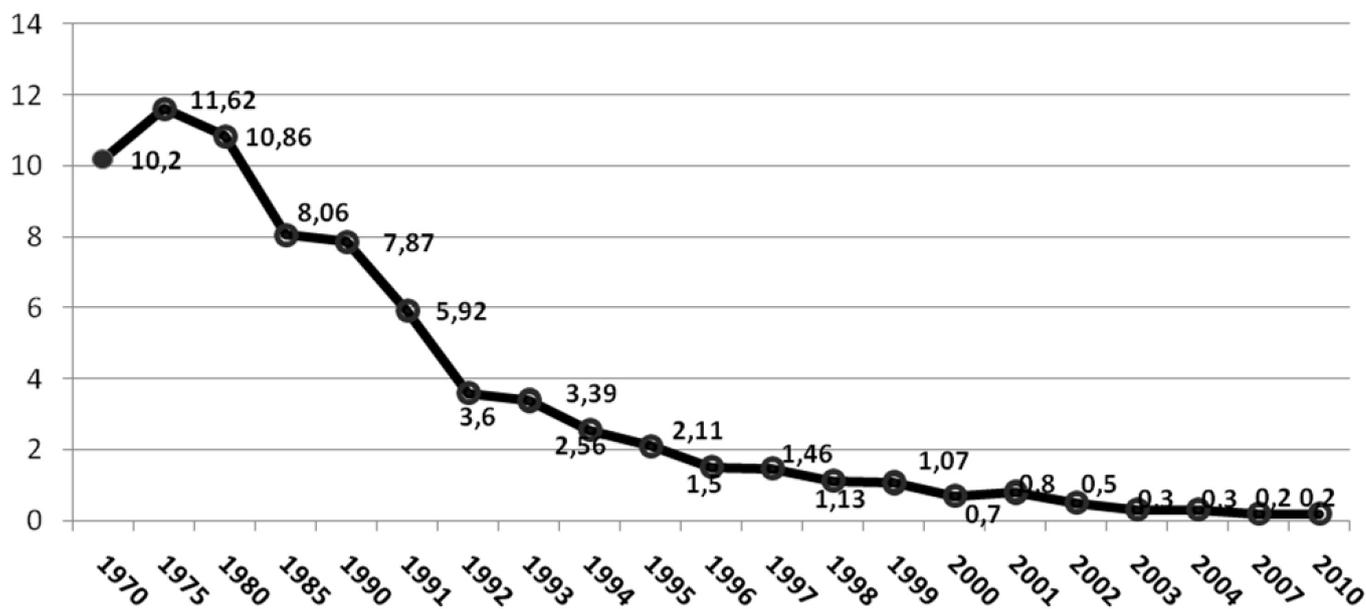


Fig. 1. – Typhoid – intensive rate in Uzbekistan for 40 years (%)

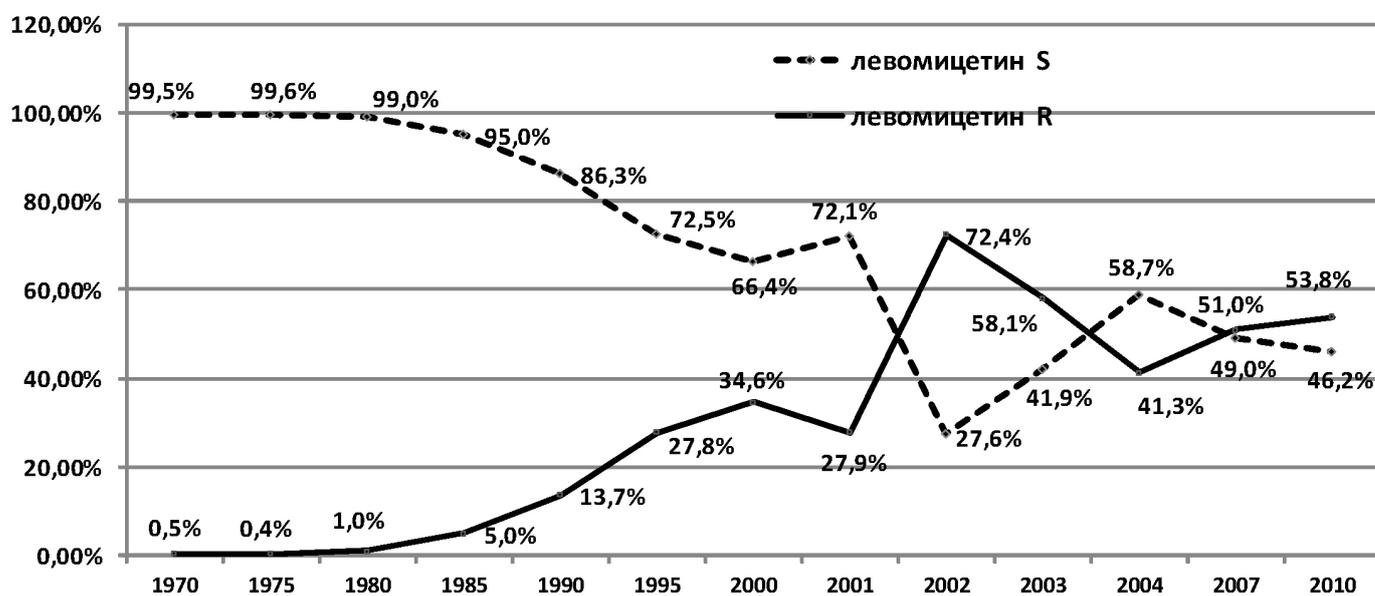


Fig. 2. – Dynamics of frequency laevomycetinum susceptible (S) and laevomycetinum resistant (R) *S. typhi* strains isolated from patients in Uzbekistan for 40 years

Irrespective of the mode of transmission (via contaminated water or food) at present typhoid is characterized by a severe course with gradual onset of the disease. So, if typhoid in 1979, out of patients in 15.0% revealed a mild form of the disease, 57.0% — medium and only 28.0% were observed severe course of the disease, the patients with typhoid caused by antibiotic resistant strains *S. typhi* (61 patients, examined in 1997) mild forms of the disease is not detected, in 62.3% of cases was recorded moderate form, and in 37.7% of cases develop severe for typhoid. In 2002, 102 patients with typhoid were examined.

Mild, medium and severe course of the disease were observed in 5.9%, 39.2% and 54.9% of the cases respectively; severe course rate was 2 times as high as in 1979 and 1.5 times as high as in 1997.

Comparative analysis of clinical symptoms of typhoid at present, as 40 years ago demonstrated similar picture: domination of intoxication syndrome, dyspepsia, violation of stool, indefinite form fevers, and neurologic symptoms with development of typhoid state depending on the disease severity. It was also found, that frequency of typhoid recurrences didn't depend on properties of the causative

agent, mode of transmission and severity of clinical course, but was connected with adequacy and length of etiotropic therapy and presence of inter-current diseases. Frequency of typhoid recurrences was similar in the groups under study (patients in 1979, 1997 and 2002) and varied from 7.8% to 11.5% ($P > 0.05$).

The next stage of the study was analyzing of frequency of acute and chronic bacteria carriage forming in patients with typhoid.

Until recently bacteria carriage forming was observed in 5–6% of patients with typhoid of Uzbek population, caused by laevomyecetinum susceptible strains (fig. 3).

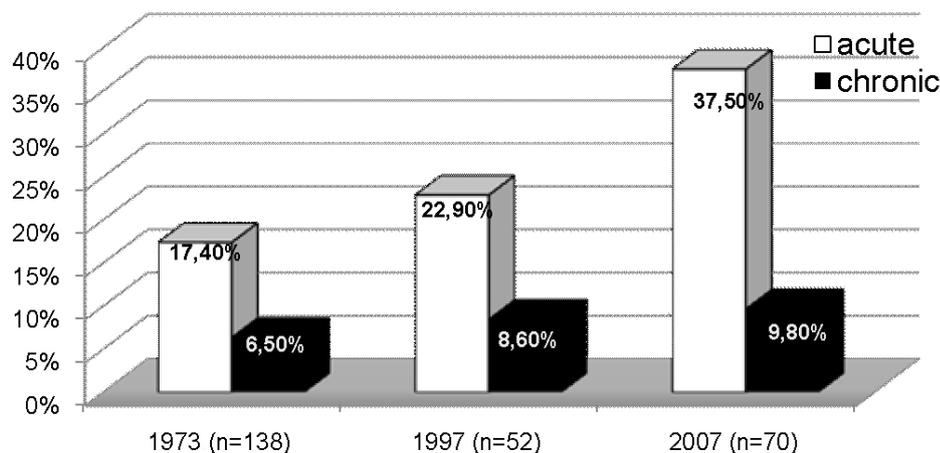


Fig. 3. Frequency of bacteria carriage forming (acute and chronic) in patients of compared groups

Increase of typhoid cases polyresistant to antibiotics follows by 1.5–2 fold increase in cases of acute and chronic bacteria carriage.

Thus a high frequency of acute and chronic bacteria carriage forming is one of the peculiarities of outcome of current typhoid.

It gave occasion to analyze frequency of bacteria carriage forming in patients with laevomyecetinum susceptible typhoid in 1973–1979 and in patients with laevomyecetinum resistant typhoid in 2007. It was established that acute and chronic bacteria carriage forming in these periods amounted to 17.4% and 6.5% and 37.5% and 9.8% respectively, so the number of acute bacteria carriage in typhoid cases caused laevomyecetinum susceptible strains was significantly higher than in typhoid caused by laevomyecetinum resistant strains.

Analysis of a number of clinical, immunological and cytochemical indices allowed to single out some of them with prognostic value for bacteria carriage forming. There were ESR, II (ratio of CD4/CD8 T-lymphocytes) and amount of antigen-binding lymphocytes, sensitizing to *S. typhi* antigen. Patients with bacteria carriage forming had higher values of ESR at the period of early convalescence (2 times and more as high as the norm). ESR of the patients with outcome in recovery amounted to 30–40 mm/hour at the height of the disease, at the period of early convalescence ESR decreased to 1.5–2 times as high as the norm and to the moment of discharge from the hospital ESR was within normal range. In patients with bacteria carriage forming a high level of ESP (20–25 mm/hour) persisted after temperature normalization.

An expressed immunosuppression was observed at the early stage of the disease in patients with bacteria carriage forming and helper response prevailed at the period of convalescence. It manifested in dynamics of II: in cyclic course of AT with outcome in

convalescence at the initial stage II gradually increased, achieving maximal value (1.8–2.0), at the stage of symptoms relief it decreased to 1.2–1.3 at the period of convalescence II increased to 1.4, approaching the normal value.

In the group of patients with acute and chronic bacteria carriage forming II increased at the initial of the disease, and it sharply decreased to 1.2–1.3 at the height of the disease with subsequent enhancement at the stage of symptoms relief and remained increased at the late stage of convalescence.

The next stage of our study was analysis of changes in content of antigen-binding lymphocytes (ABL), sensitizing to *S. typhi* antigen. In patients with bacteria carriage forming increase of ABL amount was insignificant, but at the stage of late convalescence a considerable increase of this index was observed, unlike the patients with disease outcome in convalescence characterizing by decrease of this index at the stage of late convalescence (it exceeds values in control group insignificantly).

Conclusion

Thus typhoid in Uzbekistan has undergone substantial changes for last 40 years: enlargement of children proportion in the morbidity structure, more severe course of the disease, domination of antibiotic resistant strains, increase of cases of acute and chronic bacteria carriage.

In the process of forming typhoid outcomes (convalescence or *S. typhi* carriage) dynamics of the following indices is of great importance: ESR, II, level of antigen-binding lymphocytes, specifically sensitizing to *S. typhi* antigen. At present abdominal typhoid is characterized by significant distinctions from the course of the disease 40 years ago and it requires a serious revise of tactics of patient's management.

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Antigen-binding lymphocytes for diagnosis organopathology in brucellosis

Abstract: The essential diagnostic method for determining the value of lymphocyte antigen to tissue antigens is its high sensitivity and specificity: ASL content reaches diagnostic levels in the early stages and creates the possibility of preventive treatment of organ damage in brucellosis.

Keywords: brucellosis, antigenbinding lymphocytes, tissue antigens, organopathology.

Brucellosis — a contagious, anthroponotic disease characterized by severe, often chronic course, the possibility of the propagation of the epidemic spread and classified as particularly dangerous infections. The diagnosis of brucellosis is set in the presence of clinical manifestations, epidemiological assumptions, confirmed by laboratory studies [3; 7; 8; 11].

Brucellas are characterized by a high capacity for invasion and intracellular parasitism. When the destruction of their, its released endotoxin. Brucella penetrates through the skin or mucous membranes and lymphatic enter the lymph nodes, where they can be stored for a long time and lead to a restructuring of the body's immune. In most cases, the immune response does not provide sanitation of the organism from the pathogen. Brucella long remain in metastatic lesions from which the re-repeated dissemination of the pathogen in the body with the development of reactive changes and chronic allergic process. It is possible resorption of inflammatory formations or formations persistent irreversible scarring of the affected organs and tissues. The main pathogenetic changes during brucellosis reduced to a non-specific inflammatory and degenerative processes in organs and tissues, hyperergic reaction, cirrhotic changes in organs and tissues [3; 7; 11].

The causative agent of brucellosis, having a high infectivity, causes changes in almost all organs and tissues. First of all, it is the nervous, lymphatic, cardiovascular system and connective tissue [1; 2; 9; 10; 12; 13; 14].

Pathological changes in the brucellosis are found in many organs. In the acute stage in parenchymatous organs found serous inflammation with the subsequent development of degenerative processes. It is develop infectious-reactive reticuloendotheliosis, panangiitis. The defeat of vessels is the morphological substrate organopathology

when brucellosis. In the lymph nodes, liver and other parenchymal organs observed hyperplasia of reticular cells [2; 3; 10].

In the sub-acute stage of the disease are detected productive inflammatory processes, combined with degenerative processes and changes in infectious-allergic. In chronic brucellosis is prevail proliferative and inflammatory changes of granulomatous character with the formation of granulomas. In the thick connective tissue accumulates a significant amount of serous fluid, there is a loosening and destruction of the fibrous substance. Inflammation completed development of sclerotic tissue. The allergic nature of the systemic nature of the inflammation causes morphopathogenic changes.

However, it should be noted that clinically significant signs of organ damage are rare. At the same time, it is necessary to take into account the possibility of “masking” of clinical symptoms other manifestations of disease, typical for brucellosis as neurological and bone and joint pain [1].

The overwhelming number of patients (up to 80%) increased liver and spleen. In the acute phase may develop specific focal pneumonia, bronchitis sometimes brucellosis.

The defeat of the urinary organs manifests moderate albuminuria, microscopic haematuria, the advent of single cylinders, renal epithelial cells. Rarely develop glomerulonephritis, sometimes with nephrotic component.

In subacute form of brucellosis (suspended after 3 months from the beginning of the disease) in addition to the symptoms of intoxication detected focal lesions in the form of arthritis, neuritis, plexitis and ets.

Conventionally, after 6 months from the onset of the disease is considered chronic brucellosis. For chronic brucellosis is

characterized by involvement in the pathological process of new organs and systems. In the clinical symptoms is predominate expressed focal lesions and effects of intoxication on the back burner. Temperature usually normal or low-grade, low-grade fever is sometimes installed thrust. It is typically relapsing course of the disease.

With the advent of focal changes in locomotor apparatus and nervous system of patients with the condition worsens. Prevalent lesions of the locomotor apparatus, manifested in a variety of combinations manifested in various combinations, i. e. the defeat of bones and joints, muscles and ligamentous apparatus. On palpation of the body found painful compaction, fibrositis and cellulite (nodules or cords). Patients complain of myalgia, arthralgia. The pains are transient "volatile" nature. If brucellosis it affects not only large joints (shoulder, elbow, hip, knee and ankle), but small one. Brucellosis arthritis is prolonged for months. As a result of chronic inflammation of the joints configuration change is limited to their function. Subsequently, developing ankylosis, contractures, muscles atrophy. It is frequent bursitis, tenosynovitis. The bone X-ray examination revealed arthrosis arthritis, osteoporosis areas, narrowing of joint cracks, and hardening. Characterized by pain, stiffness and limitation of motion, deformation (spondylosis) of the various parts of the spine [3].

The defeat of the genital organs: orchitis, epididymitis lead to a decrease in sexual function and impotence. Women may develop mastitis, salpingitis, oophoritis, metritis, endometritis, which lead to amenorrhea, dysmenorrhea, spontaneous abortions, infertility [3; 8; 9].

In a number of infectious diseases, including brucellosis and, established involvement in the pathological process of the cardiovascular system [12; 13].

With the defeat of different genesis of a body or in its cells are a violation of intracellular processes and the development of dystrophy. Increasing the degree of dystrophy causes destruction and necrosis of cells. Enter into the internal environment of the molecule or fragments of structural and functional proteins with organ specificity. Tissue proteins and molecules, "alien" to the internal environment, acquire the status of tissue antigens (TA) started an immune reaction aimed at their neutralization and elimination. In the presence of TA in the internal environment of an organ differentiated and circulate in the blood lymphocyte antigen (BLA) capable of specifically binding to TA only of the body. The level of BLA to the TA reflects the intensity of destruction and necrosis of structures in the body: the increase in the dynamics of ABL indicates an increase and a decrease in BLA — on the fading intensity of these processes, which allows us to estimate the extent of organ involvement, as well as the effectiveness of the therapy [4; 5].

The method for determining the value of ABL to TA is its high sensitivity and specificity: the content of ABL to TA reaches diagnostic levels in the early stages and long before the appearance of clinical signs of the body, which creates the possibility of early prediction of the risk of organ failure. Setting response ABL to TA several organs can detect multiple organ destruction of the body in the development of pathology.

The purpose of this study was to evaluate the importance of indicators ABL to TA various organs to identify the degree of destruction of brain tissue, liver, kidney, joint capsule, endometrial and ovarian in acute, subacute and chronic forms of brucellosis.

In patients with brucellosis multiple organ defeat may have the most diverse range. Therefore, for a comprehensive treatment, including causal treatment and therapy aimed at relief of the pathological process in the affected organs, it is necessary for each individual patient to determine the nature multiple organ defeat. To assess multiple organ defeat the most informative and promising is the

determination of blood lymphocyte antigen (BLA) specifically sensitized with respect to specifically sensitized with respect to tissue antigens (TA) of organs [4; 5].

The principle of the method to determine the BLA to TA is as follows. Sensitized lymphocytes patient tissue antigen specifically binds their surface receptors. The used human erythrocytes of blood group O (1), on which the membrane using 3.0% solution of CrCl_3 loaded with tissue antigens, derived from tissue of human organs. Incubation of lymphocytes suspension of the subject with red blood cells loaded with TA, the formation of rosettes, consisting of centrally located lymphocyte and red blood attached there to TA erythrocytes on the membrane. Under the microscope with an immersion lens is made counting the percentage of rosette-lymphocytes to the total pool of lymphocytes [4].

To account for the interaction of nonspecific lymphocyte antigen reaction is carried out parallel to the rosette with red blood cells loaded with human serum albumin. To determine the multiple organs lesions determined the level of antigen-binding lymphocytes specifically sensitized to the antigens of the tissue of the brain, liver, kidney, shells joint bags in all patients, ovary, endometrium and myometrium in women.

The results of the study showed that patients with acute brucellosis most common pathological process were exposed to liver tissue (100% of patients), and the joint capsule (at 96.7% of sick). The average degree of increase the ABL to TA liver was $5.14 \pm 0.16\%$, rising to a maximum of 9%. The average degree of increase the TA to BLA shells joint capsule was $4.60 \pm 0.15\%$, rising as much as possible, in some cases up to 10%. Deviations higher than normal levels was also observed in terms of BLA to TA kidneys in 75.6% of patients, with an average of $3.82 \pm 0.11\%$, the level of the maximum values in up to 7%. In 53.3% of patients it was showed improvement of ABL to brain TA, with an average of $3.75 \pm 0.16\%$, reaching in some patients up to 6% (Table 1).

In subacute brucellosis in 100% of patients have elevated levels of ABL to liver TA an average of $5.23 \pm 0.26\%$ and the BLA to the TA joint capsule shells to $5.00 \pm 0.21\%$, ranging from 3 to 8%, at 65.7% of the patients showed an increase in BLA to brain TA an average of $3.03 \pm 0.24\%$ and 48.6% of patients improving to ABL to kidney TA an average of $2.97 \pm 0.23\%$, the maximum values were 6–7% (Tab. 1).

Analysis of the results to the BLA parameters studied TA of the secondary-chronic brucellosis found that the increase in performance BLA specifically sensitized to the TA of the liver was observed in 86.4% of patients, kidneys in 60.6%, and in 34.8% of patients to the brain TA and in 100% of patients in the joint capsule TA shells, respectively, with an average of $4.37 \pm 0.19\%$, $3.80 \pm 0.14\%$, $4.00 \pm 0.17\%$ and $4.83 \pm 0.12\%$. The maximum values of ABL to the joint capsule TA of the liver is 7%, and the kidneys and the brain of 6%, whereas in acute brucellosis they rise to 9–10% (Table 1).

Frequent manifestations of infection are a syndrome of general intoxication and fever, accompanied by functional (transient) impaired kidney and liver. Febrile body temperature can lead to violations of water-electrolyte metabolism, which also affects the kidney function [1]. This apparently explains the more frequent liver, kidneys and brain in acute brucellosis compared with secondary chronic form of the disease.

In acute and chronic secondary we studied as indicators of BLA to TA ovary, endometrium and myometrium (Table 1). Comparative analysis of the results showed a significant increase in all indicators in the norm ($3.35 \pm 0.34\%$, $2.29 \pm 0.19\%$ and $1.71 \pm 0.19\%$, respectively in acute; $0.20\% \pm 4.47$, $2.73 \pm 0.08\%$ and $2.07 \pm 0.03\%$ respectively, with a secondary-chronic; in healthy women, the figures were respectively $2.32 \pm 0.13\%$, $1.74 \pm 0.15\%$ and $1.37 \pm 0.11\%$.

Table 1. – Lymphocyte antigen display in various forms to treat brucellosis

ABL to TAF	Norm n = 23	Brucellosis		
		Acute n = 90	Under acute n = 35	Secondary chronic n = 66
Brain	2.26 ± 0.13	3.75 ± 0.16*	3.91 ± 0.18*	4.00 ± 0.17
Liver	1.64 ± 0.13	5.14 ± 0.16*	5.23 ± 0.26*	4.37 ± 0.19*,**
Kidney	1.93 ± 0.13	3.82 ± 0.11*	4.06 ± 0.28*	3.80 ± 0.14*
Joint capsule	2.04 ± 0.21	4.60 ± 0.15*	5.00 ± 0.21*	4.75 ± 0.30*
	n = 19	n = 17		n = 15
Ovary	2.32 ± 0.13	3.35 ± 0.34*	–	4.47 ± 0.20*,**
Endometritis	1.74 ± 0.15	2.29 ± 0.19*	–	2.73 ± 0.08*,**
Myometrium	1.37 ± 0.11	2.07 ± 0.03*	–	2.07 ± 0.03*

Note: * — $P < 0.05$ with respect to the accuracy of performance standards; ** — $P < 0.05$ with respect to the accuracy of the indicators of the acute form.

Comparative analysis between the studied forms of brucellosis showed significantly higher values in ABL to TA ovarian and endometrial secondary chronic brucellosis. Based on what we can assume that in chronic processes occur deeper destructive changes in these

organs. So BLA performance to allow the TA of different organs to evaluate the nature, frequency and degree of involvement of various organs in the disease process when brucellosis, allowing clinicians to spend in addition to causal treatment Organotropic specific therapy.

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Colposcopic features of cervical mucus associated with certain urogenital infections

Abstract: There conducted a colposcopy study of women in sexually transmitted infections and reproductive health department of RSPMC D and V and identified certain changes in the cervical mucus which had the combination of ureaplasma, chlamydia and HPV, characterized by atypical colposcopic picture.

Keywords: sexually transmitted infections, colposcopy, cervix of uteri.

Background

Today cervical pathology is an urgent problem. Much attention is attracted women of peri — and postmenopausal age with background and precancerous diseases, since they are at increased risk of developing cervical cancer (CC). Cervical cancer is extremely common problem and is leading in the structure of cancer incidence and mortality, and is one of the important health and social problems in the developed countries [1; 3; 4].

At present, the importance is attached to the mixed Chlamydia — and Mycoplasma-viral infections. Given chlamydia tropism to columnar epithelium, the primary lesion in women is a cervical mucosa in which the pathogens can persist for months or even years, causing a variety of pathological changes. The frequency of cervical lesions in urogenital chlamydiosis is 49–53 %, and according to some sources up to 93 %. The most common manifestation of urogenital chlamydial infections is cervicitis, the development of which is often accompanied by desquamation of stratified squamous epithelium of the cervix to form a true or pseudo-erosion. There was a direct correlation of chlamydial infection of cervix uteri with the presence of histiocytes, lymphocytes, and an unidentified short bacteria stained by Papanicolaou in the scraping preparations [3; 5; 6].

Currently, colposcopy is one of the informative clinical and endoscopic methods for the study of pathological processes in the cervix uteri that allows to estimate the prevalence of lesions and identify their location on the border of flat and cylindrical epithelium, which can not be done in the ordinary examination. In assessing the colposcopic presentation it is used international colposcopic terminology adopted at the World Congress of Pathology and Colposcopy of cervix uteri in Rome in 1990: normal colposcopic presentation, original squamous epithelium, columnar epithelium, normal zone transformation, abnormal colposcopic patterns [2; 4].

Aim

Identify colposcopic features of cervical epithelium associated with a variety of STIs.

Materials and Methods

We examined 70 patients with different STIs in STI and RH department of RSSPMC D and V over the period from 2015 to 2016. Complaints of patients were discharges from the genital tract of various kinds, underbelly pains, itching, burning. Screening for sexually transmitted infections was made by PCR diagnosis and bacteriological studies of separated genitals. It was performed extended colposcopy in stages: first, the cervix was purified from discharge with cotton swab, then, surface was lubricated with diluted acetic acid solution and then, cervical uteri was treated with Lugol's solution (Schiller test) to determine the status of cervical epithelium and the localization of the pathological focus.

Results

Of 70 studied patients, in 35 were found *Ur.urealyticum*, in 15 *Chl. trachomatis*, in 7 HPV type 16/18, in the rest of 13 patients STIs was no detected.

Complaints of patients were: mucopurulent discharges in 50 % of patients, in 40 % of patients — underbelly aches, in 40 % of patients — itching and burning, When viewed with the naked eye, all patients visually presented endocervicitis, cervical ectopia. All women underwent colposcopy study. Thus, 60 % of studied patients presented ectopia of the cervix, which seemed mucosal site, devoid of epithelium with distinct protruding edges; the bottom is uneven, rough, bright red in color, sometimes with loose necrotic overlays. When performing extended colposcopy in women without STIs after processing of cervical mucosa with 3 % acetic acid solution colposcopic pattern showed incomplete metaplasia

of stratified squamous epithelium in 100 % of women. When applied Lugol's solution on cervical portion, devoid of epithelium, there followed the phenomena of iodine negative zone (pathological lesions of modified keratinized epithelium) in 30 % of women who had unstable nature, punctuation phenomenon (atypical epithelium with fine mottle, presenting atypical vascular loop), of mosaic (foci above the surrounding tissue, resembles a mesh marbling, is often found on the periphery of transformation zone which presents branched stromal papilla with vessels inside) was not observed. Women with combined chlamydial infection, while extended colposcopy, presented normal transformation zone in 50 % of women, iodine negative zone in 70 % of women, acetowhite epithelium in 50 % of women, punctuation phenomenon, mosaics and atypical vessels were absent. The same results were followed in women with ureaplasma infection. About 20 % of studied patients were colposcopically diagnosed cervical leukoplakia which had the appearance of white spot or thin dense plaque strongly associated with the underlying tissue while normal colposcopy and did not disappear after drying cervical mucosa with swab. Extended colposcopy for women without STIs in the spots identified horny overlay with rough, scaly or folded surface — the base of leukoplakia. 90 % of women were detected iodine negative zone, 50 % of women — punctuation phenomenon and mosaics, 90 % of women — unstable acetowhite epithelium. Women with leukoplakia coupled with chlamydia presented iodine negative zone and acetowhite epithelium of resistant nature in 100 % of women, in 80 % — punctuation, in 70 % — delicate mosaic, women with ureaplasmosis presented the same patterns. Women with leukoplakia coupled ureaplasmosis and chlamydia with HPV were observed iodine negative zone and stable acetowhite epithelium, coarse mosaic phenomenon and punctuation in all women. Colposcopy, in 10 % of surveyed patients were diagnosed cervical dysplasia, that was characterized on the background of whitish or erythematous areas by defining areas of leukoplakia and its varieties, erythroplakia, iodine negative zones in 60 %, and margins of stable acetowhite epithelium, rising above the mucosal level with keratinization of glands and vascular atypia were observed in 50 % of women. Coarse punctuation was observed in 60 % and mosaic in 55 % of women. The most suspicious of gland malignancy with a broad rim with matte shade around the mouth of the duct.

Atypical corkscrew vessels, non-contracted under the effect of acetic acid, were observed in 60 % of patients. At dysplasia in combination with chlamydia and ureaplasmosis in colposcopic presentation were phenomena of iodine negative zones in 80 % and acetowhite epithelium in 60 % of women, coarse mosaic phenomenon in 70 % and punctuation in 70 % of women, abnormal blood vessels in 80 % of women. In women with HPV, 90 % of women noted iodine negative zone and 70 % of women — stable acetowhite epithelium, 100 % of women — coarse punctuation and mosaic, atypical tree network of vessels.

Conclusions and Discussion

Thus, study results indicate that while extended colposcopy for cervical uteri diseases in conjunction with STIs have been observed the marked changes exhibiting with increased detection rate of atypical colposcopic indicators — mosaic, punctuation and atypical vessels, particularly pronounced in women with cervix uteri diseases associated with sexually transmitted infections. This study demonstrates that some of urogenital infections have a certain role in the progression and malignancy of processes in the cervical mucus, which requires the need for early detection and elimination of STI data.

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Improved results of treatment purulent destructive diseases of soft tissues using laser treatments

Abstract: The aim of research was to study the effectiveness of photodynamic treatment and CO₂ laser destructive purulent wounds of soft tissues. The use of CO₂ laser has allowed for the possibility of early and bloodless nekroektomii, improve wound repair, and reduces microbial contamination of purulent wounds. Method has photo coagulating and sterilizing properties effects on the tissue.

Photodynamic therapy is a very effective non-invasive and gentle treatment of purulent wounds and serve as justification for the use of the method of photodynamic therapy in clinical practice for the treatment of acute local inflammatory processes combined with CO₂ laser and traditional treatments.

Keywords: Photodynamic therapy, photosensitizer, methylene blue, purulent wound, microbe, CO₂ laser, laser surgery, planimetry.

Introduction

The questions about surgical infection now remain one of the priority tasks in clinical medicine and this is connected both to high morbidity rate and significant difficulties in treatment. According to the data of the literature, the quantity of the patients with acute purulent diseases of soft tissues accounts 30–60 % among all surgical patients (Svetukhin A. M. et al, 2002; Gorunov S. V., 2004; Abaev Yu. K. [1]). Thus till 70–80 % of them admit to the hospital due to urgent events. In the structure of postoperative complications the surgical infection shares from 32 up to 75 % (Efimenko N. A., 2005). More than 30 % of all lethal outcomes in the postoperative period is connected with various purulent — inflammatory processes (Novojilov A. A., 2006).

In spite of the fact that the history of the question of treatment of these pathologies accounts not one decade, and to the present time the plenty of various techniques being proposed, the problem of efficiency and quickness of the results obtaining remains not resolved up to the end Baranov E. V. [5]. The use of laser methods of treatment appeared to be one of perspective directions in the modern medicine for solution of this problem. For today the antibacterial photodynamic therapy associated with CO₂ laser in the treatment of purulent wounds is the most effective method. CO₂ laser have photocoagulating properties and sterilizing action on the tissues. Thereof the section of tissues is carried out without blood loss and the surface of wound section remains to be absolutely sterile.

The photodynamic therapy (PDT) represents a rather new method of treatments based on application of medicinal preparations — Photosensitizer (of substances, sensitive to light) and laser radiation with certain length of a wave appropriate to peak of absorption of photosensitizer (Ischuk, 2009).

The purpose of research: To improve results of treatment of the patients with purulent — inflammatory diseases of the soft tissues with complex application of CO₂ laser and FDT.

Materials and methods

For the solution of the tasks determined it was performed examination and treatment of 327 patients with purulent wounds of soft tissues of various etiology and location of age from 16 till 82 years, treated in the department of purulent surgery of the 1st Clinical hospital on the basis of the Chair of the GP surgery of Tashkent Medical Academy during 2010–2015. Depending on the treatment performed the patients were divided into 3 groups: Group 1 (control) included 109 patients being treated by the common traditional methods; group 2 (main group I) consisted of 111 patients, who received in a complex of traditional methods of treatment with FDT together with 0.05 % buffer solution of methylene blue. Group 3 (main group II) comprised 107 patients who received complex of traditional methods of treatment with CO₂ laser and FDT. Among the studied patients there were 97 (57.8 %) men, and 71 (42.2 %) women at the age from 16 till 85 years. According to nosological forms at the patients there were prevailed erysipelatous inflammation in 38 patients (22.6 %) and phlegmons of various localization in 22 (13 %) patients.

Table 1. – Structure of the patients with purulent – destructive diseases of the soft tissues in groups

№	Nosology	Control group	Main group I	Main group II	Totally
1.	Erysipelatous inflammation	24	25	24	72
2.	Postinjection abscess	11	9	13	33
3.	Phlegmon	8	9	7	25
4.	Purulent hematoma	5	4	5	14
5.	Infected wounds	14	16	12	42
6.	Acute purulent mastitis	4	3	6	13
7.	Carbuncle	9	7	7	23
8.	Abscessing furuncle	6	5	3	17
9.	Acute paraproctitis	3	5	4	12
10.	Hydradenitis	7	6	6	19
11.	Purulent dermoid cyst	8	7	6	21
12.	Abscess	8	6	6	20
13.	Postoperative wound suppuration	5	4	7	16
Totally		109	111	107	327

The characteristic of the device

The CO₂-laser. Length of a wave of the laser: 10.6. Target power: 1 ~ 15 w. A mode of beginning: Focusing, defocusing.

For photodynamic therapy there was used light irradiator with length of a wave 600–640 nm. with density of power 200 mWt/cm². Distance from the lateral side of the radiator to the damaged surface was 2–3 cm. at absence of the thermal discomfort in the patient. The total time of irradiation depended on the area of the damaged surface and accounted from 15 up to 30 minutes.

Technique of CO₂ séances and photodynamic therapy

In the complex of traditional methods the treatment was added by CO₂ laser and photodynamic therapy. The application of the CO₂ laser has allowed early and bloodless necroectomy as well as increased efficiency of photodynamic therapy (because at presence of necrotic masses and purulent films effect of FDT is sharply reduced). On dependence of the patient's health state the quantity of séances fluctuated from 3 to 7 séances. After 2–3 séances in a zone of the purulent center there was observed significant reduction of necrotic detritus and characteristic smell. During treatment of the patients with purulent — inflammatory diseases of the soft tissues There were used the following parameters of the device "JZ-3A" at evaporation of pathologically changed tissues it is recommended to apply impulse-periodic regimen: power

15 Wt.; a diameter of a light spot 0.5 mm. duration of a pulse from 0.5 up to 1 sec.; duration of a pause between pulses 0.05 sec. (Scolbelkin O. K. et al., 1996).

The method was applied more often at superficially located purulent — inflammatory diseases of the skin and soft tissues. After surgical debridement of the purulent focus the common treatment was added with photodynamic therapy. On the wound, after standard surgical debridement and drying there was applied photosensitizer. As a photosensitizer there was used 0.05 % buffer solution (or ointment) of methylene blue with exposition of 30 min. Then there was carried out an irradiation of wound surface with light irradiator for photodynamic therapy. The length of a wave was 630–650 nm. with density of power 200 mWt/cm². The distance from the butt-end of the irradiator to wound surface was 10 cm. at absence of thermal discomfort in the patient. The duration of treatment was 15–30 min. depending on the area of wound surface. After irradiation of wound surface the photosensitizer becomes colorless, because the photodynamic reaction begins. The number of procedures was 3–6 séances in relation to clinical diagnosis.

In the patients from control group the temperature of body was normalized, on the average, on the 3rd day, the use of CO₂ laser and photodynamic therapy resulted in faster normalization of temperature of a body, on the average, on the 2nd day.

Table 2. – Dynamics of the cardiac rate and temperature of body

Parameter	Before treatment			After treatment		
	Main group I	Main group II	Control group	Main group I	Main group II	Control group
Heart rate (min.)	88.3 ± 2.1	88.1 ± 1.9	87.9 ± 2.3	75.4 ± 1.3	74.0 ± 1.0	79.5 ± 1.8
Body temperature, °C	38.8 ± 0.08	38.2 ± 0.06	38.6 ± 0.05	36.9 ± 0.07	36.7 ± 0.05	37.8 ± 0.09

At hospitalization all patients had signs of intoxication of various severity degree of expressions, which were confirmed by changes of blood leucocytic formula: leucocytosis, increase in number of juvenile neutrophils, appearance of plasmatic cells, decrease in quantity of monocytes and lymphocytes, as well as rise in parameter LII (up to 6–8 standard units). The increase in number of the juvenile neutrophils indicated about tension of compensatory mechanisms, providing for toxins inactivation. The decrease in quantity of monocytes and lymphocytes testified about inhibition of immunologic defensive system of the body. In 3 days after performance the of surgical debridement of the purulent center and realizations of complex traditional therapy in the patients there was noted decrease in parameters of LII to 2.7 Units, at additional effect of PDT on the wounds there was occurred decrease in parameter LII — to 1.95 Un.

the changes revealed indicated about activation of nonspecific body resistance and intoxication decrease. Ten days after operation in the complex treatment of purulent wounds with use of CO₂ laser and PDT the value of LII correlated to the norm — 1.6 ± 0.4 Un., while in the patients of control group it remained to be increased — 1.82 ± 0.14 Un. The parameters of LII in the main group reduced faster due to decrease in neutrophil change and increase in quantity of monocytes, lymphocyte and eosinophils.

The analysis of dynamics of clinical manifestations shown, that the treatment of purulent wounds with use laser FDT results in fast reduction of perifocal inflammatory events. Hyperemia of the tissues surrounding the wound was solved during 1–2 days, there was noted marked decrease in local edema, on the average, on the 2–3 day, infiltration in the wound margins preserved for 3–4 days.

Table 3. – Blood parameters in the patients with purulent – inflammatory diseases of f soft tissues

Parameter	Before treatment			After treatment		
	Main group I	Main group II	Control group	Main group I	Main group II	Control group
Leucocytes, G/l	9.8 ± 1.1	9.6 ± 1.0	9.7 ± 1.7	8.4 ± 1.0	7.9 ± 1.0	8.6 ± 1.9
Eosinophils, %	2.6 ± 0.3	2.6 ± 0.5	2.5 ± 0.6	2.1 ± 0.4	2.0 ± 0.2	2.3 ± 0.7
Stab neutrophils, %	2.2 ± 0.31	2.1 ± 0.4	2.2 ± 0.4	1.8 ± 0.2	1.6 ± 0.5	1.9 ± 0.35
Segmented neutrophils, %	36.5 ± 1.5	36.0 ± 1.0	37.0 ± 1.2	43.2 ± 1.1	40.5 ± 1.5	41.2 ± 1.3
Lymphocytis, %	48.2 ± 1.4	48.9 ± 1.5	48.6 ± 1.6	43.0 ± 1.5	41.0 ± 1.5	45.3 ± 1.2
ESR, mm/h	16.9 ± 0.5	16.0 ± 0.5	17.0 ± 0.7	9.4 ± 0.5	8.4 ± 0.5	11.0 ± 0.6

Table 4. – Dynamics of the wound process depending on the treatment performed

Methods of Treatment	Quantity of patients	Average Terms (days)		
		Wound debridement	Granulation appearance	Onset of marginal epithelization
Main group I	111	4.2 ± 0.7	3.6 ± 0.6	5.1 ± 0.4
Main group II	107	3.8 ± 0.5	3.5 ± 0.6	4.9 ± 0.4
Control group	109	7.1 ± 0.5	6.9 ± 0.6	8.0 ± 0.7

Analyzing on the whole the clinical events of the wound process it is important to note that after performance of PFT there were shortened terms of wound cleaning from purulent detritus and fibrinous mass, as well as term of granulations appearance and onset of epithelization particularly of the main group II (Table 4). On the average, debridement of wound from purulent detritus and fibrinous mass developed on 3.8 ± 0.5 day, and granulation appearance was revealed on 3.5 ± 0.6 days. The onset of margin epithelization was noted on the 4.9 ± 0.4 day, that reliably was better than at traditional treatment.

In the patients of group of comparison receiving traditional treatment, in 4 patients on 3–4 day there was registered formation of secondary necrosis with following performance of necrectomies, that was not found in the main group of the patients.

Objectively to evaluate dynamics of healing of purulent wounds may be possible on the basis of planimetric examinations. They showed that in group of patients where photodynamic therapy

with methylene blue was used for treatment the area of purulent wounds decreased faster than in control group (Table 5). Thus, in the studied group the area of purulent wounds shortened to the 10 day by 75%, at the same time at the common treatment the area of purulent wound decreased by 56% ($p < 0.05$).

The parameters of postoperative bed-day in groups differed considerably. If at traditional treatment of the patients with purulent wounds the average bed-day coefficient was 10 days, then at the patients of the basic group I, having complex treatment in the postoperative period with use of laser photodynamic therapy, the duration of hospital staying accounted 7 days, while in the main group II this index was 5 day ($p < 0.05$).

During observation over the patients from the main group within one year there were not found formation of keloid or rough hypertrophy scars in any patient. The cicatricial tissue did not overhang the skin level, was smooth, did not deform the skin and subcutaneous fat and was not adhered with sublaying tissues.

Table 5. – Planymetry in dynamics

Group of patients	Wound area (cm ²)			
	1 day	3 day	7 day	10 day
Main group I	93 ± 7	74 ± 4	45 ± 3	23 ± 1
Main group II	88 ± 5	72 ± 5	41 ± 4	19 ± 1
Control group	85 ± 8	68 ± 5	52 ± 3	34 ± 3

The microbiological analysis of the pathological discharges from purulent focuses showed that leading place both in the monoculture and in the associations were occupied by *St. aureus* (84.9% and 80.4%, respectively); *Str. Pyogenus* was isolated in the monoculture in 5.7% and in association in 5.8% of cases; anaerobes in 5.7% and in 4.7% of cases, respectively.

At quantitative microbiological examination there was established, that before treatment in the patients of both groups there was determined a high level of contamination of the wound tissues, in 1 g. of wound tissue there were contained, on the average, 10^{6-9} COE. Immediately after performance of CO₂ laser and PDT the microbe contamination of the wound tissue was not changed, and one day after the contamination of the wound tissue by microbe flora decreased to 10^{6-7} COE/g, during PDT and traditional treatment in 1 day the contamination of the wound tissue by microbe flora decreased to 10^{7-8} COE/g. At traditional treatment these parameters did not change and account 10^{7-9} COE/g. On the third day in patients of the main group II the content of microbe in 1 g of tissue accounted 10^{3-5} COE/g, on the 7 day after performance of PDT in the granulated wounds this indicator reduced to 10^{2-4} COE/g. In the patients of the

main group I in the same period of microbe contamination of the wound tissue was 10^{5-6} COE/g, and in patients receiving traditional treatment in the same period the parameter of microbe contamination of the wound tissue accounted 10^{6-7} COE/g, which differed by various representations. The results obtained showed that use of CO₂ laser and PDT with photosensitizer methylene blue reduced more effectively bacterial contamination of the wound tissue, than traditional treatment.

Morphological investigations showed that before surgical debridement in the histological assays the wall and bottom of the wound were presented by destructive necrotic tissues, intensively infiltrated by polymorphonuclear leucocytes, the tissues are edematous, there was noted venous and capillary plethora, stases, perivascular diapedesis and focal hemorrhages.

At traditional treatment by the data of histological and cytological studies the wound process is slowed down, the microcirculatory disorders preserve more long, there is found edema, neutrophil infiltration, focuses of necroses of the tissues. Thus inflammatory expressions prevail over reparative, macrophage reaction is slowed, macrophage-fibroblast interaction is damaged, there is found growth

and maturation of granulated tissue, fibroblast proliferation and epithelization.

At цитологическом research in 3 day after CO₂ laser and photodynamic effect there is noted significant reduction of microflora in the smears-prints. The contents of neutrophils reduced from 91.0% up to 75.0% from the total number of cellular elements. The high number of degenerative forms of neutrophils is noted ($57.63 \pm 4.8\%$), connected with their destruction under photodynamic exposure. The increase in quantity of macrophages and monocytes with phagocytosis of bacteria, tissue and cellular detritus is found. There is occurred small quantity of fibroblasts, predominantly of juvenile forms, considerably exceeding their quantity in control group (8.7% in comparison with the basic group I – 3.1%, basic group II – 2.2%, respectively). The marked changes indicated about activation of regenerative processes and corresponded inflammatory-regenerative type of cytogram.

On the 5th day after CO₂ laser and photodynamic therapy microflora was not found practically. The quantity of neutrophils decreased considerably (to $63.0 \pm 3.5\%$). There is met a great number of macrophages and fibroblasts ($15.0 \pm 2.9\%$ and 14.2% ,

respectively), that indicated about the further activation of reparative processes.

By the 7th day macrophages and fibroblasts appeared to be prevalent cellular elements (15.8% and 19.3%, respectively), the young epithelial cells are found, that allows suggestion about regenerative type of cytogram.

Thus, the presented data confirm reliably high clinical efficacy of antibacterial therapy, based on CO₂ laser and photodynamic effects, induced by simultaneous effect on the pathogenic microflora by physical and chemical factor.

The use of CO₂ laser allowed possibility for early and bloodless necroectomy, improvement of wound reparation as well as reduction of microbe contamination of the purulent wound. The method has photocoagulating properties and sterilization effect on the tissues.

The data obtained showed that the photodynamic therapy is effective enough noninvasive and safety method for the treatment of purulent wounds and serves as basis for use of the method of photodynamic therapy in the clinical practice for treatment of local acute purulent-inflammatory processes CO₂ laser and traditional methods of treatment.

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The advantages of modern methods of diagnosis and intraoperative neuromonitoring during removal of intracerebral brain tumors

Abstract: The results of a survey of surgical treatment and observation of 66 patients with intracerebral brain tumors of supratentorial localization. Data analysis MR-tractography allowed to choose an optimal surgical approach to tumors, to identify areas available for disposal and perform resection in an adequate amount of conservation white matter pathways of the brain, thus minimizing surgical trauma, reduced risk, and worsening of neurological deficit that determines the efficiency of operations and quality of life of patients.

Keywords: DT-tractography, white matter tracts, brain, tumor, life quality.

Introduction

Neoplastic lesions of the brain is a complex clinical problem due to the pronounced deterioration in the quality of life of patients and often poor prognosis. Primary tumors of the central nervous system make up 1.4 % of all cancers and 2.4 % of cancer mortality, while the share of malignant gliomas have to 50–60 % of all primary CNS tumors [8; 10]. The main task of a neurosurgeon at removal of intracerebral tumors is the maximum possible removal of tumors with minimal damage to the brain tissue and the establishment of a histological diagnosis. The degree of trauma critical brain structures depends on the post-operative neurological deficits and the quality of life of the patient, and the degree of resection of tumors — the duration of the period without relapsing.

The use of modern neuroimaging techniques and new technologies in surgery mass lesions becomes more widely used. This allows you to increase the degree of radical removal of the tumor with the least possible damage to functionally important brain structures [2; 5; 7].

Prospects for the development and improvement of neurosurgical diagnostic system extends the capabilities associated with neuroimaging. In this connection, noteworthy method tractography diffusion tensor (DT tractography) allows non-invasive visualization of individual white matter pathways throughout the brain. The use of DT tractography in tumor lesions of the brain provides information about the structure of abuse conductive fibers of the white matter near the borders of the tumor, which allows you to define areas of tumor invasion, and the degree of restructuring fibers under the influence of treatment [4; 5].

So far, intraoperative monitoring during removal of intracerebral tumors and assessment of the minimum damage to motor ways, functionally important brain structures remains relevant in neurooncology [2; 4].

Purpose of the study

Improving the results of surgical treatment and quality of life of patients with tumors of the brain using data DT tractography, neuromonitoring white matter pathways in the brain.

Materials and methods

The material of the study was the use of the data DT tractography in the planning and the choice of the angle of attack during surgery on the pathological center. Monitoring, and analysis neuromonitoring defeat pathways of white matter of the brain was performed pre-, intra- and post-operative period through the early ENMG that are practiced in the Republican Scientific Center of Neurosurgery MOH Uzbekistan.

We had analyzed the results of treatment of 54 patients which were hospitalized in the Republican Scientific Center of Neurosurgery and the Ministry of Health of the Republic of Uzbekistan and were operated under the same conditions. 32 patients of them are in the control group (I-group), and 34 are in the main (II-group). All patients came to the clinic with conventional MRI or CT images, and DT-tractography were performed to 34 patients. The use of DT-tractography in tumor lesions of the brain provides information about the structure of abuse conductive fibers of the white matter near the borders of the tumor, that allows to determine the areas of tumor invasion, and the extent of the reorganization of the fibers under the influence of treatment. High probability of occurrence or worsening of neurological deficit after surgery limits the ability of tumor resection during their propagation in the functionally important areas of the brain. When planning the operation and removal of intracerebral tumors must adhere to the tactics as possible cytoreduction in functionally reasonable limits [6; 7; 8].

The operation is performed under the control of intraoperative monitoring of mechanogram using needle electrodes in m.bicepsbrachi, m.quadricepsbrachi and m. quadricepsfemoris, established with geterolateralnoy side. Computer system SYNOPSIS with software "Neyrotex», Russia was used.

Results and discussion

In describing the degree of radical surgery we stuck to the classification, which uses the terms total, subtotal removal and open biopsy.

Investigation of diagnostic tumor supratentorial localization showed that at the time of detection, tumor, more than half (53.9 % of cases) of patients had a tumor size of 35 to 60 mm., which is visually proved DT tractography and defeat pathways of the cerebral white matter brain.

Table 1. – Distribution of patients according to the degree of radicalism removing the tumor of Education

Volume remove a brain tumor	Q-ty operations, abs. %	
	I-group	II-group
The total	17 (53.1 %)	13 (38.2 %)
Subtotal	12 (37.5 %)	19 (55.9 %)
Biopsy open	3 (9.4 %)	2 (5.9 %)

After making analysis of the data DT tractography, the results showed that more than half (55.9 %) primary surgical interventions ended with subtotal removal of the tumor, total removal of the tumor was possible in 38.2 % of cases, open biopsy in 5.9 % of cases that shown above in Table 2 number.

In all cases, the resection of the tumor was performed its histological verification. According to histological features in the supratentorial brain tumors in patients oligodendrogliomav identified 18 (27.3 %) cases, anaplastic astrocytomas — 15 (22.7 %), fibrillar astrocytoma — in 11 (16.7 %) cases, fibrillar-protoplasmic astrocytoma -to 9 (13.6 %), glioblastoma — 9 (13.6 %) cases and metastaz brain tumor — 4 (6.1 %), which is written below (Table 2.)

Table 2. – The distribution of patients depending on the histological structure

Pathological diagnosis	Number of observations	
	abs.	%
Oligodendroglioma	18	27.3
Anaplastic astrocytoma	15	22.7
Fibrillar astrocytoma	11	16.7
Fibrillaryastrocytoma, protoplasmic	9	13.6
Glioblastoma	9	13.6
Metastasis	4	6.1
Total:	66	100

The results of our study showed that the improvement in outcomes of surgical treatment of patients with intracerebral tumors supratentorial localization depended on the evaluation of the changes of the white matter of the brain in terms of visualizing pathways D-tractography.

From Table 3 it is clear that in the study group (II) after surgery in the early period of profound hemiparesis has resolved to moderate hemiparesis in 2 cases, and moderate hemiparesis to slight hemiparesis in 3 cases, the most high information DT-tractography has been featured in determining the surgical approach and scope of the operational resection of tumors located in the temporal lobe of the brain in the area of the intersection of pathways coming from Broca's area to Wernicke's area, where the visual beams of radiation is placed. In tumors convexital localization, in which there is

no particular difficulty in terms of the surgical approach, the main issue is the amount of the radical removal of the tumor, especially if the patient has no gross neurological disorders. Surgical damage of

the projection pathways can lead to the appearance or expressed deepening paresis when seemingly total removal of the tumor and the great surgical treatment [9; 10; 11].

Table 3. – Comparative distribution of patients for neurological deficit

Neurologic manifestations	Before surgery				After surgery			
	I-Group		II-Group		I-Group		II-Group	
	Abs n = 32	%	Abs n = 34	%	Abs n = 32	%	Abs n = 34	%
Without movement disorders	3	9.4	5	14.7	2	6.3	5	14.7
Easy hemiparesis	11	34.4	10	29.4	9	28.1	13	38.2
Moderate	10	31.3	11	32.4	14	43.8	10	29.4
Deep hemiparesis/hemiplegia	6/2	25.0	7/1	23.5	4/3	21.8	5/1	17.7

Currently, surgical treatment of gliomas cannot be radical, due to the biological characteristics of the tumor, but survival is directly linked to radical surgery. Optimal tumor resection can be performed only when it is clearly located, and its boundaries are clear. Every neurosurgeon faces the problems of the relation of the tumor and the important anatomical structures during surgery. Therefore, the interest recently increased in research on the use of DT tractography [3; 4; 7; 11].

At the planning stage surgical intervention determine intact furrow surrounding the tumor, and then, in accordance with the contours of the projection boundaries tumor resection is possible in the cortex approaching the perifocal area. Determining the spatial relationship of the tumor with the adjacent portions of the cortex and subcortical pathways depending on the tumor location and extent of its spread allows to choose the tactics of surgical approach [8; 9].

We observed regression of neurological deficit among the operated patients of the group, which contributed to the flow of postoperative period without complications and improved the quality of life and its duration.

Data of mechanogram used for noninvasive and more complete removal of the tumor with the greatest possible preservation of pathways and visualized the potential increase in the amplitude of the muscle and the appearance of sharp peaks in the motor tract irritation and allowed the surgeon to more accurately determine the angle of attack, the amount of tumor resection. We have used computer system «Sinapsys» (Neyrotex, Russia), 4-channel electric stimulator, bipolar with rhythmic stimuli at 1 Hz. Bipolar electrodes used in a rounded shape for registration of surface. We investigated the median and tibial nerve by the standard method with the definition of conduction velocity (CV) for the efferent fibers, the amplitude of muscle response and excitation thresholds. Application ENMG step intra- pre- and post-study allows to evaluate and objectify pyramidal tract functional insufficiency prior to surgery, to control, store and minimize surgical trauma fibers pathways and finally determine a strategy of drug therapy after surgery.

Changes fibers white matter of the brain caused by neoplastic processes may be characterized as a dislocation, edema, infiltration, degradation. Development of adequate surgical approaches and development of microsurgical techniques are important factors in maintaining the functional integrity of the pyramidal tract in surgical interventions on the brain. Involvement of the efferent fibers of the pyramidal way into the capsule of the tumor stroma causes neurological deficit in the form of restriction of active movements of the limbs, identifying topography anatomic interest of the motor area.

According to our analysis at ENMG distinguish 2 types of conduction disturbances on motor ways:

1. The compression-compression irritative;
2. ischemic.

Computer program averaging curves and operating automatic miscalculation.

Table 4. – Compression-irritative disorders

Conduction velocity (CV) efferent	30.5 m/s	control N _{B/K} — 50 m/s (n. medianus)
	29.8 m/s	N _{n/K} — 49.5 m/s (n. femoralis)
A max	2.5 mk V 2.8 – 3.0 mk V	5.0 – 5.5 mk B 7.5 – 8.7 mk B
Excitation threshold (ET)	Sharply reduced 4 – 3 mA	7 – 8 mA

Table 5. – Ischemic disorders

Conduction velocity (CV) efferent	19.8 – 21.5 m/c	control 55 m/s
	19.5 – 22.5 m/c	49.5 m/s
A max	1.25 mk V 1.9 – 2.5 mk V	5.5 mkV 7.5 – 8.7 mkV
Excitation threshold (ET)	10 – 15 mA	N 7 – 8 mA

It was found that pyramids disorders in patients with supratentorial tumor localization, accompanied by a greater or lesser degree of impaired muscle potentials, depending on the nature and extent of lesions tumoroznogo lobe. Pronounced ENMG parameter changes were observed in 12 patients with a sharp decline in the M-response amplitude and conduction velocity of efferent fibers. Moderate settings ENMG violations were found in 22 patients.

The most serious violations of the parameters ENMG registered among patients with frontal and frontoparietal localization of cases in supratentorial localization of brain tumors. At the same time, it is often marked a sharp decline in SPI efferent fibers and reducing the amplitude of M-response to current high threshold of irritation. Such violations we see as ischemic changes related to the disease process involving direct anatomical structures pyramidal pathway. These hypoxic ischemic brain dysfunction requires special measures, improves blood flow to the brain, both during surgery and in the postoperative period (the introduction of vasoactive drugs, volume expansion of BCC, locally applique with papaverine).

In 19 cases, most often in tumors of the parietal and temporal localization-parietal and 1 cases with occipital localization parameter changes ENMG affects of moderate decline of CV efferent fibers, reducing the amplitude of M-response due to lower threshold of irritation.

These changes were seen as a reaction to the activation coinciding with stimulation of the pyramidal tract due to dislocation disorders, swelling, etc. Typically, these violations were reversible in the postoperative period and defined us as a compression — irritative

showing the processes of excitation of neurons. Research ENMG performance in the preoperative period in patients with tumors supratentorial localization, had predictive value for postoperative course and degree of recovery of pyramidal disorders.

In most cases, patients with compression — the nature of the pyramidal irritative disorders in the postoperative period had positive dynamics in the conductivity improvement ENMG parameters. In 10–15 % of cases, the dynamics of indicators ENMG were noted.

In patients with ischemic pyramidal disturbances positive trend was recorded in 62.1 % of cases. In 37.9 % of patients speakers are not

detected. And in 21 % of patients ENMG reduction options were recorded after surgery.

Dynamics of ENMG postoperative defined tactics of drug therapy. Metabolic drugs, nootropics, antioxidants and stimulants are prescribed after the positive dynamics of the IPN and the excitation threshold. Vasoactive drugs with the reduction of BCC added to the treatment in reduction indicators ENMG.

The study of functional status, family and social adaptation (quality of life) of patients also showed a significant dependence of the results of treatment of morphological characteristics of the tumor and minimal trauma pathways of the brain during surgery [2; 7; 8].

Table 6. – The quality of life of patients with supratentorial localization tumors after treatment with radical surgery (%)

The volume of tumor resection	Group	Quantity	The quality of life after treatment, %			Points By Karnofsky
			good	Satisfactory	Unsatisfactory	
Total	I-gr	n = 17	n = 5 (29.4 %)	n = 7 (41.2 %)	n = 5 (29.4 %)	64.3
	II-gr	n = 13	n = 4 (30.8 %)	n = 6 (46.1 %)	n = 3 (23.1 %)	68.6
Subtotal	I-gr	n = 12	n = 5 (41.7 %)	n = 5 (41.7 %)	n = 2 (16.6 %)	69.9
	II-gr	n = 19	n = 10 (52.6 %)	n = 8 (42.1 %)	n = 1 (5.3 %)	78.1
Biopsia	I-gr	n = 3	–	n = 1 (33.3 %)	n = 2 (66.7 %)	55.3
	II-gr	n = 2	–	n = 2 (100 %)	–	60.3

The table 6, the performance of surgery in patients of the main group in the subtotal removal of tumors, accompanied by a good performance in the future quality of life — 78.1 points on the Karnofsky scale. At the same time performing surgery in the control group, both in total and subtotal tumor removal in patients QOL Karnofsky lower than that in the basic group.

Thus, the optimization of the volume of the removal of the tumor tissue is directly connected with the possibilities of preoperative surgical planning, specifying the topography of the tumor, to obtain the most complete information about the relationship of the tumor to important functional areas of the cerebral cortex and white matter of the conductive fibers.

Conclusions:

1. Data Analysis MR tractography allows you to choose the best surgical approach to the tumor, define available to remove sections and complete removal of an adequate volume of preserving FIA and white matter pathways in the brain.
2. Removal of intracerebral tumors under the control of intraoperative monitoring using data DT-tractography provides intraoperative precision and safety of surgery, to minimize surgical trauma, thereby reducing the risk of neurological deficit, which determines the efficiency of the operation and a good quality of life.

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Pathogenetic aspects of exudative otitis media in children and treatment approaches

Abstract: Our study showed that, in most cases, exudative otitis media develops on the background of nose and nasopharynx diseases. Accordingly, the timely identification and removal of the above causes, can lead to positive dynamics. A comparative analysis of the treatment results did not show reliable differences between therapy, aimed to dysfunction of auditory tube elimination and parallel tympanic cavity bypass.

Keywords: exudative otitis media, bypass, auditory tube.

The problem of hearing organ pathology becomes more and more actual from year to year in the social-economic and health spheres [1]. Among the causes of hearing loss in patients of children's age, the frequency of occurrence of exudative otitis media is one of the leading places [5]. Exudative otitis media (EOM) — poly-etiological disease characterized by the presence of fluid in the middle ear cavities and development sluggish, recurrent, not purulent inflammation in the auditory tube and tympanic membrane, cells of the mastoid process, which subsequently leads to varying degrees of hearing reduction.

Among the causal factors in the development of exudative otitis media is the most hotly debated also infectious, allergic and immunological factors [3; 4; 5; 6; 7; 9; 10].

EOM often develops against the background of the drainage and ventilation functional disorders of the auditory tube in acute and chronic diseases of the nose, paranasal sinuses and pharynx, after suffering by acute respiratory illness, irrational use of antibiotics in the treatment of acute otitis media or allergic rhinosinusopathy.

Effects of exudative otitis media have the highest proportion (45–58%) in the structure of infant and teen hearing loss with the annual increase in the number of patients up to 1.5% [2].

In scientific publications remains disputable choice method of treatment of exudative otitis media. Most authors adhere to active surgical tactics of treatment of exudative otitis media, which is a long bypass tympanic cavity. According to Sedeberg-Olsen J. and co-authors [13], Fish U. [8], even timely and high-quality treatment of exudative otitis media in some cases ends with formation of retraction cholesteatoma. Last circumstance prompted the otosurgeons to search for methods to prevent complications of exudative otitis media. On the initiative of Jahnke K. [11], next phrase appeared in the foreign literature “nasal preceding cholesteatoma surgery”, which literally means nasal surgery, prevent cholesteatoma. In his research the author relied on data Meyer W., Krebs A. [12], which published the work on improving the auditory tube ventilation function in patients with chronic otitis media. In our view, timely conducted restoration operation in the nasal cavity, paranasal sinuses and nasopharynx, substantially improve current and forecast exudative otitis media.

In the pathogenesis of otitis media exudative auditory tube dysfunction plays a dominant role. Therefore, timely finding and

elimination auditory tube dysfunction reasons, in many cases leads to full rehabilitation of patients.

The purpose of the study. The study of diagnostic value of different examination methods for the detection of pathology of the nose and nasopharynx, and comparative assessment of treatment methods of the exudative otitis media in children.

Materials and methods. Under our supervision were 176 children with exudative otitis media aged from 3 to 18 years, from them 110 (62.5%) boys and 66 (37.5%) girls. 105 children (59.7%) was diagnosed with a double-sided, in 71 (40.3%) a unilateral process, 115 (65.3%) patients with acute, 61 (34.7%) chronic otitis media exudative form.

The survey methodology included a review of complaints and patients anamnesis, otorinolaryngology inspection, x-ray and MSCT of paranasal sinuses. All the patients performed nasal and nasopharynx endoscopy, otoendoscopy and otomikroskopy. Degree of retraction eardrum was determined by classification M. Tos and J. Sade (1990). The results recorded on videotape, It allowed to judge about dynamic of disease current and if you need to change treatment tactics. Mono-tympanometry were conducted using a test “Valsalva”, and “Toynbee”, determining the pass ability of the auditory tubes in the Eardrum perforation (after bypass surgery), type classification of tympanogram by Jerger (1970). Verification of the diagnosis of exudative otitis media was evaluated according to the classification of N. Dmitriev and co-authors (1996).

Patients were divided into two groups: the first group of patients, along with conservative therapy conducted sacrificial nose surgery and Chair to address the auditory tube dysfunction. A second group of patients received similar treatment with a shunt tympanic membrane at the same moment.

Treatment effectiveness criterions were next: normalization of data endo- and microotoscopy, tympanometry and hearing improvement.

Results and its discussion. In the study of anamnesis should note the following: The parents of 66 (37.5%) patients connected disease of the child associated with transferred respiratory infection, 47 (26.7%) patients were in a frequently ill children group, 34 (19.3%) patients had burdened allergy anamnesis since early

childhood (exudative — catarrhal and thymicolymphatic diathesis) in 29 (16.5%) cases, — accompanied by worm infestation.

The results of endoscopy of the nose and nasopharynx showed the following: 58 (32.9%) patients had vasomotor symptoms — allergic rhinitis, in 38 (65.5%) — allergic rhinitis combined with different forms of nasal septum deformation, in 73 (41.5%) patients were defined adenoid vegetations degree II–III, including: 32 (43.8%) surveyed adenoids combined with hypertrophy of the tonsils II–III degree, 24 (32.9%) they were combined with hypertrophy of tubular rolls, 17 (23.3%) — with scar changes in the nasopharynx related to previously transferred surgical interventions (adenotomy, re-adenotomy). In 45 (25.6%) patients was determined a strip of pus, running down the back wall of the nasopharynx (symptoms of sinusitis) over the pharyngeal mouth of the Eustachian tube.

On MSCT of paranasal sinuses, in 86 (48.9%) patients were diagnosed sinusitis, 39 (45.3%) of them — maxillary and ethmoid sinuses inflammation, 31 (36.1%) of them — ethmoiditis, 16 (18.6%) of them — patients with unilateral sinusitis.

It is known that the endo- and microotoscopy allow assessing the state of the eardrum at the auditory tube dysfunction. At endo- and microotoscopy in 59 (33.5%) patients was revealed the presence of vascular injection and retraction of the eardrum, in 55 (31.3%) — vascular injection and protrusion of the eardrum, in 32 (18.2%) — trans-illumination of horizontal liquid level, in 30 (17%) — retraction pocket of them — in 16 (53.3%) patients it was controlled, and in 14 (46.7%) — uncontrolled, that increased the risk of secondary cholesteatoma. All patients underwent Valsalva and Toynbee tests to determine the mobility of the tympanic membrane and pass ability of the auditory tube: in 119 (67.6%) patients the tympanic membrane was moving, in 57 (32.4%) — it was almost stationary.

On the audiogram in 96 (54.5%) of the patients was determined conductive hearing loss — I degree, in 56 (31.8%) — II degree of

conductive hearing loss, in 24 (13.7%) — III degree of hearing loss mixed character. In 121 (68.8%) patient recorded tympanogram type “B”, 55 (31.2%) — the type “C”. Monotympanometry had shown in 97 (55.1%) patients good pass ability of the auditory tube, in 45 (44.9%) — a violation of pass ability of the auditory tube.

To compare methods of treatment, the patients were divided into two groups. The first group — 91 (51.7%) the patient received conservative therapy and needs surgery, aimed at removing the auditory tube dysfunction. Of these, 62 (68.1%) patients diagnosed with acute, 29 (31.8%) — chronic exudative otitis media. For elimination of the auditory tube dysfunction we have done a course of conservative (antibiotics, antiviral, anti-inflammatory, antihistamine drugs, secretolytics and decongestants, transporting drugs by Proec or puncture maxillary sinuses with the introduction of antibiotics and corticosteroids) and surgical (adenotomy, adenotonsillotomy, ultrasonic disintegration of the lower nasal concha, adhesiotomy pipe rollers, septoplasty, maxillary sinusotomy) treatment.

The second group — 85 (48.3%) patients who simultaneously with surgery in nasal cavity and nasopharynx conducted bypass tympanic membrane. Of these, 53 (62.4%) are diagnosed with acute, 32 (37.6%) — chronic otitis media exudative form. Shunt is installed as standard, in posterior-inferior quadrant of tympanic membrane that reduces the risk of injury to the medial wall of the tympanic cavity. Term shunt ranged from 2 to 4 weeks.

After the therapy, the patients of both groups repeatedly inspected and examined in 2nd and 4th week. As already noted above, the criteria of effectiveness of therapy was improving data otoscopy (otoendoscopy and otomicroscopy), hearing and tympanogram registration type “A” in conducting impedans. After bypass surgery was checked a permeability of the auditory tube of tympanic membrane again. Data on patients after therapy, conducted in the table 1.

Table 1. – Comparative analysis conducted therapy in patients with EOM

Groups	Positive clinic- audiologic dynamics (number of patients)		Without improvements (number of patients)	P
	in 2 weeks	in 4 weeks	in 8 weeks	
I (91 patients)	48	26	17	< 0.05
II (85 patients)	42	24	19	< 0.05
Total quantity (176 patients)	90	50	36	< 0.05

As can be seen from the table, according to the results of the therapy, the improvement of clinical-audiology data the two groups from each other reliably are no different. Research indicates that the bypass is not reliably tympanum improves results of treatment and outcome of EOM.

After 2 weeks held conservative therapy and surgical techniques eliminate the dysfunction of auditory tube and tympanic cavity shunting, 90 (51.1%) positive patients clinical-audiology dynamics that led to data normalization of endo- microotoscopy, monotympanometry, improve hearing and tympanogram registration type “A”. At 50 (28.4%) patients noted positive clinical-audiology dynamics in 4 weeks.

Our research has shown that timely and prompt surgical intervention, aimed at restoring the auditory tube dysfunction, reduces the need for shunting tympanic membrane and number of shunt related complications.

Due to the fact that, at 36 (20.5%) patients in the observation period (within 8 weeks), there was no positive clinical-

audiology dynamics, this group of surveyed performed antrotomy with double venting antruma (based on the picture of MSCT temporal bones).

Conclusions: our study showed that exudative otitis media in children, in most cases, develops against the background of the pathology of the nose and nasopharynx, which leads to dysfunction of auditory tube. Complex diagnostics, including endoscopy of the nose and nasopharynx, otoendoscopy, as well as the MSCT paranasal sinuses, represents the most reliable information about the cause of the auditory tube dysfunction.

Analysis of the treatment results did not show reliable differences between therapy, aimed to elimination the dysfunction of auditory tube and tympanic cavity parallel shunt.

Therefore, early diagnosis and prompt surgical removal of the causes leading to the auditory tube dysfunction, combined with comprehensive conservative therapy, give positive clinical and functional results, and they are an important component in the hearing rehabilitation of such patients.

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Indicators nitroxide ergic system at mycoplasma pneumonia in combination with herpes infection in children with immunotherapy

Abstract: In children with mycoplasma pneumonia associated with herpes infection, there is overproduction of nitric oxide and peroxynitrite-related activation of the inducible form of nitric oxide synthase. It appears more pronounced in patients with MP + HSV + CMV association.

Keywords. Mycoplasma, herpes, nitrogen oxides, children.

Actuality

Currently, one of the urgent problems of Pediatrics is mycoplasma pneumonia, which is caused not only widespread among it early childhood, despite the widespread use of modern antibiotics [2; 4; 8]. Today emerged pneumonia is often due to the addition of herpes virus infection (HVI). In recent years there has been growth in the proportion of “intracellular” (atypical) pathogens in the etiological structure of community-acquired pneumonia in children, such as *Mycoplasma pneumoniae* (MP) [1; 3; 5]. Frequency of MP reaches 35–50%. The absence of a rigid cell wall at mycoplasma determines the polymorphism of cells, resistance to penicillin, aminoglycosides and cephalosporins. Often MP associated with herpes infection (HSV + CMV or HSV + VEB + CMV), determining the severity and recurrent nature of pneumonia [6; 7; 8]. It should be said that lip polysaccharide (LPS) of bacterial origin that trigger inflammation, interact with neutrophils, macrophages, cause accumulation in the body of a free-radical oxygen species that interact with the azo containing compound may form a nitrogen oxides [6; 10]. The radicals of these compounds (NO), superoxide and it's reaction product peroxynitrite, formed by the infectious diseases have a significant role in the development and pathogenesis of diseases: they are mediators of inflammation, modified proteins and nucleic acid damage [9; 10]. The constant change of the microbial

landscape, dynamic changes of reactivity and immune response in children with mixed infection dictate the need for adequate pathogenetically oriented immunostimulatory therapies. It should be a differentiated approach to the treatment according to the identified infectious agents to avoid polypharmacy. In this regard, promising a differentiated inclusion in the basic therapy MP with herpesvirus infection glycyron and anaferon. However, it is necessary to study the mechanism of action of the proposed systems of the therapy, which determined the purpose of the present study.

Objective

Influence of treatment of mycoplasma pneumonia in combination with herpes infection in children to the performance of nitric oxide system.

Material and methods

The study involved 190 infants with mycoplasma pneumonia (MP), combined with the herpes simplex virus (HSV) (40 children – group 1), cytomegalovirus (CMV) (50 children – group 2) or association (100 children – group 3) in the active phase of the disease, are hospitalized in the children's center of the RSSPMC Pediatrics of Health Ministry of Republic of Uzbekistan. The most serious disease proceeded in patients with MP + CMV + HSV. Clinical diagnosis of mycoplasma pneumonia was established based on clinical-anamnestic and additional laboratory and radiological data.

The control group consisted of 30 healthy children of comparable age. The diagnosis of mycoplasma pneumonia was based on the classification of clinical forms of bronchopulmonary diseases in children adopted in Moscow at a symposium on improving the classification of non specific lung diseases in children (1996). Biochemical studies include determination of the amount of NO metabolites nitrite and nitrates (NO_2 and NO_3). In a modification Metelskaya V.A. and et al. it was showed activity of nitric oxide synthase (eNOS); nitrate reductase activity (NR) level peroxynitrite (ONOO^-). Statistical analysis of the results of research conducted with the help of software «Microsoft Excel XP» and «Statistic 6.0».

Results and discussion

Clinical symptoms of MP in association with herpes virus infection in infants characterized by severe symptoms of intoxication and hyperthermia, dryness of mucous membranes of the upper respiratory tract, cough and painful events conjunctivitis with severe bronchial obstruction syndrome. Radiological findings revealed infiltration of the lung tissue, and in some cases determined by the deformation and blurring of pulmonary pattern, increased vascular component and interstitial changes. It was marked anemisation, neutropenia, mild leukocytosis with signs of eosinophilia, monocytosis, lymphocytosis, and in some cases with leukopenia, lymphocytopenia, accelerated erythrocyte sedimentation rate (ESR), all of which indicate the presence of inflammation in the body with pronounced decrease in immunoreactivity in children.

Along with these children with MP in combination with herpes infection, we observed an increase in the level of the end products of nitric oxide metabolism, especially in the third group of patients. Increased production of NO^- observed on the background of inhibition of eNOS and over expression of inducible nitric oxide synthase forms. Subsequent reaction of NO^- with oxygen radicals results in the formation of the toxic effect of high oxidation activity of the agent — ONOO^- . When generating nitric oxide and superoxide same system it increases the probability of the interaction, so that these enzymes may contribute significantly to the formation of OOO^- in the cells and tissues, often becoming a cause of cell death. Research ONOO^- content in the blood of children with mixed-pneumonia showed a statistically significant increase of its content in 1.87; 2.25 and 4.22 times, respectively, in the 1st, 2nd and 3rd groups of children. More pronounced changes in the indices of nitric oxide observed in the mixed infection. During the basic pharmacotherapy MP + HSV (comparison group) on the 10th day of treatment, we observed a tendency to reduce the high levels of NO^- , significant decrease of 1.27 times the content of ONOO^- in the background of a some decrease NR in 1.11 times. By 30 days of the study the tendency to normalization of nitric oxide maintained. Values NO^- , ONOO^- and NR significantly decreased in 1.25; 1.4 and 1.15 times the original values, respectively. Follow-up study of the above parameters is shown approaching the content of NO^- and NR activity to the values of the control group children, but the level and activity of eNOS ONOO^- differed significantly from them (Table 1).

Table 1. – Indicators of nitric oxide in children with mycoplasma pneumonia, $M \pm m$

Groups	Contents of products		Activity of ferments	
	NO_2 (NO_3), mcmol/l	ONOO^- , mcmol/l	eNOS, mcmol/minr	NR, mcmol/minr
Control group n = 30	9.67 ± 0.43	0.08 ± 0.003	16.88 ± 0.87	0.22 ± 0.005
1 st group, n = 50	$12.47 \pm 0.48^{***}$	$0.15 \pm 0.006^{***}$	12.57 ± 0.36	0.32 ± 0.011
2 nd group, n = 40	$13.49 \pm 0.39^{***}$	$0.18 \pm 0.006^{***}$	12.30 ± 0.31	$0.39 \pm 0.007^{***}$
3 rd group, n = 100	$15.75 \pm 0.24^{***}$	$0.33 \pm 0.007^{***}$	9.45 ± 0.51	$0.48 \pm 0.011^{***}$

Note: * — differences with respect to the data of the control group significant: * — $P < 0.05$; ** — $P < 0.01$; *** — $P < 0.001$.

Inclusions in the complex therapeutic measures anaferon and glycerol have a more pronounced positive effect in stabilizing the performance of the nitrogen oxide. Thus, high levels of NO and ONOO^- significantly decreased in 1.24 and 1.5 times, low activity eNOS increased somewhat, and the high activity of the NR declined relative to baseline values. On the 30th day of treatment studied parameters close to the values of healthy children, remained within those limits and catamnesis. As can be seen from the above data, the inclusion of a set of glycerol and anaferon promoted earlier normalization of nitrous oxide compared with conventional therapy.

Standard MP + CMV pharmacotherapy for 10 days reduced the high values of NO^- , NO and ONOO^- in 1.14; 1.18 and 1.31 times the original values, respectively. By the 30th day of treatment the decrease was 1.22; 1.3 and 1.31 times, respectively, the above figures. Despite ongoing treatment and preventive measures, even catamnesis children undergoing MP + CMV, remained low values of eNOS, high activity NR and high levels of peroxynitrite. This indicates that the risk of relapse in the presence of precipitating factors. Inclusion in the complex therapeutic measures MP associated CMV, glycerol and anaferon contributed to the earlier normalization of the studied parameters. So, for the 10th day of treatment higher values NO^- , NR and ONOO^- under the influence of the proposed therapy significantly decreased in 1.34; 1.31 and 1.64 times as compared to baseline, in 1.1; 1.14 and 1.8 times the performance of comparison group respectively. This positive trend will continue in the future, bringing the studied parameters to the values in healthy children, especially in the follow-up study.

Such dynamics of changes of indicators of nitrogen oxide under the influence of glycerol and anaferon coincided with positive dynamics of reduction of clinical manifestations of pneumonia. According to some authors including anaferon activating antiviral immune system of children, helped to reduce the concentration of virus in the affected tissues. According to researchers, anaferon increases interferon production, their binding to the receptors that is essential for the body's defense against the virus. Basic pharmacotherapy MP + PIP + CMV to the 1st day of treatment has no significant effect on nitric oxide system. We noted a significant decrease in high-level NO. NO^- and 1.14 and 1.37 times the original values. By the 30th days of the decline was 1.2 and 1.57 times, while the activity of eNOS was significantly increased by 1.26 times, the high activity of the NR declined to 1.42 times compare to baseline values. Despite the disappearance of the clinical manifestations of CAP in catamnesis in this group of children, changes in the indices of nitric oxide maintained: the level of NO and NO^- exceed the normative values of 1.2 and 2 times the activity eNOS remained low at 1.27, the high activity of the NR 1.23 times. Inclusion in the complex therapeutic measures MP, associated herpesvirus infection, glycerol, anaferon and polyoxidonium helped to reduce NO, NR and ONOO^- in 1.21; 1.3 and 1.57, increase the activity of eNOS by 1.33 times compared to baseline values. Even more pronounced positive changes we have seen in the 30 days of treatment: the value NO^- , NR and ONOO^- were lower than the comparison group of 1.1; 1.18 and 1.91 times, the activity of eNOS exceed 1.19 times. However, despite this,

the values of the above parameters were significantly different from the values of the control group children. However, despite this, the values of the above parameters were significantly different from the values of the control group children.

In our opinion, the intensification of anti-viral defense Anaferon against the backdrop of a significant stimulation of the immune system with glycyron stimulate earlier elimination etiological factors, earlier regress of clinical manifestations of pneumonia and reduce the recurrence of the disease. Indeed, according to the literature data, glycyron activate killer cells, blood phagocytic function of blood, antibody production and cytokine production. Have detoxification properties of the drug is determined by its structure and high molecular weight contributes to the rapid elimination of exo- and endotoxins, increases the resistance of the cell membrane to the cytotoxic action of these substances. It can be said that the proposed

complex of therapeutic measures bacterial and viral pneumonia can significantly enhance the antibacterial and anti-virus protection in children, reduce the incidence of complications and relapses.

Based on these data, we can make the following conclusions:

1. In children with mycoplasma pneumonia associated with herpes infection, there is overproduction of nitric oxide and peroxynitrite-related activation of the inducible form of nitric oxide synthase. It appears more pronounced in patients with MP + HSV + CMV association.
2. During the basic treatment of the MP on the background of herpes virus infection violations persist in the system of nitric oxide. Inclusion in the complex treatment viferon, especially polyoxidonium promotes earlier restoration of the balance of enzyme eNOS and iNOS, preventing the overproduction of nitric oxide and peroxynitrite.

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Efficacy of laser therapy in infants with infectious-inflammatory respiratory diseases

Abstract: The developed schemes and regimes for assigning the low-intensity laser therapy percutaneous approaches to optimize the therapy of infectious and inflammatory diseases of the respiratory tract in infants, reduce the incidence of complications and loss of physiological diseases, speed up recovery periods.

Keywords: Respiratory diseases. infants, pneumonia, immune system.

Despite the fact that over the last decade in our country and the world have achieved significant progress in the diagnosis and treatment of infectious and inflammatory diseases of the respiratory system in infants, these diseases are still an acute problem not only pulmonology, pediatrics and as a whole. Thus, according to WHO, about 155 million cases of pneumonia in children in the world each year, with one killed about 1.4 million before the age of five years. Thus, this disease is one of the leading causes of child mortality worldwide [1; 2].

According to sample surveys in a number of cities on the stages of nursing infants, infectious diseases detected in 50–60 % of hospitalized children, preterm children — 70 %. Of these, up to 35 % of newborns come with purulent-inflammatory and other infectious diseases directly from maternity hospitals [3; 4].

Including 20 % of children pyo-inflammatory diseases are detected in the first 3–5 days after admission, which suggests their infection in the maternity hospital. Admission to the children's hospitals of the large number of infected infants poses a

threat for the occurrence of nosocomial diseases directly to the children's hospital.

In the course of the rehabilitation of patients with pneumonia of children along with the use of drugs, use non-drug remedies and treatments. It should be noted that non-drug program is still insufficiently used in pediatrics and the need for their propagation in the medical practice is evident.

Material and methods. We conducted a survey of 115 healthy and sick children with pneumonia received in-patient treatment CCCH number 1 in Tashkent. 34.8% of sick children came to the hospital in serious condition medium, while 36.5% received diagnosed with severe pneumonia. In 45% of the surveyed children combined with the basic pathology of infectious processes: catarrhal omphalitis, trombovaskulit of umbilical vessels, the phenomenon of acute respiratory viral infection, conjunctivitis, catarrhal otitis media, while 55% found concomitant pathology of the central nervous system.

Observed the children were divided into 3 groups.

The control group consisted of 18 healthy newborns; comparison group — from 45 infants with pneumonia who received conventional basic therapy according to current guidelines and standards, and the main group — 48 infants with pneumonia who received conventional therapy in combination with low-intensity laser radiation.

We used the "Vostok" laser therapeutic device for scientific research. Laser therapy was carried out according to the developed scheme taking into account the existing recommendations.

Results of investigation and discussion. In 94% of the children surveyed had acute onset pneumonia, clinically manifested wet cough (80%), symptoms of intoxication (95%).

Availability febrile fever during the early days of the disease was noted in 80% of cases. In 20% of cases occurring with normothermia. In 30% of cases the disease was preceded by ARVI. Typical local the physical changes in the lungs were detected only in 30% of cases. The remaining children were heard hard breathing, diffuse variegated wheezing. Tachypnea noted in 31%, tachycardia — in 48% of cases. In 15% of cases limited cyanosis of the skin in the nasolabial triangle it was expressed. In 10% of patients revealed mild hepatomegaly. Hemogram at first days of the disease characterized by leukocytosis and a shift in blood counts in 16% of cases.

All infants had radiographic evidence of pneumonia. In 86.6% of the changes in lung tissue had a focal, in others — the drain — focal character. Most often observed localization of bilateral pneumonic changes (66.6%). Most children diagnosed burdened premorbid background (71.6%). Among the background conditions prevailed secondary immunodeficiency states (14%), perinatal pathology of the central nervous system (27.7%).

Laser therapy in children with pneumonia was used with 2–3 day hospital stay, during the reduction of symptoms of intoxication and to reduce body temperature. By the end of LT 80% disappeared infiltrative changes in the lungs, improved clinical and laboratory findings (reduced or completely disappeared wheezing, hemogram indicators have stabilized — with the normalization of ESR and positive dynamics of leukocyte). All patients were well tolerated.

Conclusion

The effectiveness of laser therapy is expressed in the improvement of blood circulation, normalization of impaired circulation, activation of metabolic processes in the outbreak, reducing tissue edema, prevention of acidosis and hypoxia, a direct impact on the microbial factor and activation of the immune system.

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Surgical tactics in combined injuries of the bones of facial skull according to retrospective array

Abstract: The results of treatment of 3911 patients with combined injuries of the bones of facial skull were analyzed in the article. The issues of treatment of associated injuries, its surgical tactics take an important place among the urgent problems of modern surgery. The analysis has shown that variety of osteosynthesis classifications by time of performance, and contraversion data on immediate outcomes result to inconsistency of purely temporal approach in determining the treatment strategy for combined fractures of maxillofacial region, and necessity to develop new criteria and standards for selection of time, method and amount of traumatologic treatment.

Keywords: Combined maxillofacial trauma, surgical tactics, treatment criteria, osteosynthesis.

The problem of treatment of associated injuries has an important place among the urgent problems of modern surgery, traumatology, maxillofacial surgery, neurosurgery and other surgical disciplines. This can be attributed to difficulties in diagnosis and treatment of this category of victims, a high percentage of deaths and the poor results of treatment [4; 5].

In recent years the frequency of injuries caused by the rapid development of industry, construction, transport, highlighting the social and economic importance of the problem increased significantly [2; 6; 7].

In the treatment of combined injuries of the middle zone of the facial skull there are three main problems in the foreground: the timing of specialized care, the amount of surgical intervention and the method of fixation of bone fragments.

Selection of optimal terms of osteosynthesis is an important issue in clinic of combined maxillofacial fractures. This position is confirmed by a variety of osteosynthesis classifications by time of performance [2; 5].

Materials and methods of investigation

In accordance with the aims and objectives of the present study we conducted a complete retrospective analysis of treatment outcomes of 3911 patients treated in Republican Scientific Center of Emergency Medicine for the past years 2001–2010. Archival materials with associated trauma of maxillofacial region were copied. "In-patient card" (F.№ –003/y) was used as initial control material.

Striving for early osteosynthesis of maxillofacial bones, earliest activation of victims and prevention of complications, the indication and timing of operational intervention were estimated by different methods.

It allowed us to form two groups of surveyed victims and to carry a comparative analysis of peculiarities of traumatic disease (TD) duration, and closest treatment outcomes depending on the treatment strategy.

The first group of retrospective study included 2606 patients with combined trauma (CT) of maxillofacial region (MFR), treated at RSCEM from 2001 to 2007 (ARA — an array of retrospective analysis).

Indications and timing of osteosynthesis of maxillofacial bones in this group, with minimal risk to the patient, were established according to traditional separation of severity of the patient's condition and the severity of injuries.

The second group included 1305 clinical observations of the victims with combined injuries of MFR was treated at RSCEM from 2008 to 2010. In this group the possibilities to optimize surgical treatment of fractures were explored by using methods of objective estimation of the severity of injury (ACO — an array of clinical observation).

This article covers the issues of treatment tactics (time of specialized care, the amount of surgical intervention) in combined maxillofacial trauma according to the study of retrospective array.

Results of investigation and discussion

From 2003 to 2007, 652 victims were carried out 782 operations of osteosynthesis, that is, one victim had 1.2 osteosynthesis. Prevalence of fractures of the upper jaw in the general structure of maxillofacial fractures, determines a high proportion of intraosteal osteosynthesis method by Malyshev applied in 61.8 % of cases. Extrafocal osteosynthesis with Ya. M. Zbarzha, V.F. Rudko's apparatus or Kirschner-wire (K-wire) by M.A. Makienko's method were used in 32.2 % of the victims, mostly with fractures of the lower jaw, in 6.0 % of cases a combination of osteosynthesis methods was used.

Average period of osteosynthesis in a retrospective array was 8.2 ± 0.7 days. We used accepted periodization of TD in selecting a group of victims, depending on the timing of osteosynthesis (Gumanenko E., 1992).

The first group consisted of 122 patients (18.8 %) who got osteosynthesis on admission to the hospital, that is, in the first period of TD, characterized by acute disorders of vital functions. The second group was presented out of 125 patients (19.2 %), who had osteosynthesis on 2–3rd day, after relative stabilization of vital functions, constitutes the essence of the second period of TD.

During the period of maximal probability of complications, extending from 4 to 10 days and corresponding to the third period of TD, 255 patients (39.1 %) were operated, composing the third group.

Another 150 victims (22.9 %) carried osteosynthesis operation on the forth period of TD, characterized by a complete stabilization of vital functions, beginning with the 11th day after the injury. As seen from the data, the largest group of victims was operated on 4th day after injury – 62.0 %. Analysis of the dependence of the timing of osteosynthesis and leading localization of damage is shown in Table 1.

As follows from the table 1, osteosynthesis timing varied depending on location of the dominant damage.

So osteosynthesis is most commonly performed when the brain injury was the leading component of CT, while in the group of victims who carried osteosynthesis within 10-days, abdominal and pelvic injuries were dominated. On 2–3-4 days osteosynthesis is carried mainly to patients with dominant damage of maxillofacial region, that is, patients with multiple fractures of the maxillofacial region (42.5 %), where fractures of both jaws only were 12.5 %. Thus, while the role of damage maxillofacial region as a leading component of the CT decreases and severity of injuries of the abdominal organs and extremities injuries increases, declination of surgical activity against the fractures of maxillofacial area is observed. The analysis of dynamics of victims' condition severity during the process of treatment is presented in Table 2.

Table 1. – Localization of dominant injury in patients with combined trauma of maxillofacial region depending on the timing of osteosynthesis (%)

Localisation of dominant injury	Time of maxillofacial bones osteosynthesis' performance				Total
	On admission	2–3 days	4–10 says	Later than 10 days	
Head (face)	14.7	10.5	12.3	7.8	15.8
Neck	2.3	0.0	1.2	0.0	1.2
Chest	7.9	5.0	7.7	8.7	7.6
Abdomen	2.6	2.5	5.1	19.6	7.8
Pelvis	2.6	2.5	10.3	17.4	9.3
Spine	1.2	0.0	1.3	4.3	1.6
Extremities	51.1	67.0	42.9	25.0	50.6
Combined	1.8	0.0	5.1	6.5	6.1
Total:	18.8	19.2	39.1	22.9	100.0

Table 2. – The dynamics of the general condition of the victims

Severity of the victims condition	On admission		By the end of 1 st day		By the end of 3 rd day		By the end of 6 th day	
	Abs.	%	Abs.	%	Abs.	%	Abs.	%
Satisfactory	0.0	0.0	21	0.8	190	7.3	571	21.9*
Moderate	477	18.3	1256	48.2*	1535	58.9*	1514	58.1*
Severe	1816	69.37	1227	47.1*	844	32.4*	466	17.9*
Very severe	297	11.4	96	3.7*	13	0.5*	36	1.4*
Terminal	16	0.6	6	0.2	24	0.9	19	0.7
Total:	2606	100.0	2606	100.0	2606	100.0	2606	100.0

Note: * — statistically significant difference compared with the state on patients' admission ($p < 0.05$).

From the table we see that on admission to the hospital, most of them (69.7%) were in the severe and very severe (11.4%) state, the leading causes of choice were life-threatening consequences of injuries and traumatic shock (TSH). Intensive care was requested in 96.4% cases, surgical intervention — in 54% of the total number of victims.

Amount of emergency operations, performed on admission to the hospital, was 42.8%, urgent operations — 17.9%, deferred operations — 16.2% and 23.1% of planned operations. Although 61.9% of patients improved their state by the end of 1st day, positive trend mainly was supported by increasing in the number of victims in a moderate state up to 2.5 times, accompanied with extremely small number of victims in satisfactory condition (0.8%). This suggests that achievement of moderate severity state by the end of the first day in patients with CT should be considered as a success of pursued intensive care.

Reducing the rate of positive dynamics in victims condition in the next two days is explained by, first of all, the preservation of effects of life-threatening factors of trauma, and the second — with the development of complications.

The victims in moderate severity condition virtually remained the same 58.1% by the end of six days, satisfactory condition at that

time was observed in 21.9%, and severe conditions decreased from 69.7% to 17.9%. During this period, among the causes of victims' serious condition, the role of late complications, including pneumonia increases, because life-threatening effects of trauma, in most cases, have already been eliminated, or resulted in death.

On the other hand, analysis of the severity on the day osteosynthesis was performed, showed that most of the victims at the day of osteosynthesis was in a state of moderate (42.6%) and severe conditions (46.7%). 7.9% was in satisfactory condition and 2.8% — in critical. Table 3 shows the dependence of types of TD clinical duration upon the severity on the day of osteosynthesis.

From the data presented in this table, we can see that osteosynthesis performed in victims in satisfactory condition does not result in a subsequent fatal outcome and associated with low complication rate (7.6%). In the group of victims of moderate severity on the day of osteosynthesis the rate of complications was 47.7%; and 4.2% of complications were the cause of death. Group of victims in severe condition on the day of osteosynthesis, characterized by a higher rate of complications (41.9%), and in 5.8% of cases complications were cause of death.

Table 3. – The dependence of the clinical duration of TD upon the severity of the victims on the day of maxillofacial region bones osteosynthesis (n = 2606)

Severity of condition	Duration type						Total	
	Not complicated		Complicated					
			With favorable outcome		With un favorable outcome			
	Abs.	%	Abs.	%	Abs.	%	Abs.	%
Satisfactory	96	3.7	8	0.3	0	0.0	104	4.0
Moderate	446	17.1	175	6.7	26	1.0	647	24.8
Severe	297	11.4	156	6.0	115	4.4	568	21.8
Very severe	0	0.0	18	0.7	18	0.7	36	1.4
Total:	839	32.2	357	13.7	159	6.1	1355	52.0

In the group of patients with very severe condition the incidence of complications was 100%, and mortality from them — 50.0%. Such a big difference in terms of mortality in groups of victims who were in a state of moderate and severe conditions on the day of operations (4.0% and 24.8%, respectively), with equal frequency of complicated cases with favorable outcome of TD's duration (24.8% and 21.8%, respectively), may indicate the inadequacy subjective estimation of victims condition.

Surviving victims' average period of hospitalization was 53.2 ± 3.2 days. In half of the cases it has not exceeded 1.5 months, and 12% of the patients' hospitalization lasted more than 3 months. Only 4.5% of victims did not require treatment in the intensive care unit, and the rest of the victims treated in this department 6.9 ± 0.4 days in average. While in 33.7% of the cases, the duration of treatment should not exceed 3 days, in 23.8% — six, and in 24.2% — ten days. Thus, the treatment tactics in combined maxillofacial trauma, according

to a retrospective array, were based, on the one hand, on striving for an early performance of osteosynthesis, and on the other hand on a subjective estimation of the severity of patients' condition, allowing operation without the threat of complications and death. High variability of damage combinations of various regions of the body in CT, the processes of their mutual aggravation substantially restricted rational treatment strategy choices in combined MFT.

On the other hand, the subjective method of severity estimation in retrospective led to inadequate surgical tactics: overestimation of organism's reserves led to undue mortality, underestimation — to the loss of optimal terms for osteosynthesis due to complications development aggravating condition of the victims and postponing the time of this surgery on indefinite time. As a result, the average term for osteosynthesis to be performed was 8.2 ± 0.7 days, with 38.6% of patients underwent surgery during the period from 4 to 10 per day, that is the most likely period

for complications to occur. The severity of victims' condition was not determined so much by damage to maxillofacial region as damage to other areas of the body. Implementation of osteosynthesis on admission and during the first 24 hours in 16.8% of the victims identified the leading component of CT as damage of the brain, and in the group of victims who carried osteosynthesis within 10-days, abdomen and pelvis injuries prevailed. The highest frequency of multiple fractures of MFR (20.0%) of which only fractures of both jaws were 12.5%, resulted in a priority of the head as a leading component of CT in victims — those patients carried osteosynthesis mainly on 2–3rd day.

Type of osteosynthesis was determined by localization and nature of MFR fractures. Prevalence of the upper jaw fractures in

the overall proportion of fractures determined a high proportion of intraosteal osteosynthesis applied in 69.8% of cases. Extrafocal osteosynthesis with V. F. Rudko or Y. M. Zbarzha's apparatus used in 41 patients (20.3%), mainly with the fractures of the lower jaw.

Surviving victims' average term of hospitalization was 53.2 ± 3.2 days. 95.5% of victims needed intensive care, and its duration was 6.9–6.4 days in average.

Thus, the variety of osteosynthesis classifications by time of performance, and contradictory data on immediate outcomes, depending on this factor shows inconsistency of purely temporal approach in determining the treatment strategy for combined fractures of maxillofacial region, and necessity to develop new criteria for selection of time, method and amount of traumatologic treatment.

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Our experience of thoracoscopy application in diagnostics of pleuritis of unclear etiology

Abstract: This study includes 45 patients with pleural exudate of unclear etiology who underwent diagnostic thoracoscopy (TS). Etiology of pleuritis of unclear etiology was rather diverse, however in 36 (80%) patients, the cause of exudate accumulation were malignant tumors. Efficacy of thoracoscopy in the differential diagnosis of pleuritis of unclear etiology accounted 100%. Because of miniinvasiveness thoracoscopy may be recommended as method of choice at this pathology.

Keywords: thoracoscopy, exudative pleuritis, methothelioma.

Introduction

Long before the Swedish doctor Hance Hristian Yakobeus the first thoracoscopy with binocular endoscope was performed by the Irish Richard Cruise in 11-year-girl with pleuro-thoracic fistula in 1866 [1]. In XX century this method was used predominantly for diagnosis and treatment of tuberculosis for decades. Now the thoracoscopy has been used both in the benign pathology and malignant neoplasms. The obvious advantages of such operations are as follows: small traumacity, good cosmetic effect, minimal frequency

of complications and fast rehabilitation of the patients. To the present time in the oncological clinic the main indications for thoracoscopy have been developed:

- 1) pleuritis of unclear etiology;
- 2) disseminated process in the lungs;
- 3) précising diagnosis of the pulmonary cancer;
- 4) lymphadenopathy of the mediastinum;
- 5) benign peripheral pulmonary tumor;
- 6) solitary metastasis;

- 7) peripheral pulmonary cancer of the first stage (T1–2N0M0);
- 8) benign tumor of the mediastinum [1; 2].

The reasons of the pleural exudate may be as primary pleural tumors (malignant mesotheliomas), so as secondary (metastatic) its lesions. According to the literary data, from the first reference of the patient to the doctor to the establishment of the reason of pleuritis often lasts 3–4 months [3; 4], that considerably reduces efficiency of treatment and worsens the prognosis. So, the radical surgical treatment of the malignant mesothelioma of the pleura is possible to be performed only in 7–10% of the patients, and this, first of all, is connected to difficulties of diagnostics of disease. The pleuritis mostly often complicates progressing of the disseminated pulmonary cancer (25–50%), breast cancer (15–40%), ovaries cancer 10% [5], that testifies to late diagnosis and advanced stage of process, that, in its turn, requires the fastest specification of the diagnosis and beginning of the antitumorous therapy. The difficulties of differential diagnosis of the pleural exudates are well-known [6; 7; 8]. To establish diagnosis on the basis of the results of pleural liquid examination is failed approximately in 20% of all patients with pleuritis [9]. To establish diagnosis by pleural punctate may be made only in 50–60% of patients with metastatic pleuritis and 20% with mesothelioma of pleura [6, 10]. At the same time, when pleuritis is the first symptom of the tumorous disease one cytological confirmation is insufficient for establishment of the primary tumor. For this purpose there is required performance of histological and some times immunohistochemical confirmation for definition histogenesis of the tumor.

For diagnosis of pleural tumors and exudates of unclear etiology the thorascopic methods of examination have been used more widely over the last time [11; 12; 13; 14], which are carried out in order to obtain the high-grade biopsy material under the visual control [12] because cytological investigation of the pleural exudates as well as needle biopsy of the pleural exudates seem to be less effective and are accompanied by high (9%) number of complications [13; 15]. At the same time diagnostic accuracy of thorascopy in these patients is assessed differently and accounts from 90 up to 100% in comparison with 44% at needle biopsy of pleura and 62% in cytological examination of the liquid [7; 14].

The high efficiency of the TS in the differential diagnosis of pleuritis of unclear genesis is not doubtful [16; 17], but, unfortunately, a number of the authors recommend to apply it in last turn, after the opportunities of less invasive methods of diagnostics are exhausted [18]. This tactics results in loss of time and decrease of efficiency of the subsequent treatment and, as a consequence, to decrease of parameters of survivability.

The **purpose** of our research was to define efficiency of the thorascopy in the differential diagnosis of pleuritis of unclear etiology with use of the highly technological method of TC.

Material and methods of research

This study includes 45 patients, of them males were 24 and females — 21, who received treatment from 2009 to 2013 in the department of Thoracic oncology of the Republic Oncological center of the Ministry of Health of the republic of Uzbekistan. All patients underwent diagnostic TC with purpose to establish causes of the exudative pleuritis. The age of patients accounted from 21 to 70 years (mean age — 44.2 years). The turns from exudates The age of the patients has made from 21 till 70 years (average age — 44.2 years). Terms from exudates revealing to hospitalization was from 3 to 8 months. In 4 (8.9%) patients there was found bilateral liquid accumulation that aggravate their health state. 12 (26.7%) patients in terms from 1 till 5 years were treated

due to onological diseases, such as cancer of the lung, thyroid gland, breast, ovarian, kidney. All patients was performed pleural puncture with cytological investigation of the pleural exudates. By the results of researches it was not possible in any case to establish accurate diagnosis, that became the cause for performance of diagnostic videothorascopy.

The thorascopy in all cases was made under endotracheal anesthesia with method of separate lung ventilation with use of endoscopic advice of firm D-Light System/videocamera Telecam PDD SL/(Karl Storz GmbH, Germany). The patients with bilateral were operated on the side of the greater accumulation of the exudates previously performed pleural puncture with maximal liquid evacuation on the opposite side. Under the TC conditions the pleural liquid was evacuated and sent to the cytological investigation.

In cases of pleura lesions there was performed biopsy with forceps from 3–6 its mostly changed sites with the urgent and planned histological investigation of biosamples. The patients with primary tumors revealed (pulmonary cancer, malignant pleural mesothelioma) were determined degree of the loco-regional tumorous distribution with purpose to precise resectability.

Results of research and their discussion

At videothorascopy (VTS) there was found hemorrhagic liquid in 37 (82.25%) patients, and serous liquid of volume from 400 to 2200 ml. in 8 (17.8%) patients. The friable adhesions were determined in 22 (48.9%) patients, which were easily divided; and in 3 (6.7%) patients there were revealed extensive pleural adhesions which were divided into volumes required for VTS performance; in 5 (11.1%) there was noted collaboration of the lung due to fibrous adhesions as the result of long existed exudative pleuritis. The performance of VTS with biopsy provided establishment of etiology of exudative pleuritis in all the patients. The data received are presented in table 1.

Table 1. – Etiology of exudative pleuritis

№	Etiology of exudative pleuritis	Number of patients, n = 45	
		Abs.	%
1	Lung cancer	15	33.3
2	Pleural canceromatosis	10	22.2
3	Diffusive malignant mesothelioma	8	17.8
4	Tuberculosis	4	8.9
5	Sarcoidosis	4	8.9
6	Malignant thymoma	3	6.7
7	Nonspecific inflammations	1	2.2
Totally		45	100.0

According to the carried out research the efficiency of VTS in differential diagnosis of pleuritis of unclear etiology accounted 100%. With the purpose of definition of tactics for treatment at revealing primary malignant neoplasms the loco-regional distribution of the tumorous process was also specified. So, in 8 (17.8%) patients with the established diagnosis of “malignant mesothelioma” the tumor was characterized by diffusive distribution both in the parietal and visceral pleura as multiple nodular masses of various sizes. In 13 (86.7%) from 15 patients, in which the pulmonary cancer was a reason of accumulation of liquid, there were determined multiple defects both in the parietal and visceral pleura in form of microgranular changes, localizing, mainly, in the lower parts of the pleural cavity. Similar thorascopic picture was observed in 3 (6.7%) patients with malignant thymomas in which the primary tumors occupied the upper and middle floors of the anterior mediastinum and infiltrated its organs.

The results of treatment of exudative pleuritis in 10 patients with pleural canceromatosis were shown in table 2.

Table 2. – The causes of pleural canceromatosis

№	Causes of the pleural canceromatosis	Number of patients, n = 10	
		Abs.	%
1	Breast cancer	3	30.0
2	Kidney cancer	2	20.0
3	Soft tissue sarcoma	2	20.0
4	Ovarian cancer	2	20.0
5	Thyroid gland cancer	1	10.0
	Totally	10	100.0

The causes of bilateral exudates accumulation in the pleural cavities were pleural canceromatosis in 2 (50%) patients, malignant lymphoma — 1 (25%), tuberculosis — 1 (25%) patients.

It is necessary to note, that in our supervisions the etiology of exudative pleuritis was various enough: pulmonary cancer, metastases of the solid tumors mesothelioma, malignant lymphoma, tuberculosis, nonspecific inflammation and sarcoidosis. Nevertheless, it is extremely important to specify that in 36 (80%) patients by the reason of pleuritis were malignant tumours. Analyzing results of the study performed, it is possible to conclude, that TS resulted in cardinal change of clinicoroentgenological diagnosis in 9 (20%) patients, and in the rest 36 (80%) was essentially specified or complemented. The received data show insufficient reliability of existing noninvasive or miniinvasive (transthoracic section biopsy) methods of clinical examination in differential diagnosis of the exudative pleuritis.

The results of our research have shown, that informativity of TS allows not only to establish the cause of exudation but also adds knowledge about expansion of the tumor impairment. Also according to the data obtained in our investigations at presence of the pleural exudates related to the malignant pleural mesothelioma the use of TS provides assessment both to the character and distribution of the tumor process that is particularly important for determination of the strategy of the further treatment.

The obtained our information about the nature of so-called pleuritis of unclear etiology, particularly in the oncological patients, confirmed data both of native [11] and foreign researchers [13; 19]

about necessity of the prompt finding — out of their reasons and inadmissibility to use tactics of long unreasonable supervision and treatment. In 5 (11/1%) patients the complication has arisen as коллабирование of the lung on the side of pleuritis, that in some patients resulted in performance of pulmon- or lobectomy.

According to the results received the diagnostic TS may provide the reliable morphological diagnosis practically in all patients of the given category. It is impossible to say, estimating others devices, though less invasive, but also less exact methods of surgical diagnosis (cytological investigation of the pleural liquid, thin-needle aspiration biopsy of the pleura) which quite often appeared to be insufficiently informative and consequently not always useful at diagnosis of pleural exudates. The above-presented data allow us to share the opinion of the researchers, who consider the wider application of be necessary in relation to the diagnostic TS in the patients with exudative pleuritis, particularly in it long and persistent clinical progressing or suspicion on tumor etiology of disease [11; 14; 15; 20; 21].

On the basis of results of the study performed the following stages of diagnosis of pleuritis of unclear etiology are proposed at performance of the thoracoscopy:

- 1) evacuation of the pleural exudate, identification of the reasons of its accumulation and differential diagnosis; pleural exudate, revealing of the reason of his (its) accumulation and differential diagnostics;
- 2) repeated forceps biopsy, shown at presence of pleural neoplasms with subsequent urgent histological investigation of the slides (informative diagnosis — main criterion for diagnosis — basic criterion of diagnostics);
- 3) definition of the loco-regional distribution of the tumor processes (at primary malignant tumours) with an estimation of resectability.

Conclusion

The researches carried out show, that the diagnostic TS seem to be the method of choice in the differential diagnosis of recurrent pleuritis of unclear genesis resistant to treatment during 4–6 weeks, particularly in patients, having oncological diseases in the anamnesis. The use of TS in this pathology allows providing optimal way for use of the method with the purposes of improvement, both of diagnosis and subsequent treatment of intrathoracal neoplasms.

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Barrier-protective complexes of duodenum and their role in initiation and persistence of duodenal ulcers

Abstract: Aggression factors provoking epithelial level barrier complex disorder make possible the micro-organisms penetration and infiltration in deep layers of aggression factors components. It leads to development of pathologic reactions, inflammatory injuries of tissues and formation of micro-collectors which makes possible deeper penetration to stratum of duodenum and stomach wall. All above mentioned leads to appearance of peculiar circulus vituosus which is a structural base of persisting and chronization of gastroduodenal ulcers, development of their complications.

Keywords: gastroduodenal ulcers, barrier-protective complexes, Aggression factors, stomach, duodenum.

One the most important functions of gastrointestinal tract's (GIT) mucous membrane is barrier-protective one which is an important chain of unique process directed to saving of internal environment's constance [2–7; 11; 12].

W. A. Walker [12] divides GIT protective factors into non-immunological (local intestinal flora, secretions, gastric barrier, gastric motor activity), liver filtrational capacity, antibacterial substances: lysozyme, bile acids and others) and immunological or local immune system.

B. T. Ivashkin et al. [7] define two protection lines: the first is mucous layer produced by cells and the second one — the cells themselves.

Droy et al. [11] divide protective lines into pre-epithelial, epithelial and post-epithelial. They note that mucus, immunoglobulins, saprophytic micro-flora are the components of pre-epithelial protection (including lysozyme, lactoferrin, bacteriostatin and other substances). Saprophytes locating on the enterocytes surface protect them from dehydration, adsorb macromolecules, neutralize physical and chemical aggressines, promote protection from pathogenic microorganisms and their toxins. Epithelial line, by their data, abdicates from glycocalix, epithelial membranes and connective complexes.

The authors pointed that blood flow in mucous membrane besides trophic function provides the post- epithelial protection as well.

The scheme of protective barrier reported by M. T. Droy et al. [11] from morphologic point of view does not include many components providing barrier-protective function.

Investigations underwent on extensive clinical and experimental material covering a broad range of digestive tract different pathologies allowed to characterize in detail the structures of barrier-protective functions in correlation with each other [2–6].

There were defined three levels of protection: luminal, epithelial and connective-tissue [3–6].

Luminal level. From morphologic point of view it is presented by components of over-epithelial mucous layer having strict structural organization. It is made up from special cells secretions (mucus, pepsin, biologically active substances and others), from migrated epithelial and connective-tissue cells and from parietal micro-flora. Luminal level has an ability of self-regulation but it mostly depends on epithelial layer's conditions.

Epithelial level has been formed by epithelial lining structures. Epithelial cells with their intercellular connective complexes and intercellular spaces, intraepithelial lymphocytes, immunocompetent

cells and basic membrane refer to them. Condition of this level depends mainly on secretory activity of epithelial cell, lytic ability of their intercellular structures and the level of plasmatic membranes development. The role of intraepithelial immunocompetent cells has been described in details [1, 12]. Basic membrane besides of trophic and supporting functions has selectivity to let through various substances and micro-organisms.

Connective-tissue level consists of: basic intercellular substance; fibers and fibroblasts (non-specific passive phase); cells synthesizing non-specific protective factors — bioactive (eosinophil, mast cells); cells responsible for phagocytosis (micro- and macrophages); cells synthesizing specific protective factors — antibodies (plasmatic cells); micro-vessels walls structures (pericytes, basic layers, endothelial cells).

Change of cells morphologic conditions reflects the condition of protective barrier [3–6].

Any disturbance of structures' continuity and in the first place, epithelial lining providing the most important level of barrier-protective function is the base of aggressives penetration into deeper complexes and development of pathologic process. The role of helicobacters in appearing and persisting of gastroduodenal ulcers is the most bright example [5].

A. M. Khadjibaev et al. showed the presence of so called micro-collectors in the depth of gastroduodenal ulcers which are the base of their chronization and persisting [10]. This phenomenon has been registered as discovery — "Appearance of gastric juice through ulcerous defect in the stomach wall and in duodenum in patients with ulcerous disease" – № OT –12119, priority of discovery 06.02.1991.

Trigger of appearance and development of ulcerous defect and forming micro-collectors is a disorder of barrier complexes of stomach and duodenum mucous membrane. In the first place it refers to epithelial lining integrity disorder. It is conditioned by activation in luminal and parietal levels of aggression factors. These factors are made up as well from the presence of pathogenic micro-organisms in the lumen as activation of producing pepsinogen and hydrochloric acid [5].

But the bases of these initial injuries of epithelial lining at persisting, especially complicated by bleeding or perforation of duodenal ulcers have not been studied.

Goal: to estimate the integrity of duodenum epithelial lining at duodenal ulcers and their complications – perforations and bleedings.

Materials and methods

Biopsy materials received from dissected duodenal ulcers during surgeries and endoscopic investigations. There were 12 long-acting persisting not complicated ulcers, 18 complicated perforations and 22 with ulcerous bleedings and also control group (10 without pathologies of digestive tract) among them.

For *light microscopy* the samples were fixed in 10–12 % solution of neutral formalin. After appropriate processing the pieces were poured into paraffin cuts by 5–7 mcm. thickness were prepared. General morphologic picture has been studied on cuts colored by hematoxylin and eosin.

For *transmission microscopy* biopsy materials immediately after excision were fixed in 2.5 % solution of glutar aldehyde on phosphate buffer during 2–12 hours, washed in phosphate buffer, fixed in 1 % solution of osmium tetroxide and after dehydration in alcohol-acetone, poured into mix of epon and araldit.

Ultra slim cuts were prepared from received blocks on Ultracut (Reichert Yong) ultramicrotome which were contracted by solutions of uranylacetate and lead citrate (Ultrastainer LKB micro-processor) and were investigated on Hitachi-H-600 electronic microscope.

Investigation and photographing of preparations have been done with the help of Axioscope (Carl Zeiss) microscope with ProgRes, CapturePro 2.6 digital camera connective with Pentium IV PC.

Results and discussions

Undergone investigations showed integrity of mucous membrane, its epithelial lining in all investigated samples of the control group (fig. 1, 2).

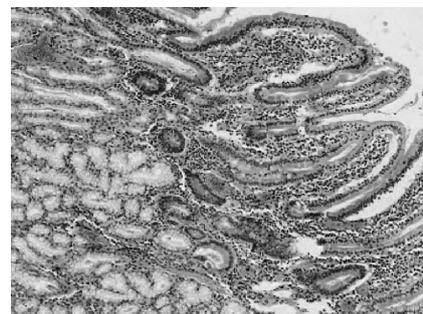


Fig. 1. Fringe with uninjured epithelial lining. Control G-E 10×10

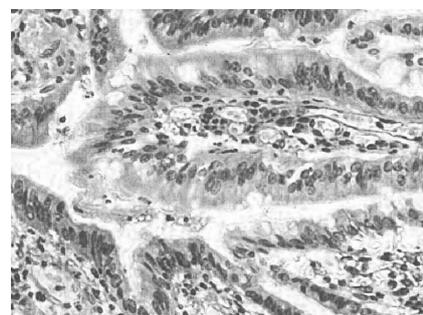


Fig. 2. Uninjured epithelial lining of fringe. Control G-E 10×40

At complicated ulcers (both perforated and bleeding) there is a disorder of epithelial lining integrity disorder with increasing mucus layer on its surface. Connective tissue cells and micro-organisms migrated from epithelial lining have been detected in mucus (fig. 3–5).

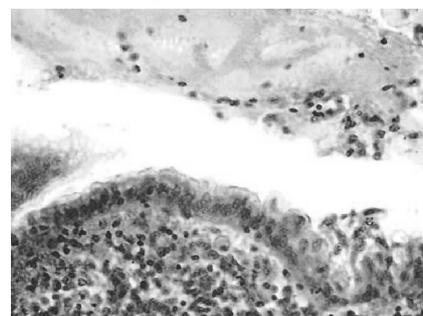


Fig. 3. Epithelial lining integrity disorder of fringe. Bleeding in stroma. Periulcerous zone of bleeding ulcer. G-E 10×40

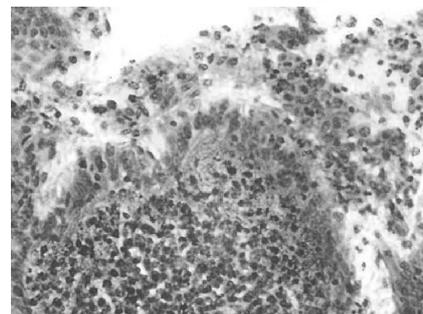


Fig. 4. Epithelial lining integrity disorder of fringe. A big quantity of connective tissue cells on surface. Bleeding in stroma. Periulcerous zone of bleeding ulcer. G-E 10×40

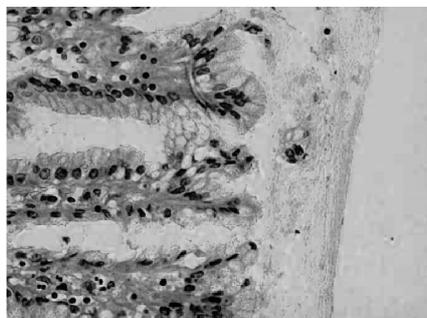


Fig. 5. Mucus layer thickening with micro-organisms over epithelial lining with damaged integrity near border of perforated duodenal ulcer. Phagocytosis by neutrophil of micro-organisms. G-E 10×40

Epithelial lining integrity disorder leads to cells of connective tissue migration increase into lumen including neutrophilic leukocytes and an ability of phagocytosis in luminal level of barrier-protecting complex. From the other side, epithelial level integrity disorder leads to a possibility of penetration different aggression factors deep into mucous membrane including pepsin, the other components of gastric juice and stomach content including micro-organisms. These factors action leads to disintegration of intercellular contacts and junctions. Connective complexes are broken, intercellular fissures are dilated (fig. 6).

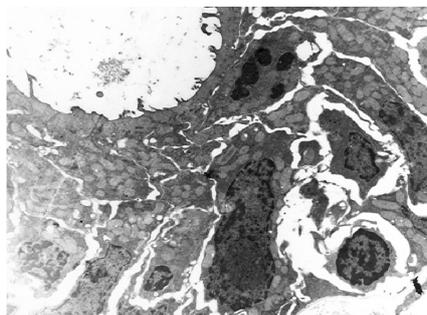


Fig. 6. Border of perforated duodenal ulcer. Dilatation of intercellular spaces, mitosis. TEM×5000

Contact of various micro-organisms including fungi with cells surface leads to alteration which aggravates epithelial level integrity disorder (fig. 7, 8). Different micro-organisms including those ones which are similar to helicobacters penetrates intercellular spaces (fig. 8).

Aggression factors provoking epithelial level barrier complex disorder make possible the micro-organisms penetration and infiltration in deep layers of aggression factors components. It leads to development of pathologic reactions, inflammatory injuries

of tissues and formation of micro-collectors which makes possible deeper penetration to stratum of duodenum and stomach wall. All above mentioned leads to appearance of peculiar circulus vituosus which is a structural base of persisting and chronization of gastro-duodenal ulcers, development of their complications.



Fig. 7. Fungi like *Candida* on surface of epithelial cells of bleeding duodenal ulcer. TEM×5000

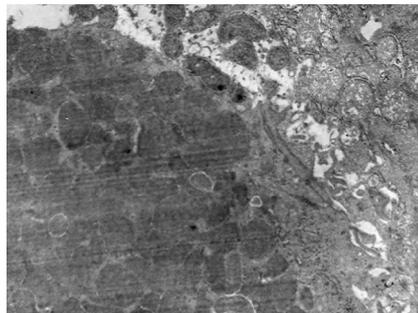


Fig. 8. Micro-organisms on surface of epithelial cells, border and of intercellular spaces of bleeding duodenal ulcers. TEM×15000

Conclusion

According to data received at present study it is possible to offer an algorithm of appearing, development and persisting of ulcers:

1. Aggression factors provoke epithelial level barrier complex disorder and it make possible penetration and infiltration of micro-organisms into deep layers of the other components of aggression factors.
2. Epithelial level barrier complex disorder leads to development of pathologic reactions inflammatory injuries of tissues and formation of micro-collectors.
3. It makes possible deeper penetration to stratum of duodenum and stomach wall. All above mentioned leads to appearance of peculiar circulus vituosus which is a structural base of persisting and chronization of gastro-duodenal ulcers.

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The contribution of polymorphism C634 G of gene VEGFA in development of cerebral vascular pathology in the patients with cephalalgic syndrome

Abstract:

Objective. The purpose of research is to study the importance of allele variants of polymorphism C634G of gene VEGF A in the development of the cerebro-vascular pathology.

Materials and methods of research. Materials and methods of research: There were studied 178 patients who form the main group receiving out-patient and stationary treatment in the Republican Clinical Hospital № 1. The control group consisted of 172 conditionally healthy persons of the Uzbek nationality.

Results. during the comparative analysis of frequency of distribution of the alleles and genotypes of polymorphism of gene VEGF A C634G.

Conclusion. Besides the frequency of unfavourable state was defined by homozygotic genotype G/G.

Keywords: cerebral vascular pathology, cephalalgic syndrome, polymorphism C634G of gene VEGFA.

The headache being multidisciplinary problem, reduce the quality of life of patients and result in significant burden to the economy of many countries in the world. Many factors have a great importance in the development of headaches, among them the special place is occupied by the pathology of the cerebral vessels. The more researchers have become interested in studying of this pathology over the last time. The molecular-genetic mechanisms of the development of the cerebral vessels underlie this pathology. Thus, one of the factor regulating the processes of the angiogenesis appeared to be vasculoendothelial grows factor (VEGF), which, first of all, has ability to induce angiogenesis and vasculogenesis. VEGF was isolated in 1989 by French doctor N. Ferrara, who was the first taking attention on its contradictory and dual role in the human body [1; 2; 3; 4]. Now it is shown, that VEGF, playing the important role in maintenance of endothelial stability and physiological neoangiogenesis, simultaneously take an active part in processes of neovascularization in the pathological situations, particularly, in the grow of atherosclerotic patch and neoplastic processes at oncogenesis [3; 7; 8; 9; 10]. The further study of VEGF role is considered perspective in relation to development of cardio-vascular diseases in the basis of which the processes of circulation disorders and ischemia lay (ischemic heart disease, disturbances of peripheral blood circulation, disorders of cerebral, retinal blood flow. The main ways of angiogenesis stimulation include stimulation of the proliferation

of endothelial cells; increase in permeability of vessels and regulation of the production of matrix metalloproteinase [1; 2; 3; 4; 5; 6; 11].

Among several allele variants of this gene the variant VEGFA C634G gains the special importance, because the replacement of nucleotide citozine by guanine in the position 634 occurs if it is available.

The purpose of research is to study the importance of allele variants of polymorphism C634G of gene VEGFA in the development of the cerebro-vascular pathology.

Materials and methods of research: There were studied 178 patients who form the main group receiving out-patient and stationary treatment in the Republican Clinical Hospital № 1.

The diagnosis in the patients was made on the basis of clinical-neurologic, neurovisualized examinations: CT of the brain with angiography or MRI of the brain with angioregimen, Molecular-genetic investigation of polymorphism C634G of gene VEGFA (rs2010963) was also carried out.

The control group consisted of 172 conditionally healthy persons of the Uzbek nationality.

Genom DNA from the samples of peripheral blood (VacutainerBectonDickinsonInternationalc EDTA) was isolated with use of kits “QIAamp DNA BloodMiniKit”, Qiagen (Germany), according to the instruction. Concentration and cleanliness of DNA were estimated on the spectrophotometer NanoDrop 2000

“ThermoScientific” (USA). Amplification was performed with the help of thermocycler Amp PCR-system 2720 (AppliedBiosystems, USA) with use of a commercial set of firm OOO NPF Litex (Moscow) accordingly to the instruction of the manufacturer.

Mathematical methods of the analysis.

The frequencies of alleles and genotypes (f) were calculated by standard formula:

$$f = n/2N \text{ and:}$$

$$f = n/N,$$

where n — prevalence of variant (allele or genotype), N — volume of sample.

The estimation of deviation of distributions of genotypes from initial distribution by Hardy-Vainberg Харди-Вайнберга was performed with the help of the computer program «GenePop» [12].

The relative deviation of the expected heterozygosis from observed (D) was calculated by formula:

$$D = (h_{\text{obs}} - h_{\text{exp}}) / h_{\text{exp}}$$

where h_{obs} and h_{exp} — observable and expected heterozygosis, respectively.

The estimation of the proportion of rates and 95 % Confidential Interval (OR and CI) was spent with the use a package of the program OpenEpi (ver. 9.3).

Results and discussion

The distribution of genotypes by rs 2010963 in the main and control samples corresponded to expected at balance Hardy-Vainberg (BHV). In the table 1 the estimation of observable and expected heterozygosis is also presented. As it is visible from the table, in both investigated groups the actual heterozygosis (H_{obs}) did not prevail expected (H_{exp}), and the level of observable heterozygosis was less than expected ($D = -0.05$ and $D = -0.04$, respectively).

Table 1. – The level of heterozygosis of polymorphism rs 2010963 of gene VEGFA in main and control groups

Groups	Heterozygosis		D	χ^2	P
	H_{exp}	H_{obs}			
Main group	37.22	34.83	-0.05	0.27	0.4
Control group	22.74	21.51	-0.04	0.114	0.5

In the main group polymorphism rs2010963 is characterized by relatively high level of theoretically expected heterozygosis ($H_{\text{exp}} = 0.37$), that is a parameter of average, but close to maximal (0.5), genetic variety in a population at diallele polymorphism. As it is known, by a level of observable heterozygosis it is possible to judge

a measure of genetic variability in a population. In the populational sample the least parameter of observable heterozygosis ($H_{\text{obs}} = 0.21$) is found out, that testifies to a possible low level of a genetic variety of our population by this locus (about presence of effect of the founder).

Comparative analysis of frequencies of genotypes and alleles of polymorphism of rs 2010963 of gene VEGFA of the control group with various clinical forms of the cephalalgic syndrome on the background of the pathology of the cerebral vessels allowed identification of a number of associations.

The frequencies of C and G alleles rs 2010963 of gene VEGFA in the main group of the patients accounted 75.3 % and 24.7 %, in the group of control — 62.5 % and 37.5 %, respectively (fig. 1 and tab. 1). The general predisposition to the pathology of cerebral vessels was associated with allele variant G. The relative chance of the development of the cerebro-vascular pathology for carriers of allele G increased reliably 2.2 times in comparison with carriers of the alternative allele C ($\chi^2 = 15.4$; $P < 0.05$; OR = 2.2; 95 %CI 1.47–3.239). Adverse allele G was reliably increased in the main group in comparison with group of control (24 % against 13.1 %) ($\chi^2 = 42.2$; $P < 0.05$; OR = 4.0; 95 %CI 2.58–6.145).

Then the results of the analysis of association of genotypes rs 2010963 of gene VEGFA with risk of the development of a pathology of the cerebral vessels (fig. 2) are presented.

The comparative analysis of frequencies of genotypes between groups of the patients and control also has revealed statistically significant differences. The frequencies of genotypes C/C, C/G and G/G rs 2010963 of gene VEGFA accounted: 76.2 %, 21.5 % and 2.3 % — in control group, 57.9 %, 34.8 % and 7.3 % — in the main. In the both studied groups the genotype C/C appeared to be the most widespread which was determined with frequency 76.2 % in the united sample of the patients and 57.9 % in sample of the control ($\chi^2 = 13.2$; $P < 0.05$; OR = 0.4; 95 %CI 0.27–0.68). The heterozygotic genotype C/G was determined 1.9 times more often in group of the patients (34.8 %), than at the control (21.5 %). These differences have achieved a level of the statistical significance ($\chi^2 = 7.6$; $P = 0.001$; OR = 1.9; 95 %CI 1.211–3.141). The frequency of unfavourable homozygotic genotype G/G in group of the patients was reliable higher in comparison with the control (7.3 % against 2.3 %). According to calculated coefficient of the ratio of chances, the risk of development of pathology of the vessels in the carriers of this genotype is higher 3,3 times reliably, than in carriers of other genotypes ($\chi^2 = 4.7$; $P = 0.03$; OR = 3.3; 95 %CI 1.05–10.36).

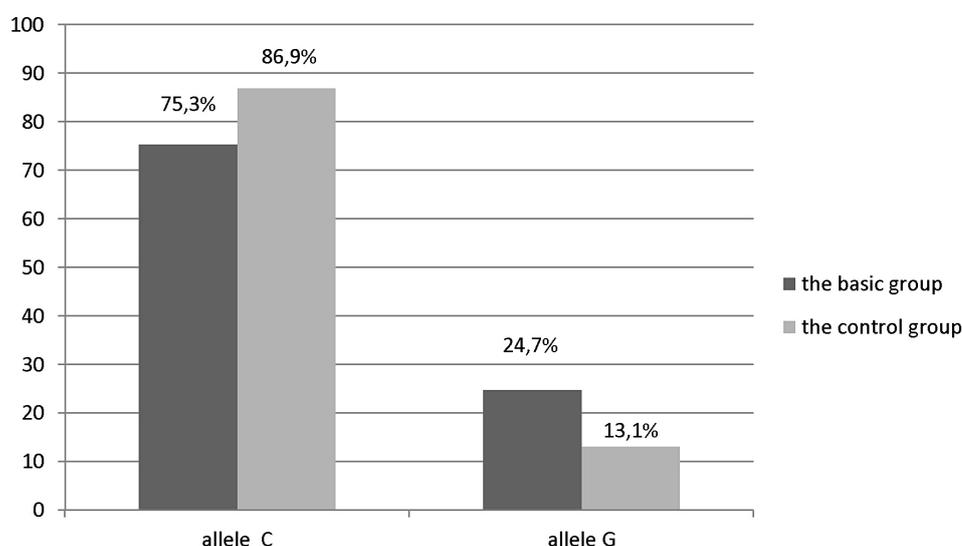


Fig. 1. Frequency of distributions of alleles of gene C VEGFA G 634

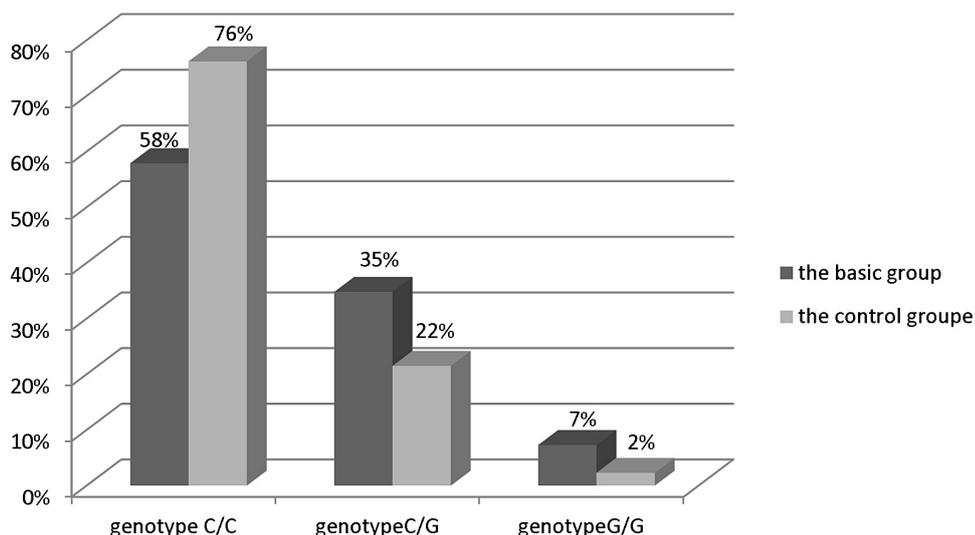


Fig. 2. Frequency of distributions of genotypes of gene C VEGFA G 634

Thus, during the comparative analysis of frequency of distribution of the alleles and genotypes of polymorphism of gene VEGFA C634G, between main and control groups the statistically reliable differences have been revealed. Thus the general predisposition to a pathology of cerebral vessels was associated with allele variant G. In the carriers of allele G the relative chance of development of a pathology of cerebral vessels was reliably increased in

more than in 2 times in comparison with carriers of alternative allele C. Besides the frequency of unfavourable state was defined by homozygotic genotype G/G, which was higher in group of the patients in comparison with the control (7.3 % against 2.3 %). So, the ratio of chances of the risk of development of pathology of the cerebral vessels in the carriers of this genotype was reliably high more than in 3 times, than in carriers of other genotypes.

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Indicators correlation among ferrokinetic performance, copper content in blood serum ceruloplasmin women with extended wear intrauterine device

Abstract: The aim was to evaluate the correlations between ferrokinetic indicators, copper and ceruloplasmin in serum of women with prolonged wearing intrauterine device (IUD). There was an inverse correlation relationship between transferrin and serum ferritin in women with IUDs, which increases with increasing duration of wearing the Navy. Within 12 months of the

correlation relationship between the content of copper and ceruloplasmin in the blood serum of women wearing the Navy has been positive, but weak. It has increased from the 18th month of wearing the Navy, but was of medium strength, and a strong, direct, positive relationship marked by 36 months of wearing a navy.

Keywords: Intrauterine device, honey, ceruloplasmin, ferrokinetic indicators, blood serum, correlations.

Exploring ferrokinetic parameters (serum ferritin and transferrin), the copper content and form of transport — ceruloplasmin serum can judge the latent forms of iron deficiency that develops after prolonged wearing of an intrauterine device (IUD) in women [1; 2; 3].

The existence of different relationships between the features of living things (biological individuals) in nature and various phenomena in society has been known since ancient times. Changing one feature or phenomenon leads to a change in another trait or event [4]. It is known that the relationship is divided into functional and correlation. The functional relationship is observed mainly in the physical and chemical processes, and correlation with biological and medical processes. In 1806, J. Kove brought the first results of the study of materials on relations between the signs in nature and coined the term “correlation” (from the Latin «correlatio» — relationship).

Correlation is assessing the relationship and variability between two or more phenomena and signs [5] and better reflects the pattern of change between the features and phenomena. In this regard, the aim of the study was to study and evaluate the correlation relationships between ferrokinetic performance, copper and ceruloplasmin forms of transport in the blood serum of women with prolonged wearing an intrauterine device (IUD).

Materials and methods

All women using copper IUDs T-shaped Cu T380A (study group) were assigned depending on the duration of wearing the Navy: 1 year (n=150); 2 to 3 years (n=150); 3 to 5 years (n=150).

The control group (n=40) have joined the women do not apply copper IUDs. All subjects were representative of age, living conditions, the number of pregnancies and births, permanent residence.

The criteria for inclusion in the main group of the study were: wearing a copper-bearing IUD T-shaped (Cu T380A), the absence of inflammatory diseases of the pelvic organs and cancer, the age of women from 20 to 49 years. IUD inserted according Muthal-Rathore A. (2004), which recommends the copper-bearing IUD T-shaped (Cu T380A) to insert at least 48 hours after the birth, taking into account the absence of infection and inflammation in the birth canal. Research carried out in the years 2009–2014 in Bukhara region.

Determining the level of ferritin and transferrin in the serum was performed by Buglanovu A. A. [6]. The content of copper and ceruloplasmin in blood serum were determined by photocolormetry on biochemical analyzer «Vitros Orto Clinical-diagnostics» Company “Johnson-Johnson” using special sets of the firm. For the correlation analysis of the material was used to determine the method of Spearman’s rank correlation coefficient (ρ). The presence of significant association between the studied signs judged with a coefficient of correlation — $\rho \leq 0.5$ [7].

Results and discussion. In the first stage of the research was carried out to study and assess the relative variability in transferrin and ferritin (ferrokinetic figures) women to apply copper-containing IUD, depending on the length of wear (Fig. 1). Investigations were carried out every 6 months.

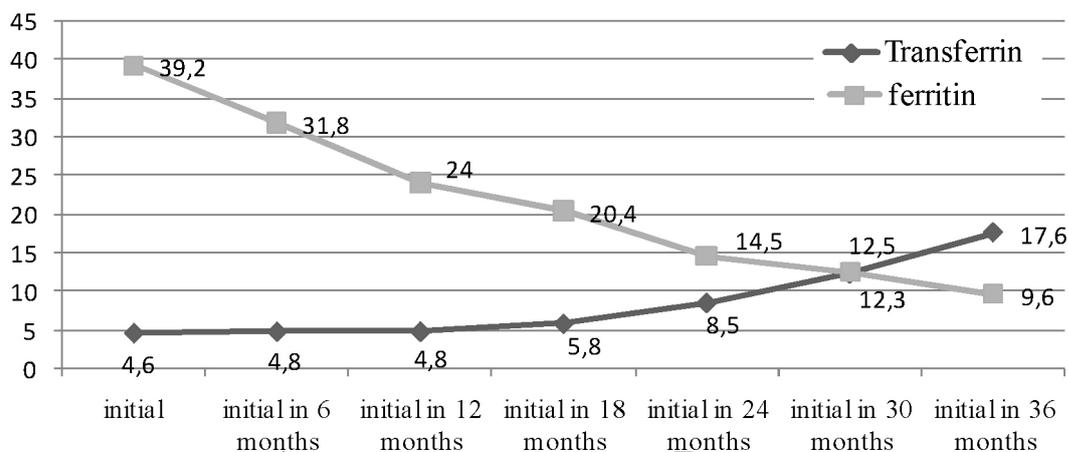


Fig. 1. Comparative parameters transferrin and ferritin levels in the serum of women, depending on the duration of wearing the IUD

The content of transferrin in serum initially (after the insertion of the IUD) was higher — 4.7 ± 0.3 g/l in comparison with normal (3.7 ± 0.05 g/l, $P < 0.05$) and timeI tended to increase. As serum ferritin observed the opposite picture — the original figure was 37.8 ± 2.3 pmol/l against 108.4 ± 1.7 pmol normal ($P < 0.001$).

The correlation analysis between the level of transferrin and ferritin in the serum of women shows that between these indicators there is a close inverse correlation. In early studies (baseline), this relationship is weak, negative ($p = -0.3$), but with increasing time of wearing the iron deficiency anemia it is amplified and over 6 months $p = -0.5$ (medium, negative correlation). Later (after 12 and 18 months), this relationship becomes strong, negative-respectively, $p = -0.7$. In other periods of observation revealed a negative relationship only intensified, reaching $p = -0.8$ (24 and

30 months). The most powerful, negative correlation is observed 36 months after insertion of the IUD, reaching $p = -0.9$. Strengthening the close, the negative correlation among the compared parameters indicates a clear relationship among the two women with IUDs. This fact proves the existence of a consistent relationship between these parameters that must be considered when choosing a method of contraception in this group of women and the time of wear.

Thus, the detected correlation relationship between transferrin and serum ferritin in women, which increases with time. The close, the negative relationship between them indicates the development of iron deficiency in women is associated with prolonged wear IUD. The data obtained can be used as an additional diagnostic and prognostic criterion for clinical and laboratory criteria of iron deficiency in women wearing IUDs. Apparently,

development of an imbalance between the transport and the standby forms serum iron determines the formation of more stable bonds in the regulation of iron metabolism in women with prolonged use of IUDs.

The next stage of research was to study the content of copper and its transport form — ceruloplasmin in serum of women with IUDs. It is found that initially (after inserting the IUD) in women copper content in the serum was significantly reduced by 1.3-fold ($P < 0.001$) relative to standard values (respectively

65.6 ± 3.1 mg/dl vs. 83.7 ± 2.4 mg/dL). But, with the lapse of time (6 months later) there is a gradual increase in this parameter, which is 30 months comes to normal values, and after 36 months, 1.7 times higher than the permissible level — $P < 0.001$ (Fig. 2).

The same trend as we have observed, and the level of ceruloplasmin, with the only difference that the original content of this parameter was increased with respect to the norm ($P < 0.05$) and gradually continued to grow, reaching to the last observation interval (36 months) to a maximum value — 747.2 ± 11.3 pmol/L ($P < 0.001$).

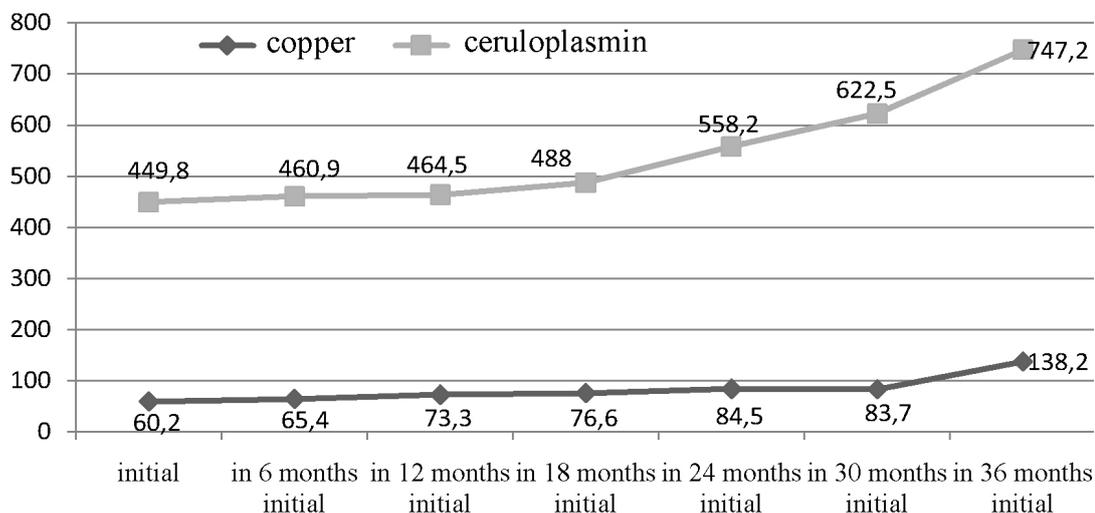


Fig. 2. Comparative parameters of copper and ceruloplasmin in serum of women, depending on the duration of wearing the IUD

Correlation analysis between the copper content and form of transport — ceruloplasmin shows that between these parameters have a direct, positive correlation, that is an increase of one indicator is closely linked to an increase in other settings. Initially determined weak, direct, positive relationship between the compared parameters ($\rho = 0.2$) is the same weak, a direct link is maintained and after 6 and 12 months of wearing the IUD (respectively, $\rho = 0.3$). Only from the 18th month revealed the relationship is strengthened and reaches $\rho = 0.5$ (average, direct, positive relationship). Eventually (after 24 months), this relationship is enhanced reaches $\rho = 0.6$, but after 30 months of wearing the IUD this relationship is weakened and reduced to $\rho = 0.4$. This coincides with the normalization of the copper content in the blood serum of women in the period of observation. But after 36 months of correlation between these indices increased sharply and there is a strong, direct, positive correlation ($\rho = 0.7$).

Furthermore, the study and evaluation of related options between copper and ceruloplasmin in blood serum shows that the baseline and within 12 months of correlation between the studied parameters was positive, but weak, that is the connection between the increase in their contents were insignificant. The relationship has intensified since the 18th month of wearing the IUD, but was of medium strength, and a strong, direct, positive relationship observed only after 36 months of wearing the IUD. This fact indicates a lack of related laws between copper and ceruloplasmin serum of

women with IUDs within 2–2.5 years. Main abrupt changes observed after 3 years of wearing the IUD, therefore, the presence of strong, direct, positive correlation between the compared parameters indicates a negative prognostic sign of wearing the IUD 3 years.

Conclusions:

1. An inverse correlation relationship between transferrin and ferritin serum from women with IUDs, which increases with increasing duration of wearing the IUD.
2. The presence of the close, the negative correlation relationship between transferrin and ferritin serum indicates the formation and development of iron deficiency in women associated with extended wear IUD.
3. Relationship between ferrokinetic parameters and duration of wearing the IUD can be used as an additional diagnostic and prognostic criterion for clinical and laboratory criteria of iron deficiency in women wearing IUDs.
4. At baseline and 12 months the correlation relationship between copper and ceruloplasmin in serum of women wearing the IUD has been positive, but weak. The relationship has intensified since the 18th month of wearing the IUD, but was of medium strength, and a strong, direct, positive relationship observed after 36 months of wearing the IUD.
5. Having a strong, direct, positive correlation between copper and ceruloplasmin in serum indicates a negative prognostic sign of wearing the IUD 3 years.

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Prognostic significance of transcription factor HIF-1 α in the regulation of NO — system in women wearing IUDs

Abstract: Women with IUDs is marked in red blood cell lysates synchronous oscillations HIF level — 1 α and NO options — system (NO content, eNO activity and iNOS, ONO concentration — 2); decrease in HIF-1 α is associated decrease in the level of NO, inhibition of eNOS activity, overexpression of iNOS and concentration of ONO₂⁻.

Keywords: intrauterine device, system of oxide, of transcription factor HIF-1 α .

Among the protective factors at the cellular and systemic level of importance is given to anti-hypoxic protein HIF-1 (hypoxia — inducible factor — 1) [1]. It is found that HIF-1 α coordinates the processes of proliferation, differentiation, and cell survival, as in stage of embryonic development and postnatal [3,4].

It was revealed that HIF-1 α regulates angiogenesis, erythropoiesis, glycolysis, vascular tone through stimulation of nitric oxide production mechanisms (NO) [7]. However, until now the role of NO and the HIF-1 α in the prevention of ischemic and reperfusion (IR) injury of the reproductive organs in their pathology is not fully understood. Some studies have shown that inhibition of NO synthesis prevents the formation of adaptive protection against IR uterine tissue damage [2,9].

Considerable interest in this regard is the work associated with wearing the IUD [6]. The protective effects of NO are related to its dilatation of vessels of internal organs, increased microcirculation, activation of antioxidant enzymes, stimulation of HIF-1 α [7], and damaging — TS overexpression of NO, an increase peroxy nitrite (ONO₂⁻), the activation of the pathological isoform of NOS — an inducible NO-synthase (iNOS) [5,7,8].

Given the above it can be assumed that as a result of wearing the IUD and the development of various complications (expulsion, inflammatory diseases of the uterus, irregular menstruation, heavy bleeding prolonged intrauterine), which occurs in 11–24% of women [2,10,13], an important factor in favor — endothelial dysfunction and hypoxia. At the same time, not only on a local level within the impaired microcirculatory bed of the uterus, but also at the system level.

In connection with the above, the purpose of the study was to evaluate the effect of extended wear IUD hypoxic transcription factor of HIF-1 α and NO Activity — system in erythrocytes.

Research methods. The study involved 150 women of reproductive age who use copper-bearing IUD for 3 years. The control group consisted of 40 apparently healthy women without IUDs. The criteria for inclusion in the survey group were women of reproductive age from 20 to 43 years ($33,6 \pm 2,15$ year) with the absence of inflammatory diseases of the pelvic organs and cancer.

In the history of the women surveyed were from 1 to 7 pregnancies and from 1 to 4 genera transferred from 1 to 5 abortions. According to the recommendations [3,4,11,13], copper-containing IUD T — shaped (Cu T 380A) is inserted after the birth in the absence of infection and inflammation. Studies conducted in the dynamics (in 3,6,12,24 and 36 months from the start of the inser-

tion of the IUD). Regularly, during the periods of wearing the IUD conducted clinical examination, we found the presence of pain, discomfort, volume and number of days of menstruation, and others.

The determination of HIF-1 α [9,11,12] prepared erythrocyte lysate. Proteins were separated on 8% polyacrylamide gel (Puggy). Transfer proteins PAGE nitrocellulose membrane electroelution was performed for 60 minutes. Western preincubated — blots were performed 60 min in PBS, containing 0,5% Tween — 20 and 5% skim milk. Then, Western — blots were incubated for 14 hours at 4 °C in a solution of polyclonal antibodies (Santa Cruz Biotech no logy) against HIF — 1 α in a dilution of 1:1000.

After washing, blots were incubated for 60 minutes in a solution of secondary antibodies conjugated with peroxidase N (Santa Cruz Biotech no logy) diluted 1:5000. Detection HIF — 1 α reaction was performed with ECL — calculations on Kodak company film followed by densitometry on penetrating densimeter DM — 1 (Russia). The results are expressed as% of total number of densitogram.

Activity markers NO — system was assessed by the content amount of stable NO metabolite (ONO₂⁻-ONO₃⁻) [9], eNOS activity [11], iNOS and ONO₂⁻ [1]. NO — the system was evaluated by spectrophotometry using dvuluchego Spectrophotometer UV VIS — 2100 (LTD, China).

The obtained data were processed using the computer program Statistika v.6. the reliability of differences counted. The original content of HIF-1 α , NO, activity of enzymes eNOS, NOS significant at $p < 0,05$.

Results and discussion. The concentration of ONO₂⁻ in the lysate of erythrocytes in women in the control group, and prior to insertion of the IUD were quite comparable. In the control group, as well as in women with IUD without complications up to 36 months of follow up were slight fluctuations of the studied parameters and did not differ from baseline (before ICH).

However, the Group WMC with anemia after 6 months there is a significant decrease in the concentration of HIF-1 α compared to the control — by 20,1% ($p < 0,05$), after 12 months was maintained in the same range as after 6 months observation. After 24 months, the level of HIF-1 α is practically no different from those in the controls, and then after 36 months was again reduced by 18,9% ($p < 0,05$).

It is believed that the decrease in HIF-1 α reflects the state of women's adaptability to the conditions of the observed groups

forming the urgent and long-term adaptation to the WMC. This is confirmed by the fact that we have found at least three groups: high- HIF-1 α — from 170 to 185% 7 (14.0%) patients, moderate between 140 and 170% — 33 (66.0%) patients and low — from 120 to 140% — 10 (20.0%) patients. 3 cases (30%), — That in patients with low levels of HIF-1 α the highest frequency of complications, such as inflammatory diseases of the uterus 1 α marked, excessive bleeding — 5 (50%), pain in the pelvis — 5 (50%). While in the whole group of the total number of examinees with expulsion and pain syndrome was diagnosed in 6 (12%), abundant uterine bleeding — in 9 (18%) patients, and inflammatory diseases of the uterus in 7 (14.0%).

Reducing the concentration of HIF-1 α simultaneously associated decrease in comparison with those in the control, such indicators NO — system as NO and eNOS expression on iNOS background and ONO $_2^-$. NO changes — the system in the lysate of erythrocytes were synchronous nature of the quantitative content of HIF-1 α . At the same time revealed correlation between the index of HIF-1 α with NO, eNOS, iNOS and ONO $_2^-$ and that amounted to an average of 6 months after wearing the IUD — $r = 0,61; 0,72-0,72$ and — 0.74.

After 12 months of wearing the IUD $r = -0,63; 0,70-0,71$ and 0.76. After 24 months of wearing the IUD $r = 0,55; 0,60; -0,86$ And 0.77. And after 36 months of use of the IUD is $r = 0,64; 0,76, 0,78$ and 0.78 ($p < 0.05-0.01$), respectively. The high correlation between the parameters of HIF-1 α and indicators of NO — the system indicates that the women adaptation mode to the WFC strengthens the processes of endothelial dysfunction and primarily due to stimulation of the pathological isoform of NOS — iNOS, and giperekpressii ONO $_2^-$ — has a high cytotoxic, tsistostaticheskim and suppressive effects [7,8,13].

However, attention is drawn to the fact that after 24 months indicator HIF — 1 α , NO, the eNOS activity, despite the high content of ONO $_2^-$. This, in — apparently caused by the activity of iNOS, were within the control that confirms by what mechanisms are formed in women with IUD and long -term resistance, is an adaptation of indicators.

It should be emphasized that women with high HIF — 1 α adaptability to the WFC, manifested in the practical absence of clinical complaints wearing a contraceptive, they do not have complications.

The absence of inflammation and bleeding in this group was due, on — apparently, that the tolerance of uterine vessels, its mucosa to the IUD.

However, long wearing IUD to 36 months reduces the possibility of adaptation HIF — 1 α , thus appears that the NO reduction, eNOS activity increasing reaction rate iNOS, cytotoxic form ONO $_2^-$. According to the literature, the high concentration of ONO $_2^-$ may be the cause of women's uterus, ovaries [5,12].

Thus, studies have shown that wearing dynamics IUD fluctuations observed in the lysate of erythrocytes HIF-1 α and indicators NO — system. Fluctuations of HIF-1 α and indicators NO — system are synchronous, which can be assumed to reflect the adaptation and reaction of the female body in the IUD, the availability of oxygen to tissues, regulation of vascular tone, which is essential for the functioning of the uterus.

Reducing HIF — 1 α , and the imbalance in the NO — system is characterized by increased damage to cellular systems on the level of the uterus, which manifests the development of complications. At the same time it revealed a clear relationship between the degree of NO — system, reducing HIF — 1 α and severity of wear IUD complications. Identify patterns depending of complications from HIF- level changes — 1 α and NO — the system allows them to be used as markers for the prediction and evaluation of the tactics of preventive and curative measures, depending on the length of stay in the uterus IUD.

Conclusions

1. Women with IUDs is marked in red blood cell lysates synchronous oscillations HIF level — 1 α and NO options — system (NO content, eNO activity and iNOS, ONO concentration — 2); decrease in HIF-1 α is associated decrease in the level of NO, inhibition of eNOS activity, overexpression of iNOS and concentration of ONO $_2^-$.

2. Revealed in the dynamics of increase in terms of women wearing IUDs statistically significant correlation between the levels of HIF-1 α and NO options — system.

3. There are three groups of women carriers of the IUD — high, moderate and low levels of HIF-1 α and functional activity of NO system that determines the nature and severity, the prognosis of complications. Women with IUDs high HIF — 1 α and functional activity of the system tolerance to NO IUDs, the complication rate is higher than in women with low levels of these parameters.

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Functional state of the autonomic nervous system in bronchial asthma in children

Abstract: These shifts vegetative status have undoubted positive effect on the microcirculation and the rhythm of the circulatory system, facilitating a more rapid liquidation of clinical manifestations of autonomic dysfunction and create psychoemotional patient comfort mode.

Keywords: nervous system, bronchial asthma, children.

As is known, autonomic tone has significant impact on the clinical manifestations of asthma (BA) [1; 4; 5; 7; 11]. Identified psychovegetative violations necessitate further development of AD therapies in terms of vegetative homeostasis correction using vegetotropic drugs [6; 8; 9; 10]. The purpose of the study. Was to examine the influence of a tranquilizer Phenibutum on vegetative status and clinical manifestations of asthma in children with initial sympathicotony.

Material and methods. All observed patients with initial sympathicotony divided into 2 groups. Patients of the first group (n = 40) sseived standard therapy alone (control group), and the second group of patients (n = 37) along with conventional methods

therapy plus Phenibutum. For greater reliability of observation and treatment of these children were held over the pair factor. Indicators reflecting the state the vegetative status of patients before and after one month of treatment are shown in Table I.

Results

Studies have shown that prior to the appointment of complex therapy in patients of both groups on the studied parameters revealed no significant differences. On the background of generally accepted standard therapy in patients of group 1 was observed a tendency to a decrease in heart rate, the number of breaths intersystem index. But after a month of therapy, none of the indicators were not significantly different from those on admission.

Table 1. – Dynamics of some vegetative parameters in patients with asthma (M \pm m)

Index	Patients in group 1	Patients in group 2	P1	P2	P3
Hr	108.01 ± 2.21 104.34 ± 2.23	105.82 ± 2.34 90.48 ± 3.04	> 0.05	< 0.001	< 0.001
Number of breaths	19.12 ± 0.96 18.23 ± 0.78	18.85 ± 0.64 16.61 ± 0.83	> 0.05	> 0.05	> 0.05
Intersystem index	5.68 ± 0.17 5.67 ± 0.16	5.58 ± 0.15 5.01 ± 0.14	> 0.05	< 0.01	< 0.01
Sbp	91.45 ± 1.89 91.29 ± 1.29	92.01 ± 1.78 95.34 ± 1.13	> 0.05	> 0.05	< 0.05
Dbp	60.42 ± 2.42 60.26 ± 2.62	61.76 ± 2.78 60.71 ± 2.29	> 0.05	> 0.05	> 0.05

The patients of the second group above figures differed significantly from that of patients in the first group. During treatment Phenibutum patients of the second group showed a significant slowing of the heart rate (HR) ($P < 0.001$), a significant reduction in

the number of breaths that led to a decrease ($P < 0.01$) coefficient Hildebrandt, reflecting the state of intersystem relations. Most of these indices is the activation of parasympathetic tone.

Table 2. – Dynamics of heart rhythm in patients with asthma initial sympathicotony ($M \pm m$)

Index	Patients in group 1	Patients in group 2	P1	P2	P3
Mo, sec.	$\frac{0.537 \pm 0.011}{0.571 \pm 0.014}$	$\frac{0.544 \pm 0.012}{0.669 \pm 0.021}$	> 0.05	< 0.001	< 0.01
AMo, %	$\frac{36.56 \pm 0.22}{30.04 \pm 0.41}$	$\frac{37.11 \pm 0.31}{24.19 \pm 0.47}$	< 0.001	< 0.001	< 0.001
AH, sec.	$\frac{0.089 \pm 0.002}{0.127 \pm 0.004}$	$\frac{0.094 \pm 0.003}{0.291 \pm 0.005}$	< 0.001	< 0.001	< 0.001
CDF, Conv	$\frac{0.089 \pm 0.002}{0.127 \pm 0.004}$	$\frac{0.094 \pm 0.003}{0.291 \pm 0.005}$	< 0.001	< 0.001	< 0.001
INI, Conv	$\frac{21.87 \pm 0.36}{9.26 \pm 0.49}$	$\frac{20.69 \pm 0.63}{5.14 \pm 0.27}$	< 0.001	< 0.001	< 0.001
AMo/AH	$\frac{384.2 \pm 10.3}{207.1 \pm 12.9}$	$\frac{362.9 \pm 13.6}{62.1 \pm 4.7}$	< 0.001	< 0.001	< 0.001
AMo/Mo	$\frac{410.8 \pm 16.8}{236.5 \pm 6.3}$	$\frac{394.8 \pm 13.4}{84.3 \pm 4.9}$	< 0.001	< 0.001	< 0.001
IN2, Conv	$\frac{68.08 \pm 1.24}{52.61 \pm 0.98}$	$\frac{68.22 \pm 1.27}{36.16 \pm 2.01}$	< 0.001	< 0.001	< 0.001
IN2/IN1	$\frac{762.2 \pm 37.7}{435.9 \pm 45.3}$	$\frac{812.0 \pm 43.6}{189.6 \pm 21.4}$	> 0.05	< 0.001	< 0.001

Note:

in the numerator — the figures before treatment in the denominator — after 1 month of starting treatment;

P1 — a significant difference before and after treatment in Group 1;

P2 — a significant difference before and after treatment in group 2;

P3 — the accuracy of the difference between groups after one month from the beginning of therapy.

Table 3. – Dynamics VPI after orthosample

Patients with baseline sympathicotonia	Dynamics VPI after orthosample					
	Amphotonic		Vagotonia		sympathicotonia	
	n	%	n	%	n	%
1-group (n = 40)	$\frac{0}{9}$	$\frac{0}{22.5}$	$\frac{0}{7}$	$\frac{0}{17.5}$	$\frac{40}{24}$	$\frac{100.0}{60.0}$
2-group (n = 37)	$\frac{0}{17}$	$\frac{0}{45.9}$	$\frac{0}{9}$	$\frac{0}{24.3}$	$\frac{37}{11}$	$\frac{100.0}{29.7}$

Index evaluation cardiointervalography also revealed certain changes vegetative parameters in both groups (Table 2), which is reflected in the significant increase in indicators such as AMo, INI, the CDF, and the reduction of Mo, AH. This proves the increase in sympathetic activity in the cardiovascular system, decreased activity of independent regulatory circuit activation and higher levels of management that is to centralize control.

After a month from the start of standard therapy in patients of the first group compared with the data on admission noted nonsignificant increase in channel activation of humoral heart rate regulation ($P > 0.05$), a significant decrease in the activity of the sympathetic the autonomic nervous system ($P < 0.001$) and increased activity of the parasympathetic division of the autonomic nervous system (ANS) ($P < 0.001$) reduction in the degree of tension of regulatory mechanisms of the body and the level of centralization of control circulation ($P < 0.001$). Complex therapy fenibuta resulted in a significant increase compared with those of the first group of Mo ($P < 0.01$), AH ($P < 0.001$) and reduction of indicators such as AMo, CDF, INI, AMo/AH, AMo/Mo ($P < 0.001$). It should be emphasized that a significant decrease in relations AMo/Mo ($P < 0.001$) and AMo/AH ($P < 0.001$) compared with patients in

the first group indicates sufficiently compensatory possibilities of restoring the parasympathetic division of the ANS and a significant reduction in the central (nervous) circuits and reducing the degree of centralization of heart rhythm.

Patients in both groups decreased during orthostatic test values AH and Mo (heart rate quickens) larger rate AMo, CDF, IN2 and derivatives AMo, Mo, and AH ($P < 0.05-0.001$). In both groups prior to the appointment of complex therapy autonomic reactivity hyper-sympathicotonic reaction characterized by a significant increase in the CDF, provided less pronounced compensatory parasympathetic reactions — AH low reserves, indicating that excessive tension in the sympathetic ANS and exhaustion function of the parasympathetic division. During treatment in patients with 1-group. There have been some favorable changes in vegetative tonus — appeared hey patients with (22.5%) and vagotonia (17.5%), which was manifested by reducing the number of cases from 100.0 sympathicotonia to 60.0% ($P < 0.01$).

Dynamics of vegetative tonus (ICT) In patients the original sympathicotony orthostasis (in %) showed in Table 3.

Distinct results were obtained in patients receiving Phenibutum. Thus, the majority of these patients responded to therapy veg-

etative balance (45.9%) and vagotonia (24.3%) and only 29.7% of patients continued sympathicotonic reaction. 1 patients group common standard therapy resulted in an increase in the number of patients with type normotonicheskim BP 10.8% asimpatikotonicheskim type — by 3.5%, which contributed to a decrease by 14.3% of patients with type gipersimpatiko-tonic autonomic reactivity.

Conclusions:

1. Conducted by standard therapy had no significant effect on the vegetative state patients with asthma sympathicotony original.

Continued gipersimpatikotonicheskaya vegetative reactivity in children is characterized by tensions adaptation reactions, which certainly requires medical correction.

2. Influenced fenibuta in patients with baseline sympathicotony positive adaptive changes occur, activation of parasympathetic ANS by reducing the activity of the sympathetic nervous system, reducing the sympathicotonic reactions by 68% by increasing the number of patients with and hey vagotonia.

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The relationship between immune and endocrine abnormalities in women with reproductive dysfunction and autoimmune thyroiditis

Abstract: The aim of the study was to examine the state of the immune and hormonal status of 90 women with reproductive dysfunction and autoimmune thyroiditis (AIT). To study the serum concentrations of the thyroid-stimulating hormone, free thyroxin, antithyroid peroxidase antibodies, antithyroglobulin antibodies and anti-inflammatory cytokines (IL-1 β , IL-6, IL-18, TNF- α), depending on the stage of AIT.

Keywords: autoimmune thyroiditis, cytokines, infertility, miscarriage.

One of the most common causes of infertility and miscarriage is a hormonal and immune imbalance occurs on the background of thyroid pathology [3, 14]. Carriage of antibodies to the thyroid gland is a common phenomenon among women of childbearing age (5–10%) and well-known risk factor for hypothyroidism [12]. In women suffering with infertility, hypothyroidism diagnosis occurs in 2–34% [11]. However, to date there is no single point of view on the role of antithyroid autoantibodies in the formation of reproductive disorders. On the one hand, antithyroid antibodies can serve as a marker of autoimmune

dysfunction and combined with other autoimmune process [7; 8], on the other hand, antithyroid antibodies can be an independent factor that has a direct negative impact on the fetus [10] and the implantation process [16]. There is no consensus regarding to the correction of the reproductive function in women with autoimmune thyroiditis yet. It is known that disturbances in the immune status forms to the clinical manifestations of both AIT and disorders in the reproductive system, which affects to the course of the disease, the severity of which is directly related to the intensity of the immune changes [2].

Objective: to study the dynamics of the parameters of immune and hormonal status in women with reproductive dysfunction and autoimmune thyroiditis.

Materials and research methods: It is surveyed 90 women who have applied to the City Perinatal Center in Tashkent (Uzbekistan) with reproductive dysfunction and autoimmune thyroiditis. The diagnosis of autoimmune thyroiditis was set on the basis of complaints, typical ultrasound picture of the thyroid gland, and increased content of antithyroid autoantibodies in the blood. The standards for inclusion of patients was increasing the level of antibodies to thyroid peroxidase (ATPO) and/or antibodies to thyroglobulin (ATG) more than 5 times with respect to the parameters specified in the test kit. Depending on the functional status of thyroid all patients with autoimmune thyroiditis were divided into 4 groups: hyperthyroidism ($n=20$), subclinical hypothyroidism ($n=20$), overt hypothyroidism ($n=20$), euthyroidism ($n=20$). The control group was consisted of 10 women with impaired reproductive function without thyroid disease.

The study of the hormonal profile was carried out in the City Perinatal Center laboratory. Determination of blood thyroid stimulating hormone (TSH), free thyroxine (fT4) was performed by method of enzyme immunodetection by using a standard set of firms «Human» (Germany). To determine the ATG and ATPO used standard «Insep» company sets (Russia). Study of cytokines: interleukin-1 β (IL-1 β), interleukin-6 (IL-6), interleukin-18 (IL-18) and tumor necrosis factor- α (TNF- α) was performed on the apparatus Stat Fax-2100 using standard sets of the company «Vector-Best» (Russian).

Ultrasound examination was carried out on the unit Mindray DC-3, for the study of the uterus and ovaries used Convex multi-frequency sensor (2.5–5 MHz.) and intracavitary probe (5–8 MHz.), thyroid scan used a linear multi-frequency transducer (5–10 MHz.).

Statistical processing of the results was carried out on a PC using standard packages applied statistical analysis software (Statistical Package for Social Science-22, Microsoft Excel). In order to determine the type of sample distribution of the test, Kolmogorov-Smirnov test was used. To analyze the results of the study were used nonparametric tests U-test and the Mann Whitney test for independent samples, the Wilcoxon test for dependent samples, Spearman rank correlation.

Results and discussions

The results of the analysis of the menstrual function of patients with AIT have shown a high frequency of oligomenorrhea (42.5%), which was found mainly among patients in the stage of overt hypothyroidism, amenorrhea less common (10.0%) and polymenorrhea (4.0%). Ovulatory dysfunction was observed in 46.3% (37) women, it was more common when the manifest hypothyroidism (in 14). The lack of the luteal phase was detected in 30.0% (24) women and was noted more frequently in women with hyperthyroidism (9). Luteal syndrome nonovulated follicle was observed in 24.0% (19) cases was mainly characteristic for patients in stage euthyrosis (10). Among all patients with AIT in 41.3% of women diagnosed with early pregnancy miscarriage, at 58.7% of infertility.

Results of the study parameters of thyroid status in women with AIT showed that in the group of women with AIT in the stage of hyperthyroidism TSH level was 0.2 ± 0.1 mIU/L (vs. 2.2 ± 0.7 mIU/L in the control, $p < 0.001$), fT4 was 2.2 ± 0.3 ng/dL (vs. 1.5 ± 0.2 ng/dL in the control, $p < 0.001$). In women with subclinical hypothyroidism TSH was 7.6 ± 4.8 mIU/L (vs. 2.2 ± 0.7 mIU/L in controls, $p < 0.001$), fT4 – 1.3 ± 0.2 ng/dL (vs. 1.5 ± 0.2 ng/dL in the control, $p < 0.05$). In women with manifest hypothyroidism TSH level was 13.8 ± 5.5 mIU/L (vs. 2.2 ± 0.7 mIU/L in controls, $p < 0.001$) and fT4 – 0.5 ± 0.1 ng/dL (vs. 1.5 ± 0.2 ng/dl in controls, $p < 0.001$).

In women with AIT in stage euthyrosis statistically significant differences in the level of TSH and fT4 compared with the control group were found. The highest ATPO and ATG have been reported in women with autoimmune thyroiditis in the stage of subclinical hypothyroidism (1332.3 ± 927.2 U/ml and 578.5 ± 645.2 IU/mL, respectively) and overt hypothyroidism (1289.3 ± 1022.6 IU/mL and 741.8 ± 501.1 IU/ml, respectively).

According to Vikgem's study, the annual risk of hypothyroidism in women with elevated ATPO and euthyroid is 2.1% [17]. The specific autoantibodies can serve as markers of the occurrence of the failure in pregnancy induced cycle [6]. The presence of high titers ATPO and ATG is associated with adverse pregnancy outcomes [13; 15], even in women with euthyroid [9].

The results of the study of pro-inflammatory cytokines, IL-1 β , IL-6, IL-18 and TNF- α in patients with AIT, significantly different from the values that was obtained in the control group. It is known that IL-1 β is a leading cytokine cascade in the inflammatory response, the highest values were observed in patients with hyperthyroidism (83.2 ± 44.2 pg/ml) and euthyroid (81.1 ± 49.6 pg/ml). Less severe reactions were observed during the manifest hypothyroidism and the concentration of IL-1 β was 63.1 ± 47.7 pg/ml. A different pattern was observed in the level of IL-6, which according to the literature is both pro-inflammatory and anti-inflammatory cytokine. The highest values were found in subclinical hypothyroidism (133.9 ± 66.2 pg/ml), relatively low — thyrotoxicosis (88.9 ± 62.5 pg/ml). IL-18, also known as IFN- γ -inducing factor by itself or IFN- γ stimulates apoptosis initialization process [5]. The values of IL-18, remained within the legal parameters for all patients with Hashimoto's thyroiditis, but were significantly lower compared to the control. The highest values of IL-18 were observed in patients with thyrotoxicosis (194.0 ± 82.2 pg/ml). In all patients with autoimmune thyroiditis, regardless of the phase of the autoimmune process determined reliably high levels of TNF- α , particularly in the group of women with euthyroid (79.9 ± 62.0 pg/ml).

According to M. M. Orlova (2012) and E. S. Kesaeva (2013) in patients with chronic autoimmune thyroiditis development characteristic cytokine imbalances that manifest increase in the content of pro-inflammatory (IL-1 β , IL-6, IL-8, TNF- α , IFN- γ) and anti-inflammatory cytokines (IL-4, IL 10) [1, 2]. According to the authors at AIT indicator IL-1 β was increased 3,4 times, IL-4 is 5.3 times, IL-6, 2,2-fold, TNF- α 3 times IFN- γ 2.5 times [1]. The results of our study indicate significant deviations IL-1 β , IL-6 and TNF- α in all patients with Hashimoto's thyroiditis, both in the stage of hypothyroidism and hyperthyroidism and euthyrosis.

As mentioned A. A. Yunusov (2014), the degree of activation of pro-inflammatory cytokines is directly dependent on the amount of thyroid cancer in women [4]. Correlation analysis of cytokine levels with the volume of thyroid spent E. S. Kesaeva et al (2012) did not reveal any direct link between these parameters [1]. We studied the correlation between immune and hormonal parameters differentially depending on the functional state of the thyroid gland. The results are shown directly proportional relationship between IL-1 β , IL-6 and TNF- α in all patients with Hashimoto's thyroiditis, regardless of the functional state of the thyroid gland. In hyperthyroidism stage revealed a direct correlation between IL-1 β and IL-6 ($r = 0.84$, $p < 0.01$), IL-1 β and TNF- α ($r = 0.57$, $p < 0.01$) between IL-1 β and ATPO ($r = 0.48$, $p < 0.05$), IL-6 and TNF- α ($r = 0.47$, $p < 0.05$), IL-6 and ATPO ($r = 0.52$, $p < 0.05$) and an inverse correlation between TSH levels and fT4 ($r = -0.82$, $p < 0.001$). At the stage of subclinical hypothyroidism was observed a direct correlation between IL-1 β and IL-6 ($r = 0.81$, $p < 0.001$), IL-1 β and TNF- α ($r = 0.80$, $p < 0.001$)

and IL-6 and TNF- α ($r=0.65$, $p<0.05$). In women with AIT in the stage of overt hypothyroidism was observed a direct correlation between IL-1 β and IL-6 ($r=0.82$, $p<0.001$), IL-1 β and TNF- α ($r=0.91$, $p<0.001$) between IL-6 and TNF- α ($r=0.72$, $p<0.001$), IL-6 and ATPO ($r=0.51$, $p<0.05$) and an inverse correlation between TSH levels and fT4 ($r=-0.51$, $p<0.05$). In euthyroid stage there was a direct correlation between IL-1 β and IL-6 ($r=0.73$, $p<0.001$), IL-1 β and TNF- α ($r=0.78$, $p<0.001$), IL-1 β and ATG ($r=0.44$, $p<0.05$) between IL-6 and TNF- α ($r=0.54$, $p<0.05$) and IL-18 and TNF- α ($r=0.48$, $p<0.05$).

Thus, the study of the dynamics of the parameters of immune and hormonal status and the results of correlation analysis indicate a close relationship between hormonal disorders and immunological changes in patients with Hashimoto's thyroiditis and reproductive dysfunction.

Conclusions:

1. Identification of high levels of pro-inflammatory cytokines and dynamics, depending on the phase of the AIT confirms the role of immune disorders in the development and progression of thyroid dysfunction at AIT.
2. The results of the analysis of correlation showed a directly proportional relationship between IL-1 β , IL-6 and TNF- α in all patients with Hashimoto's thyroiditis, regardless of the functional state of the thyroid gland.
3. There was a direct correlation between IL-1 β and ATPO, IL-6 and ATPO under thyrotoxicosis, between IL-6 and ATPO under euthyroidism between overt hypothyroidism and IL-1 β and ATG in phase euthyroidism.
4. The data may serve as inputs in assessing the dynamics of the autoimmune process and the effectiveness of the therapy.

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The impact of demographic change on the incidence of breast cancer in Uzbekistan

Abstract: In the cancer incidence breast cancer (BC) ranks first with a specific gravity of 11.7% among the female population in Uzbekistan. The areas of increased and reduced disease risk are identified. The incidence of breast cancer is associated with the peculiarities of medico-demographic situation in the regions. The incidence of breast cancer among the population is

significantly affected by the average age of the women (59.6 %) and the odds of divorce rates (27.4 %), less mortality (11.5 %) and fertility (-9.5 %).

Keywords: breast cancer, the medico-demographic situation of Uzbekistan.

Introduction

The incidence of breast cancer (BC) is increasing worldwide. According to IARC in 2012, the most common cancer was lung cancer (13 %), breast cancer (11.9 %), colorectal cancer (9.75 %). From 2007 to 2012 there has been a sharp increase in the incidence of breast cancer. In 2012, 1.7 million women were diagnosed with breast cancer. In comparison with data for 2008, the number of cases of breast cancer increased by 20 %, mortality increased by 14 %. Breast cancer is the most common cause of death among women with cancer (522 000 deaths in 2012) and the most frequently diagnosed cancer among women in 140 of 184 countries. Today, one in four women with cancer suffers from breast cancer [7, 1–3]. In the structure of cancer incidence breast cancer ranks first among the female population of Russia and the CIS States. It ranks from 18–22 % in Russia, Belarus, Kazakhstan and Kyrgyzstan to 25–33 % in Uzbekistan, Azerbaijan, and Armenia [3, 77–78]. The prevalence of malignant tumors of the mammary gland to some extent related to demographic characteristics of the population. The study analyzed the relationship between the predictors characterizing the demographic situation (birth rate, marriage rate, divorce rate, death rate, life expectancy, migration and the average age of women), and standardized performance (SP) in the incidence of malignant mammary tumors.

The purpose of the study is to study the impact of key demographic and health indicators on the incidence of breast cancer.

Materials and methods

The incidence of breast cancer has been studied on the territory of the Republic of Uzbekistan covering its 14 administrative regions, including the city of Tashkent. Source material for the study of epidemiological and statistical data on breast cancer were included into the cancer register of the National Cancer Center. Data on the numerical composition of the population in the regions, birth rate, marriage rate, divorce rates, mortality rates, life expectancy and migration were obtained [1, 70–71] and from official site of the State Committee of the Republic of Uzbekistan (www.stat.uz). The calculation of the intensive and standardized indicators was carried out according to methodical recommendations of the Moscow Research Oncology Institute n. a. P. A. Herzen [4, 116–123]. To determine the effects of demographic factors on the incidence of breast cancer we conducted a paired correlation analysis Karl Pearson and the formation of a linear regression model. To calculate the predictive incidence a linear regression equation was built. Found measure of relationship is expressed by the equation:

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + \dots + b_n X_n,$$

where Y is the dependent attribute; a is the constant, X_1, \dots, X_n — independent characteristics; b_1, \dots, b_n — regression coefficients. To establish the level of difficulty of communication dependent symptom Y with the whole set of factor signs X_1, \dots, X_n , we calculated the coefficients of multiple correlation (R). Because the multiple regression model was based for the sample population, significance of coefficient of multiple correlation R was monitored by means of F -criterion of Fisher [5, 213–221].

When interpreting probabilistic estimates of the outcomes of the observations we take into account that the truth of the result is not determined for a wide General population, and the degree of regularity doesn't regards to accidental actions [6, 17–52]. The

contribution of factor (X_i) in the formation of the incidence rate (Y) was calculated by the formula:

$$K_i = \frac{\beta_i}{\sum \beta_i} \cdot R^2 \cdot 100\%,$$

where K_i — is the contribution of the corresponding factor (X_i), R^2 — determination coefficient, β_i is the standardized coefficient Beta of the corresponding factor (X_i). Statistical analyses were carried out using the programs Excel 2003, Statistics 6.0.

Results and discussion

Breast cancer is one of the main localizations of malignant tumors among women of the Republic. From 2001 to 2010 a total of 18 671 breast cancer cases was registered. The absolute number of cases in 2010 to 1.51 times more than in 2001, the proportion of breast cancer in the structure of oncologic morbidity of female population has increased from 7.0 to 11.75 %. High this indicator is high in Tashkent (15.0 %), Tashkent region (14.0 %) (in the Republic of Uzbekistan, 2010 — 11.75 %). The most negative effects of breast cancer was relevant for women young and middle age. At the age of 44 years, the share of the disease in the structure of oncologic pathology in women is 24.5 %, 45–64 is 26.8 %, 65 years and older is 13.7 %, i. e. practically every fourth malignant tumor found in women young and middle age [7, 95–97]. One of the main indicators characterizing demographic situation in the study area is the birth rate, which is the positive process of reproduction of the population. Complex factors such as socio-economic circumstance in the country, the situation of women in society, the level of medical care to mothers and children, national and religious traditions, etc. affect its value. Analysis of correlations between incidence of breast cancer female population of administrative territories of the Republic for 2010 and demographic predictors revealed the presence of a negative relationship between morbidity and fertility rate ($R = -0.90$; $p = 0.05$). Higher fertility was observed in areas with a high proportion of indigenous inhabitants (tab. 1).

The birth rate in Jizzakh (of 23.2 %), Kashkadarya (from 24.4 %), Samarkand (to 24.1 %), Surkhandarya (24.6 %) and Khorezm (23.0 %) regions during the period analyzed was slightly higher than the national average (22.6 %). Low birth rates are typical for urbanized areas: Tashkent (21.20 %) and Navoi (21.6 %) regions, with a high proportion of the urban population (at 39.6 % and 39.9 %, respectively; the national average of 36.4 %) and expressed as factor of migration (migration outflow of 10.6 % and 16.1 %, respectively; the national average 6.56 %). An important cause of birth control — the instability of conjugal relations. The higher the divorce rate, the lower the number of births. The direct correlation between morbidity and the number of divorces, the greater the number of divorces in the population ($R = 0.87$; $p = 0.05$), the higher the incidence rate (Fig. 1).

Higher incidence is observed in areas with relatively high rates of divorce rates per 1000 population — in the city of Tashkent (1.56 %) and Tashkent (0.85 %), and Syrdarya (of 0.83 %). Minimal values are typical for areas, where there are mainly inhabitants of the indigenous nationality: Surkhandarya (to 0.24 %) and Kashkadarya (0.3 %).

Determining the reproductive behavior of the population, marriages and divorces affect fertility. Divorce leads to a reduction of the reproductive period of women. Mortality rates and life expectancy

of the population are the main criteria characterizing the demographic situation. As you know, social and environmental factors have a complex impact on the nature and trends of mortality. The mortality was significantly influenced by lifestyle, working conditions, social infrastructure, etc. Higher incidence of breast cancer

observed in areas with relatively high rates of General mortality of the population in Tashkent city (7.2%) and Tashkent (5.9%), Andijan (5.0%) and Syrdarya (5.2%) regions. Found a direct linear correlation between SP the incidence of breast cancer and the coefficient of total mortality (Fig. 2).

Table 1. – Demographic characteristics of the regions of the Republic (2010)

Region	The standardized incidence rate per 100,000 population	Mean age	The rate per 1,000 of the population		
			Fertility	The divorce rate	Mortality
The Republic of Karakalpakstan	8.5	27.2	23.24	0.55	5.11
Andijan	11.2	28.2	23.51	0.54	5.04
Bukhara	11.1	28.8	21.45	0.55	4.57
Jizzakh	11	27	23.22	0.44	3.97
Kashkadarya	8.3	26.4	24.41	0.30	3.92
Navoi	10.8	28.6	21.61	0.58	4.67
Namangan	6.6	27.6	22.49	0.75	4.67
Samarkand	8.6	27.1	24.11	0.60	4.57
Surkhandarya	6.5	26.2	24.62	0.24	4.07
Syrdarya	10.6	26.6	22.76	0.83	4.82
Tashkent	14.3	29.6	21.20	0.85	5.94
Fergana	10	28.3	22.96	0.48	5.16
Khorezm	9.3	27.2	23.03	0.57	4.49
Tashkent city	26	33.5	17.59	1.56	7.22
Across the republic	10.9	28.0	22.67	0.63	4.94

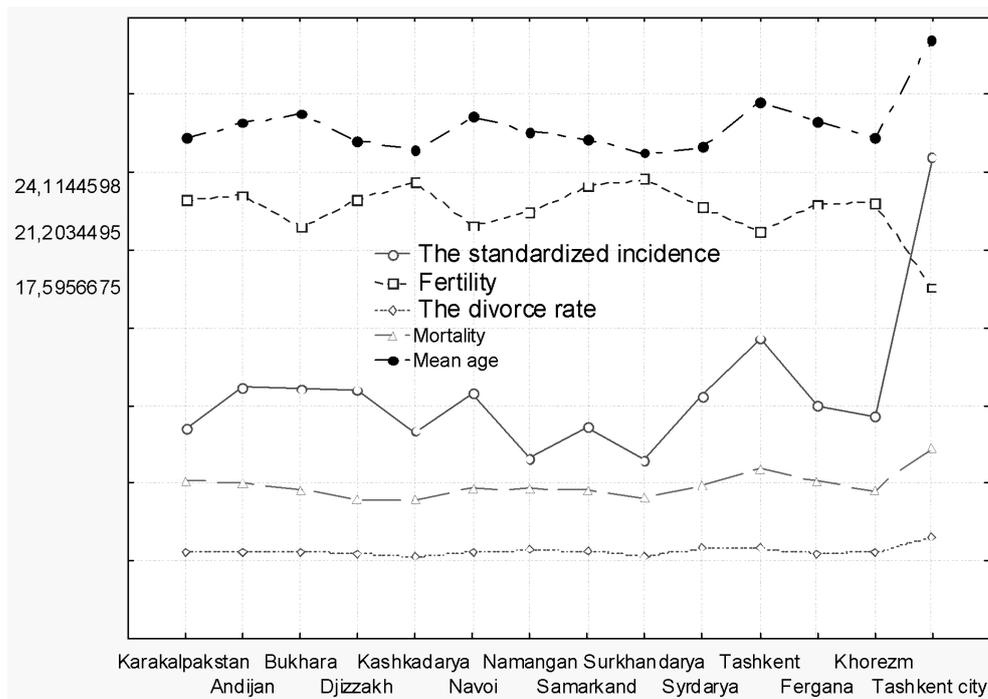


Fig. 1. The standardized incidence of breast cancer, fertility rates, mortality rates, divorce rates and the average age of women in the areas of the Republic

The higher mortality rates in the population ($R=0.87$; $p=0.05$), the greater the incidence. This is because in areas with high mortality partly women die from breast cancer.

As it is known, age is an important risk factor. The likelihood of developing breast cancer increases in proportion to age. Malignant breast tumors most often affect people older than 60 years. The disease often develops in pre-menopausal and menopausal age [2, 64–73]. The direct correlation between the incidence of breast cancer and middle-aged women, the older the average age of women in the population ($R=0.93$; $p=0.05$), the higher the incidence rate. The highest morbidity is observed in

areas with relatively high average ages of women in Tashkent city (33.5 years) and Tashkent (29.6 years), Navoi (28.6 years), Bukhara (28.8 years) and Andijan (28.2 years). The minimum value of SP morbidity typical for areas, where women live with a relatively young average age: Surkhandarya (26.2 years), and Kashkadarya (26.4 years). Except in fertility rates, divorce rates, mortality and middle-aged women were analyzed correlations between standardized incidence rates of breast cancer and the marriage rate ($r=-0.31$), life expectancy ($r=-0.31$), natural population growth ($r=-0.36$), migration inflow ($r=0.39$) and outflow ($r=0.28$) of the population.

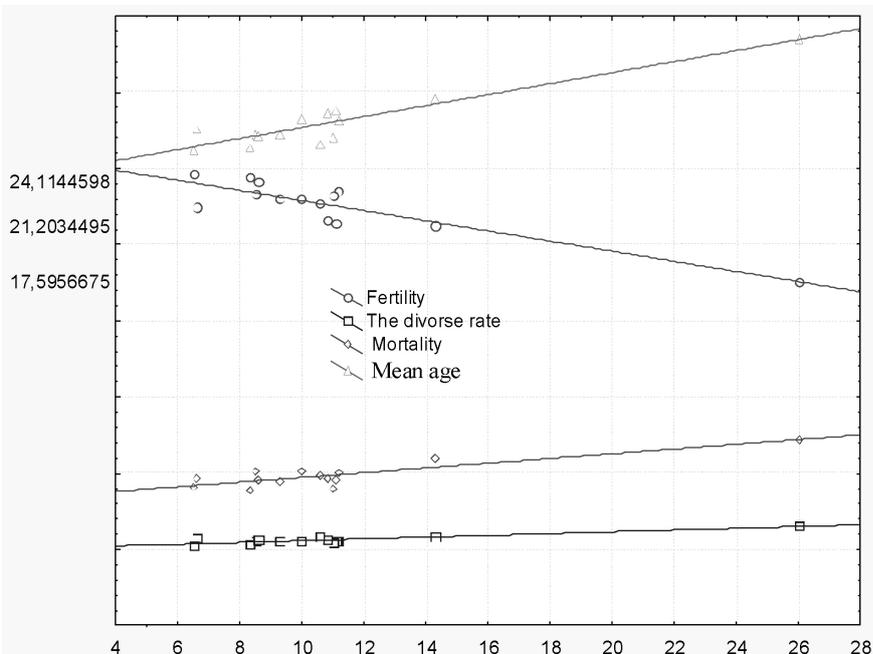


Fig. 2. The correlation between the standardized incidence rate of breast cancer and divorce rates, fertility, mortality and middle-aged women

Although between these factors and SP were found in the incidence of correlation, they were not significant ($p > 0.05$). Therefore, these factors are not included in the linear regression model. To define measures of the identified relationships was regression analysis.

The following multiple linear regression equation:

$$Y = -62.7 + 6.05 * X_1 + 2.25 * X_2 + 0.46 * X_3 - 0.78 * X_4;$$

$$R = 0.94, R^2 = 0.89, F = 18.1; p < 0.00025,$$

where: Y — the incidence rate of breast cancer,

X_1 — the divorce rates; X_2 — the average age of women;

X_3 — fertility rate, X_4 — coefficient of total mortality;

R — coefficient of multiple correlation;

R^2 — coefficient of determination, F — Fisher's criterion.

On the incidence of breast cancer in the population is strongly influenced by the average age of the women (59.6%) and the odds of divorce rates (27.4%), less mortality (11.5%) and fertility (-9.5%).

In conclusion it should be said that in areas where there is a low birthrate, high divorce rates, total mortality and the high average age of women we can expect an increased incidence of breast cancer. The average age, reproductive behavior of women, the divorce rate and overall mortality of the population, causing the state of the demographic situation in the territories and played a leading role in the incidence of breast cancer. The organizers of health in the development of preventive measures is necessary to consider the medico-demographic situation of the region.

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Clinical biochemical features in patients with undifferentiated connective tissue dysplasia

Abstract: The research objective is represented by the implementation of comparative performance analysis of NO-system, VEGF, expression indices of MMP-2, MMP-9, TIMP and magnesium level, GAG, HN in the blood of patients with congenital

MVP in UCTD. 86 patients were examined, including 36 (41.9%) men and 50 (58.1%) women aged from 15 to 25 (19.5 ± 1.42) with etiologic signs of primary (congenital) MPV. The first target group included 41 (47.7%) patient with MPV and the I grade regurgitation, the second group comprised 45 (52.3%) patients with the II grade. The conducted studies indicated that endothelial dysfunction was observed in patients with congenital MPV of the 1st and 2nd regurgitation grades, and which was conditioned by NO-system imbalance.

Keywords: mitral valve prolapse, undifferentiated connective tissue dysplasia, endothelial dysfunction.

The severity level assessment of UCTD in patients with congenital mitral valve prolapse (MVP) is classified among the complex issues in current clinics of internal diseases. It is reasoned by the variety of clinical implications of different organs and systems, primarily in cardiovascular system. The principal causes of UCTD progression in patients with congenital MVP include the development of endothelial dysfunction associated with the imbalanced polymorphism of extracellular matrix gene proteins [1, 14–23]. Endothelial dysfunction on the molecular level is conditioned by the local NO-production disorders and high oxidative stress [2, 40–44]. Vascular endothelial growth factors (VEGF) are instrumental in this process [3, 48–51]. The reduction of VEGF level determines endothelial apoptosis that leads to luminal obstruction and vascular regression. At the present time, it is established that MMP are the key effectors in tissue remodeling. Polyfunctional MMP proteins participate in the process of apoptosis and angiogenesis. The alteration of MMP level and its tissue inhibitor (TIMP) are considered as the possible prospective biological markers of differential diagnostics, CTD prognosis and treatment [4, 4–8]. The important peculiarities of impaired cardiac valve comprise the structural rearrangement of connective tissue elements, extracellular matrix, collagen and elastin fiber, glucosamineglucan (GAG) and hyaluronidase (HN) amorphous substance [5, 76–81], which during the last decade are rigorously studied by the scientists. Low Mg^{+2} concentration effects the performance of cardiac valve, dysplastic disorders of cardiac valve, prolapse deepening of mitral valve, mitral regurgitation grade, left atrial dimension and mucoid regeneration rate of valve, cardiac arrhythmia [6, 10–16].

In connection therewith, the research objective is represented by the implementation of comparative performance analysis of NO-system, VEGF, expression indices of MMP-2, MMP-9, TIMP and magnesium level, GAG, HN in the blood of patients with congenital MVP in UCTD.

Material and methods. 86 patients were examined including 36 (41.9%) men and 50 (58.1%) women aged from 15 to 25 (19.5 ± 1.42) with etiologic signs of primary (congenital) MPV. The diagnosis were established based on the classification of T.I. Kadurina [1, 14–23] and confirmed by echocardiography. Upon studying anamnestic data and instrumental examination, the patients with recurrent MVP and patients with cardiovascular diseases were not included to the target groups. The target group included 41 (47.7%) patients with MPV and the 1st grade regurgitation and 45 (52.3%) patients with the 2nd grade. There was performed the assessment of nitric oxide (NO) value in blood based on its stable metabolites (NO_2^- and NO_3^-), endothelial (eNOS) and inducible (iNOS) — synthase, peroxyinitrite (ONO_2^-), endothelin-1 concentration (ET-1), vascular endothelial growth factor (VEGF), matrix metalloprotease level (MMP-2 and MMP-9) and its tissue inhibitors (TIMP-1 and TIMP-2), glucosaminoglycans (GAG) and hyaluronidase (GH) in blood plasma. Statistical data processing was conducted by the use of variation statistics method with Student's t-test.

The performed studies figured the high stable NO metabolites that grew by 1.12 ($p < 0.05$) and 1.34 ($p < 0.05$) times in patients with the 1st and 2nd grade of regurgitation. The identified changes, obviously, represent the compensatory response of patient's

organism to definite chronic myocardial ischemia. It coincides with the high level of VEGF in patient's blood serum that leads to some myocardial vascularization. The performed investigations have found the growth of VEGF in the blood serum of patients with MVP based on the grade of regurgitation. Thus, if for patients with MVP of the I grade it raised by 1.1 times, then for patients with II grade this indicator increased by 1.27 ($p < 0.05$) times. It is approved by receptor reinforcement in the blood serum of experimental patients. In that way, the rate of VEGF-R1 increases by 1.2 ($p < 0.05$) and 1.59 ($p < 0.01$) times, and VEGF-R2 rises by 1.08 and 1.24 ($p < 0.05$) times, in accordance with the regurgitated intensity of MVP of the I and II grade. The eNOS analysis established the regressive trend in patients with MPV and the 1st grade of regurgitation, whereas in patients with the 2nd grade of regurgitation these changes are statistically significant, decreasing by 1.23 ($p < 0.05$) times related to the state of almost healthy men. It is considered that the other form of NO-synthase — iNOS is accountable for the progression of inflammatory process. In that way, if in patients with MVP of the 1st grade of regurgitation the iNOS activity increases by 1.2 ($p < 0.05$) times, then in patients with the 2nd grade of regurgitation this rise comprised by 1.36 ($p < 0.01$) related to the state of almost healthy men. The iNOS activation, that conditions the NO hyperexpression, is stimulated by the activated forms of oxygen and proinflammatory cytokines [7, 50–53]. While analyzing the results of ONO_2^- determinations in the blood serum of patients with MVP, we have revealed the rise of its level by 1.15 ($p < 0.05$) and 1.31 ($p < 0.01$) times. The NO excess and the intensified formation of cytotoxic ONO_2^- by type of feedback suppresses to a greater degree the basal rate of eNOS activity and initiates the pathologic isoform NOS — iNOS. Under these circumstances, the hyperexpression of NO and ONO_2^- has high vasopressor effect, that can be associated with its inducing influence on the activity of ET-1 [10]. With the progression of UCTD, the growth of ET-1 rate becomes statistically significant and equals to 0.780 ± 0.043 pg/ml ($p < 0.01$) in patients with the 2nd grade regurgitation, when this indicator in the almost healthy men is 0.611 ± 0.031 pg/ml. These indices exceeded the characteristics of the almost healthy men by 1.1 and 1.28 ($p < 0.01$) times, correspondingly. The conducted studies showed that in patients with MVP and the 1st grade regurgitation, the activity of MMP-2 tends to increase, while in patients with the 2nd grade of regurgitation we could observe its evident rise by 1.16 ($p < 0.05$) times. The value of MMP-9 activity in patients with the 2nd degree of regurgitation reliably raised by 1.13 times compared with the indices of almost healthy men. The content analysis of TIMP-1 in blood serum demonstrated the trend towards the decrease of its concentration in patients with the 1st grade of regurgitation and its evident decrease by 1.16 ($p < 0.05$) times in patients with the 2nd grade of regurgitation. At the same time we could observe the increasing trend for TIMP-2 in patients with the 1st degree of regurgitation, and it reliable growth by 1.36 ($p < 0.01$) times in patients with the 2nd grade of regurgitation. Considering that its level increases in systemic sclerosis, we can assume that the revealed rise of TIMP-2 in blood serum represents one of the predisposing causes in the formation of CTD. We have studied the magnesium level, GAG

and HN in the blood serum of patient with MVP considering the grade of regurgitation. The related studies demonstrated the decreasing trend of the magnesium level in patients with the 1st grade of regurgitation. The reliable decrease of the magnesium level was observed in patients with the 2nd grade, its level in blood serum decreased by 1.2 times ($P < 0.05$) related to the parameters of almost healthy people. We have conducted Pearson's correlation analysis in order to validate the importance of MMP-2 and MMP-9 increase with TIMP-1 in angiogenesis and conjunction with the content reduction of Mg^{+2} , GAG and HN. Thus, in patients with the 1st grade of regurgitation we could observe the certain relation between the growth of MMP-2 and MMP-9, and the drop of TIMP-1, the ions of Mg^{+2} ($r = -0.22-0.28$, $p > 0.05$) and the growth of GAG level and HN activity ($r = +0.24-0.31$, $p > 0.05$) as compared to the control data. Along with that, in patients with the 2nd grade of regurgitation the expression of MMP-2 and MMP-9 had the invert correlation with the activity of TIMP-1 ($r = -0.83-0.82$, $p < 0.01$), and also after the statement of relation with the drop of the ion parameters for Mg^{+2} ($r = -0.69-0.80$, $p < 0.02$ and $p < 0.01$), and the direct correlation with the parameters of GAG ($r = -0.80-0.832$, $p < 0.01$) and HN ($r = -0.77-0.81$, $p < 0.01$). The expression of TIMP-1 correlated with the drop of the level of Mg^{+2} ions in blood ($r = -0.75$, $p < 0.01$)

and inversely with the GAG indicators ($r = -0.84$, $p < 0.01$) and HN activity ($r = -0.86$, $p < 0.01$).

Therefore, the study of the mechanism of cardiac hemodynamics disorders showed that in the patients with MVP and regurgitation we can observe the inadequate endothelial production of antiangiogenic factors, which results in the decrease of response relaxation, and determines the drop of responsiveness index and the risk of hypertensive state, in particular induced by physical exercises. The development of these changes is conditioned by the rise of VEGF in blood serum; it determines the risk of angiogenesis stimulation in patients with MVP, the expression of which is related with the regurgitation grade. In patients with congenital MVP of the 1st and 2nd grade of regurgitation, we can diagnose endothelial dysfunction, caused by the imbalance of NO-system. The other factors that lead to the MVP formation includes the drop of magnesium level, HN activation, which promotes the increased degradation of extracellular matrix components followed by the growth of its debris excretion, this is associated with the activation of MMP-2 and HN. It can be expected that the reason for the progression of mitral regurgitation in patients with congenital MVP lies in the drop of TIMP-1 inhibiting action, the content of Mg^{+2} ions, HN activation.

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Significance of mid mass molecules in cytokine cascade of oral fluid in patients with oral lichen planus

Abstract: Taking into consideration that severe disturbances in metabolism accompanying by tissue destruction occur in the organism along with accumulating of toxic metabolites in biologic environment, the study of the problem is seen as endotoxiosis. The analysis of such a correlated interconnection certifies various influence of MMM on the immune system of the organism.

This influence is complicated and specific and is reflected in immune imbalance response and obviously in the structural disturbances of oral mucous membranes epithelium.

Keywords: oral lichen planus (OLP), pro- inflammatory cytokines, mid mass molecules (MMM), nuclear derivative, toxic derivative, aromatic derivative.

Oral lichen planus (OLP) is one of the most common diseases of mucous membrane of the oral cavity (MMOC). In the structure of MMOC diseases OLP composes 35%. It is known that in OLP of MMOC main changes take place in the epithelium of mucous membranes [1, 156–166; 10, 13–14].

At present, main metabolic chains responsible for cellular damage and damage of tissues in the pathology have been noted. They are: high level of peroxide oxidation of lipids and the lack antioxidant defense, unbalanced cytokine level with prevailed level of pro- inflammatory cytokines [1, 160–162; 4, 14–16; 8, 89–90; 9, 134–135; 10, 11–12].

Taking into consideration that severe disturbances in metabolism accompanying by tissue destruction occur in the organism along with accumulating of toxic metabolites in biologic environment, the study of the problem is seen as endotoxicosis. Being universal, the syndrome of endogenous intoxication (EI) is able to influence negatively on the course of various pathologic processes in the organism [3, 113–114; 5, 144–145; 6, 140–141].

Investigations of EI intensity in interaction with oral fluid cytokines in patients with various clinic forms of OLP MMOC have not been done.

Purpose of the investigation is the analysis of mid mass molecules (MMM) changes of oral fluid cytokines as well as evaluation of correlation between these data.

Materials and methods. 139 patients with OLP of MMOC including 55 males (39.57%), 84 females (60.43%) have been examined. 20 people of comparing gender and age composed a control group. In 36 patients (25.9%) a typical form of the disease was diagnosed; exudative hyperemic form was in 34 (24.4%); erosive-ulcerous form was in 42 (30.22%); bullous form was diagnosed in 27 patients (19.42%).

In verification of the disease forms, Borovskiy and Mashkil-Leison's classification was used (2001). Comparing groups were randomized according to their gender and age. This provided representation of received data.

Oral fluid was taken in the morning on empty stomach before drug therapy, it was centrifuged at 1500 *circ*/min, during 20 minutes.

Cytokine profile was studied by immuno-enzymes analysis using "Cytokine" Ltd. device, St. Petersburg. Evaluation of endogenous intoxication in oral fluid was performed in MMM spectrum by screening [7, 72–73].

Three Derivatives of MMM have been noted:

1. Nuclear derivative — is determined at 230 nm. wave represented by histone proteins and DNA wastes.
2. Toxic derivative — 254 nm. of wave consisting of hydrophobic toxins with high biologic similarity structures, contains products of not complete disintegration of proteins.
3. Aromatic derivative — 280 nm. of wave, containing aromatic aminoacids (mediators, hormones).

Results were shown by the symbolic units. Aromatic index (AI) was calculated (E280/254 nm.) as well as nuclear-peptide index — (NPI = E230/E254 nm.).

Connections of various signs were estimated by linear correlation.

Results and discussion

In patients with OLP of MMOC oral fluid has some increase in the data of endogenous intoxication.

Growth of clinical symptoms of OLP was associated with significant increase of level in toxic derivative – E-254 nm.; nuclear derivative – E-230 nm.; increase in nuclear — peptide index, decrease in aroma index (AI).

Thus, the value toxic E-254 nm. derivative were much higher than in control group up to 69.69% ($P < 0.01$) peptide — nuclear — to 208.56% ($P < 0.01$), nuclear — peptide index – to 77.42% ($P < 0.01$), aroma index was decreased to 37.78% ($P < 0.01$). Together with growing of the severity of the process on mucous membranes of the oral cavity increase in EI is noted. Quantity of toxic E-254 nm., derivative in typical type of OLP was 27.58% ($P < 0.01$) higher than in control group; exudative-hyperemic – 46.36% ($P < 0.01$); erosive-ulcerous and bullous — 112.12% ($P < 0.01$) and 88.18% ($P < 0.01$) correspondingly; the dynamics of nuclear derivative E-230 nm. shows 46.39% ($P < 0.01$); 115.46% ($P < 0.01$); 376.29% ($P < 0.01$) and 293.81% ($P < 0.01$) nuclear-peptide index 18.39% ($P < 0.01$); 54.84% ($P < 0.01$); 112.90% ($P < 0.01$) and 96.77% ($P < 0.01$) correspondingly decrease of AI is 19.78% ($P < 0.01$); 32.97% ($P < 0.01$); 50.55% ($P < 0.01$) and 45.46% ($P < 0.01$) (Table 1).

Significant peculiarity of MMM is in their clearly marked high biologic activity. Accumulation of MMM is not only a marker of endotoxication, they also contribute to severances of the pathologic process acting as secondary toxic agents influencing all vital system and organs. Data of the MMM level is the main biologic marker reflecting the level of the pathologic protein metabolism [5, 141–142].

As the main function in metabolism changes is referred to proteins, directly or indirectly, the increase of MMM level mostly due to peptide nature is one of the general pathobiochemical mechanisms of epithelial barrier and progression of erosive-ulcerous damage in the oral cavity (Table 1).

Table 1. – MMM spectrum in oral fluid of the patients with OLP

Clinical forms of OLP	Datum in optic density			Indices	
	E 280	E 254	E 230	NPI	IA
Control	0.302 ± 0.011	0.330 ± 0.014	0.097 ± 0.004°	0.31 ± 0.012°	0.91 ± 0.03°
Typical	0.306 ± 0.009	0.421 ± 0.02*	0.142 ± 0.005*	0.46 ± 0.02*	0.73 ± 0.02*
Exudative — hyperemic	0.297 ± 0.011	0.483 ± 0.015* ^o	0.209 ± 0.001* ^o	0.48 ± 0.015* ^o	0.61 ± 0.02* ^o
Erosive- ulcerous	0.320 ± 0.014	0.700 ± 0.028* ^{o,*} ^	0.462 ± 0.02* ^{o,*} ^	0.66 ± 0.031* ^{o,*} ^	0.45 ± 0.01* ^{o,*} ^
Bullous	0.311 ± 0.012	0.621 ± 0.031* ^{o,*}	0.382 ± 0.012* ^{o,*}	0.61 ± 0.029* ^{o,*}	0.50 ± 0.02* ^{o,*}
On average in patients with OLP	0.308 ± 0.008	0.560 ± 0.025*	0.299 ± 0.008*	0.55 ± 0.016*	0.57 ± 0.01*

Note: • — $P < 0.05$ for the control group; ° — $P < 0.05$ for the typical form; * — $P < 0.05$ for the exudative-hyperemic form; ^ — $P < 0.05$ for bullous form.

Table 2. – Characteristics of cytokines status of oral fluid according to clinical form of OLP

Cytokine pg/ml	Typical	Exudative- hyperemic	Erosive-ulcerous	Bullous	OLP-in general	Control group
FNO- α	70.81 ± 2.35*	100.02 ± 5.01* ^o	650.0 ± 55.40*	550.26 ± 31.24* ^{o,*}	358.25 ± 10.11	25.33 ± 1.05
IFN- γ	58.32 ± 1.65*	70.25 ± 3.24* ^o	424.02 ± 70.0*	325.43 ± 25.42* ^{o,*}	241.25 ± 11.08	24.32 ± 0.92
IL-1	22.63 ± 0.95*	60.81 ± 2.48* ^o	562.08 ± 44.31*	462.08 ± 24.81* ^{o,*}	142.08 ± 7.02	10.21 ± 0.58
IL-6	30.82 ± 1.44*	71.25 ± 3.43* ^o	505.30 ± 30.22*	421.0 ± 30.77* ^{o,*}	181.32 ± 8.61	14.81 ± 0.69
IL-8	26.81 ± 1.22*	64.83 ± 2.74* ^o	425.41 ± 40.25*	324.32 ± 28.42* ^{o,*}	224.31 ± 7.82	13.62 ± 0.55
IL-4	30.33 ± 1.24*	22.62 ± 1.02* ^o	9.32 ± 0.25*	10.32 ± 0.48* ^{o,*}	17.65 ± 0.55	16.05 ± 0.71
IL-10	34.32 ± 1.62*	27.84 ± 1.21* ^o	8.31 ± 0.3*	9.11 ± 0.31* ^{o,*}	19.40 ± 0.62	18.22 ± 0.24

Note: • — $P < 0.05$ for the control group; ° — $P < 0.05$ for the typical form of OLP; * — $P < 0.05$ for the exudative- hyperemic form; ^ — $P < 0.05$ for bullous form of OLP.

So, in patients with OLP monodirected increase of MMM content in oral fluid was noted mostly in patients with erosive-ulcerous form.

Evaluation of MMM content in oral fluid enables to assess patients condition individually as well as the severity of the course of OLP, the ways of pathogenetic treatment in the case of mucous membranes of the oral cavity.

Deviations in cytokine profile in the oral fluids were manifested by imbalance of pro-inflammatory mediators. At the same time in favorable cases (typical and exudative — hyperemic) the increase in anti-inflammatory mediators activity was noted: IL-4 and IL-10 correspondingly to 88.97% ($P < 0.01$) — 40.99% ($P < 0.01$) and 88.36% ($P < 0.01$) — 51.66% ($P < 0.01$); in severe forms of erosive-ulcerous and bullous type some decrease to 35.70% ($P < 0.01$) — 41.93% ($P < 0.01$) and 54.4% ($P < 0.01$) — 50.0% ($P < 0.01$) correspondingly.

In all clinical forms of OLP the content of pro-inflammatory cytokine is clearly ($P < 0.05$) higher than the values of control groups and progressively was growing with the severity of the process in mucous membranes. So, in typical form the index FNO- α raised up to 179.55% ($P < 0.01$) in erosive-ulcerous form — to 2089.77% ($P < 0.01$) corresponding dynamics of IFN- γ composed 139.80% ($P < 0.01$) — 1643.5% ($P < 0.01$); IL-1 to 121.65% ($P < 0.01$) — 5405.20% ($P < 0.01$); IL-6 to 108.10% ($P < 0.01$) — 3314.12% ($P < 0.01$) and IL-8 to 96.84% ($P < 0.01$) — 3023.42% ($P < 0.001$) (table 2).

Thus, as the erosive-ulcerous damage of the mucous membrane develops moderate activation of anti-inflammatory factors is changed into their inhibition on the background of intensively growing pro-inflammatory mediators (by ten, thousand times).

When correlating the data the following dependence between MMM content and cytokine level were noted:

- In patients with typical form of the disease coefficient unit of correlation certify moderate positive connection between the data in the investigation: coefficient unit range between 0.4–0.62.
- In patients with exudative-hyperemic form along with the growing correlative interconnections between pro-inflammatory cytokines and MMM level, coefficient unit is

noted to be at 0.64–0.72; and interconnections with anti-inflammatory cytokines are reduced up to 0.32–0.36.

- In patients with erosive-ulcerous and bullous forms interconnections between the pro-inflammatory cytokines level MMM concentration rises up to 0.77–0.88; but the direction of interconnections with anti-inflammatory cytokines becomes negative and is noted as moderate (–0.52) and high (–0.76).

It can be supposed that mucous membrane in no sign course of typical form OLP has a balance between immune cells produced by pro- and anti-inflammatory cytokines and endotoxins.

Under the influence of stress factors, along with developing endotoxemia in pathogenic concentrations earlier primitive cells producing cytokines are activated. The character of further series of reaction depends on general balance of produced pro- and anti-inflammatory cytokines.

In the case of balance disturbance, invasion of extra MMM into the mucous membranes macrophages are activated and secrete mediators to initiate lymphocytes for cytokine production.

Thus, in mucous membranes in the areas of papulous efflorescence are formed which are sensitive to MMM effect and pro-inflammatory cytokines (FNO- α , IFN- γ) [8,155–156; 11, 364–365].

In critical concentration of MMM and pro-inflammatory cytokines significant disturbances of local and systemic metabolism appear as well as immunologic disturbances, favorable conditions for the formation of inflammation focus.

Together with progress of the process in the mucous membranes and growth of endogenous intoxication and strengthening of systemic reaction of the organism to the local process we can see the development of imbalance between endotoxic aggression and cytokines negative processes are progressive.

Endless cytokine production leads to aggression of mediators and further progressive systemic inflammatory reactions, severity of the local damage of the mucous membranes.

The analysis of such a correlated interconnection certifies various influence of MMM on the immune system of the organism.

This influence is complicated and specific and is reflected in immune imbalance response and obviously in the structural disturbances of oral mucous membranes epithelium.

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Pathogenetic aspects of treatment of periodontitis associated with candida infection in patients with diabetes mellitus

Abstract: It is currently known a large number of substances with properties of free radicals play a role in metabolic processes. In the presence of fungal flora in the oral cavity. The expressed shifts lipid peroxidation, which actively interacts with the phospholipids of cell membranes, they change conformation of biomolecules and reduce membrane fluidity and, hence, the pressure of a cell resistance damaging factors including to the effects of *Candida* fungi. When included in the treatment regimen provides an antifungal drug FLUNOL synthesis and activity of antioxidants.

Keywords: free radicals, lipid peroxidation, of *Candida*, pathogenetic treatment, chronic periodontitis, diabetes.

Catalysts are currently known a large number of substances of free radicals (FR) with the properties, plays a role in metabolic processes [5, 85–88].

Free radicals — a variety of substances in nature, characterized by one common feature — the presence of water from the atoms of the unpaired electron. This state of matter is unstable, and free radicals tend to become stable in products by a free electron pairing [5, 88–95; 3, 100].

The most famous and important is the active oxygen species (AOS): superoxide anion radical (O_2^-); hydroxyl radical (HO^\cdot); hydrogen peroxide (H_2O_2), singlet oxygen (1O_2) [5].

Adjustable intensity of the AOS is the physiological metabolic process. Under their influence, there are processes of renovation phospholipids regulated permeability of cell membranes. They activate the membrane proteins, immunoglobulins, enzymes. Activities FR affects the process of cell division and oxidative phosphorylation. The products of free radical reactions and lipid peroxidation are involved in the biosynthesis of progesterone, a steroid and thyroid hormones, leukotriene's and prothrombin. In addition, oxygen metabolites are important components of cellular responses and humoral immunity [5, 85–95].

Excessive activation of lipid peroxidation (LPO) triggers the formation of excess free radicals. The stability and sustainability of the epithelial cell membrane depends on the balance between the processes of free radical oxidation (FRO) [5, 87–90]. The peroxide destruction leads to an explosion of the membrane of epithelial cells, thereby optimizing the adhesion of organisms per cell.

At the same time, the presence of fungal flora in the oral cavity pronounced shifts observed lipid peroxidation. Actively interact with the phospholipids of cell membranes, they change conformation of biomolecules and reduce membrane fluidity, therefore, the cells resistant to the onslaught of disturbing factors, including exposure to *Candida* fungi. Furthermore, it should be noted that the failure of the system can be balanced LPO start a chain reaction of reactive oxygen species, which greatly exacerbates the disease occurred.

However, it is advantageous that in the body there are mechanisms that control the formation of free radicals and lipid peroxidation regulatory processes in the complex they form its antioxidant protection (AOP). Antioxidants act as protectors and inhibitors of pathological reactions, contribute to the inhibition of destructive

processes, slow down aging and cell death. The physiological antioxidant system is a total hierarchy of protective mechanisms of cells [1, 40–43; 3, 220].

Antioxidants break the chains of molecules in the reactions of free radical oxidation and destroy peroxide molecule. Among enzymatic antioxidants include superoxide dismutase, glutathione peroxidase and catalase, are in the cellular structures. Non-enzymatic antioxidants – Vitamin E, K, C, ubiquinone, tryptophan, phenylalanine, ceruloplasmin, transferrin, haptoglobin, glucose, carotenoids, flavonoids, blocking the activity of free radicals in blood. Changes in the structure and function of the substrates, which act on free radicals depend ultimately on the ratio of activity of free radicals and antioxidants. Increasing the ratio of FRO/AOP specific to oxidative stress — an important factor in the pathogenesis of many diseases [1, 42–43; 8, 430–431].

In modern pharmacology antioxidants are subdivided into water-soluble and fat-soluble [2, 8–12]. Fat soluble antioxidants include one of the most powerful antioxidant — alpha-tocopherol, which plays a major role in protecting the basic structural components of biological membranes — phospholipids. The structure of the molecule enables it to effectively destroy the majority of reactive oxygen metabolites and provide antioxidant protection lipoprotein serum. Tocopherol — only lipid soluble antioxidant, a chain terminator plasma oxidation and human erythrocyte membranes.

Is invaluable in the water-soluble antioxidant – ascorbic acid, which reduces the level of superoxide anion-radical, singlet oxygen, hydroxyl radical, peroxide radical, regenerates vitamin E and glutathione oxidized form, thus restoring their antioxidant properties [1, 39–41; 10, 264–266]. In addition, there are substances necessary for the synthesis and activity of antioxidants.

The role of certain etiological factors in the development of periodontal disease is almost set, but in relation to the pathogenesis so far no consensus [3, 45–150; 7, 34–35; 9, 129–131]. The development of periodontal disease is often associated with the proliferation of *Candida*. The frequency of detection of *Candida* in parasitocenoses periodontal pockets was 26.9% [4, 61–62; 6, 42–43; 8, 428–430]. Among patients with chronic generalized periodontitis (GP) associated with *Candida* spp., Often recorded moderately (51.1) or severe (29.8) of the disease [1, 39–41; 2, 18–20]. The urgency of the optimization of complex treatment of generalized periodontitis associated with *Candida* infection is evident.

Objective: To evaluate the clinical efficacy in treatment Flunol in Candido — associated periodontal disease in patients with diabetes mellitus.

Materials and methods: Patients with generalized periodontitis associated with *Candida* spp. They were divided into 2 groups: group 1 (control), 14 patients received conventional treatment; Group 2 (basic) 15 patients received standard therapy in addition to a new antifungal drug FLUNOL (firm NOBEL, Turkey) at a dose of 50 mg. 1 time in 14 days.

Objective condition of periodontal tissues was assessed complex periodontal indices. Carried out X-ray examination. Were performed conventional periodontal treatment. Antibiotic and anti-inflammatory therapy consisted of rinsing the mouth 0.05% chlorhexidinebigluconate 2 times a day after brushing, application of metronidazole (“Metrogil-denta gel”) to the periodontal pocket, absorption in the mouth 6–8 tablets Anzibel 7 days. Delivery to the lab material for bacteriological examination in order to identify the genus *Candida* fungi was carried out in a liquid medium Saburo, crop produced on dense medium Saburo. We use a standard environment, HiMedia production (India). Statistical processing of the research data was performed using the program «Stat Soft Statistica» v. 6.0.

Results and discussion: In the clinical examination of the oral cavity in patients with established presence white plaque on gingival mucosa and tongue — palatine arches and cheeks. For some patients with *Candida*-associated periodontitis showed infiltration of individual sections of the gingival margin in the form of a dense to the touch roller. Patients diagnosed advantageously higher microbial concentration *Candida* spp. Thus, to treat *Candida*

spp. recorded in titers less than 6.0 CFU/ml in 46.67–50.0% of patients, and more than 6.0 CFU/ml — from 50.0–53.33% (intergroup differences to treatment is not revealed). As a result of therapeutic interventions in patients with periodontitis associated with *Candida* spp., were observed normalization of oral hygiene, reduction or complete disappearance of bleeding, sealing of the gingival margin, reduction of tooth mobility. All the defined tests (health index, PMA, gum recession, periodontal index, the degree of bleeding gums) in patients with GP associated with *Candida* spp., in the II main group II after treatment values were significantly ($P < 0.05$) closer to normal values. I than in patients of the control group. Therefore, the clinical efficacy of treatment of chronic periodontitis associated candida was higher in patients receiving treatment along with the basic antifungal drug FLUNOL.

Clinical improvement of the periodontal tissues, apparently mediated by both the eradication of fungal microflora and complex therapy of periodontitis. Eradication of *Candida* spp. achieved in all patients of the main group II, patients control group I *Candida* spp eradication was not so expressed: After treating 4 (12.07%) of titer remained at more than 6.0 CFU/ml. Clinical and microbiological observations suggest a more effective eradication of *Candida* spp. fungi. when included in the treatment regimen FLUNOL antifungal drug. The use of antimycotic agents FLUNOL a dose of 50 mg once every 14 days, increases the effectiveness of treatment of generalized periodontitis associated with *Candida* spp., significantly improves the clinical-functional and structural periodontal condition, promotes the eradication of *Candida* spp. of periodontal pockets with achieving and maintaining disease remission for 6 months.

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Section 5. Pedagogy

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Significance of the using of new pedagogical technologies during the lesson “Modern Uzbek literary language”

Abstract: “Modern Uzbek literary language” is considered one of the main and fundamental subjects which are continuously studied at the academic lyceums. Without overlooking the fact that the main aim of education at the academic lyceums is to direct students to the higher educational institutions it is important to say that the knowledge which is acquired at the trainings of “Modern Uzbek literary language” are really significant during the acceptance tests. And expediency is to use various methods of teaching so that to make our lessons interesting. Besides traditional methods the modern methods of teaching are important there too.

Keywords: Modern Uzbek literary language, new pedagogical technologies, research, describe, innovative.

Nowadays the demand of age is to have a notion of modern pedagogical technologies. Teacher, who works on himself, conducts training sessions on the basis of innovative teaching technologies. At the lessons with modern teaching methods the activity of students plays important role. At this kind of lessons students can freely express their thoughts, discuss the topic among them, participate in the analysis and draw conclusions. Prove their opinions with evidences and make presentations. One of the modern methods of teaching is to work in small groups. It is considered to be very effective and suitable method for everyone. This method can be used while explaining many topics on “Modern Uzbek literary language” [1].

As an example we can take some subjects of the “Morphology” section:

1. The theme “Noun and its methodological characteristics” students are divided into following groups:

- a. Group “Vatan” they should explain and give examples for Common nouns;
- b. Group “Farzand” they should explain and give examples for Proper nouns;
- c. Group “Bilim” they should explain and give examples for Concrete nouns;
- d. Group “Kitob” they should explain and give examples for Abstract nouns;
- e. Group “Mehr” they should explain and give examples for Collective nouns and etc.

The higher groups can be also given the same text and they can sort out the nouns which are related to their group. Such exercises make students active and help to form their own opinion.

2. The theme “Adjective”. In this topic we also divide students into groups from the point of view adjective forming particles:

- a. Group “Go’zal” they should describe adjectives of quality and explain their opinions with examples;
- b. Group “Muattar” they should describe adjectives of taste and explain their opinions with examples;
- c. Group “Shirin” they should describe adjectives of number and explain their opinions with examples;
- d. Group “Zangori” they should analyze adjectives of smell. We can continue this list.

It is also important to mention that the students not only give examples to the properties of adjectives which belong to their group, but also they pay attention to the adjective forming particles. It would be appropriate if they sort out adjectives to original and inflected, relative and qualitative. As the main direction of study in our Academic lyceum is related to natural sciences we try to teach lessons in connection with natural subjects. Especially the experience works with the theme of adjective. Pictures which are related to flora and fauna are handed out to the students (pictures should be colorful because we have adjectives of color). Each member of the groups writes out the adjectives which are classified to their type. Except previous exercises we can give various pictures to the groups. They should make stories, using adjectives, of these pictures. This helps to improve creative skills of students [2].

3. The theme “Verb”. So that this topic is very extensive and it allocated many hours there can be used several types of working in a small groups. For example by the meaning of the verbs we can divide them into groups such as: physical verbs, mental verbs, speech verbs and stative verbs. Relativity of the verbs can be taken to discuss as a separate topic in a groups. If we broaden students’ knowledge on this topic they will have ability exactly separate transitive and intransitive verbs, the verbs which can take two particles making relativity of the verb. Or if we mean forms of functions of a verb, on this topic we can divide students into four groups and hand out them scientific texts which give them information about pure verb form (infinitive), name of activity form, present and past participles and gerund. There should be the full information about forms of functions. Because the text-book “Modern Uzbek literary language” for second-year-students of academic lyceums doesn’t include to itself this topic. For this reason we should create an opportunity for students to learn the information that is not contained in textbooks. Teacher should focus students’ attention even on small details of forms of functions. For example variety of the name of an activity, changing the sound connected with the ending “-(u)v”, conjugation of participle and its making the function of the noun, changing of a sound in formation of a negative form, changing of a sound in connection of gerund with dull sound ended verbs.

Useful side of innovative technologies of training is that the students while taking the information also learn unknown facts for them discuss their own opinions and form proper view related to the topic.

According to experts, by making a report human can learn 5 % of information; in that case he is passive participant.

While reading we can learn 10 % of information, don't overlook that nowadays a little time is given for reading books and textbooks.

By seeing and hearing 20 % of information is added to our body of knowledge. The technical means of teaching can help us there.

With the help of visual aids person can remember 30 % of information. In that case we can use diagrams, booklets, handouts, slides, models.

While discussing during the group works we can reach 50 % of a result. Because in such type of work students express their own opinions, work with each other and prove their views.

Independent research and practical work gives 70 % of a result. Student can remember this quantity of information listening to the report.

If we try ourselves as teachers we shall reach 90 % of result. If we explain and share our knowledge to somebody we will get the best result.

Rely on the previous information we can say that working in a small groups is area to show students' skills. In that area the knowledge and experience pass the real examination.

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Section 6. Psychology

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Formation of psychological culture of the professional as criterion and level of its development

Abstract: In article the problem of development of the professional and psychological culture as criterion and level of its development, the main subsystems of psychological culture are considered, the predictive model of formation of psychological culture of the professional is presented, acmeological approach in consideration of the matter was fundamental.

Keywords: psychological culture, professional, acmeology, professionalism of activity, I-concept.

In modern time the search of such organizations of work which would provide not only the increase of their productivity, but also the development of the person in professional activity, became more active, therefore training of professionals for the main spheres of human activity gains the special importance. The professional has to combine professional abilities, knowledge, abilities, skills and experience. But, to provide the high level of professionalism, the cultural basis of professional activity is necessary [7, 34].

Psychological culture is the leading component of success of inclusion of the person in social life of society, professional formation of the expert. In the conditions of constantly changing sociocultural reality there is a problem of development and use of human potential, more great demands are made of independence, an initiative, enterprise of the person, of his ability to understand and interpret not only the happening social changes, but also own behavior and behavior of other people [1, 21].

In psychology long time there were no the system researches devoted to a phenomenon of psychological culture of the personality. In separate works of domestic psychologists this concept nevertheless was used, but the content of this concept was insufficiently fully revealed (K. A. Abulkhanova-Slavskaya, N. G. Alekseev, O. S. Anisimov, T. I. Artemyeva, L. P. Buyeva, A. A. Bodalev, A. A. Derkach, V. P. Zinchenko, V. G. Zazykin, I. S. Kohn, N. V. Kuzmina, E. A. Klimov, A. K. Markova, G. I. Marasanov, F. Sh. Mukhomedzyanova, I. N. Semenov, V. V. Stoln, etc.).

They are some foreign authors comprehending a problem of psychological culture: R. Assadzholi, A. Bandura, M. Buber, U. James, J. Kelly, M. Kurb, J. Mid, A. Maslou, E. Mirante, S. Moskovichi, J. Posner, K. Rogers, V. Frankl, E. Fromm, T. Festing, K. Jung, etc.

In scientific literature also the role of various conditions and factors mediating formation of psychological culture is ambiguously

designated. The condition of a scientific readiness of a problem of formation of psychological culture of the professional is characterized by the solution of versatile applied problems of pedagogics, psychology of development, social psychology, acmeology.

Acmeology methodology allowing to carry out target complex projects in the field of development of systems of formation of improvement of professional skill, development of integrative high-quality, professionally significant, personal educations allows to develop the complete concept of formation of psychological culture of the professional on a basis of the acmeological concepts of improvement and optimization of professional skill (A. A. Derkach, A. S. Guseva, V. G. Zazykin, B. A. Klimov, L. G. Laptev, A. K. Markova, D. E. Orban, etc.)

Acmeology studies conditions and regularities of advance of the person to tops of professional activity and maturity. At the professional's assessment acmeological approach aims at considering not only external indicators of work (success, productivity), not only internal states (motivation, work, satisfaction) of the person, but also existence of constant specific motivation to highly productive activity, to the forward ascending self-development, etc. [6, 32].

The main content of acmeological approach is identification the acmeological conditions and factors of development of the professional and formation of professionalism. Within this approach at the professional's assessment the special attention is paid to the concept «psychological culture» which is rather new in psychological science.

Studying of psychological culture of the professional is reflected in N. V. Kuzmina's and A. A. Derkach's works. The psychological culture is considered by them as the subject's interiorization of professional activity hierarchical system of knowledge, abilities, skills, and also stereotypes of professional consciousness, which are realized by him non-uniformly and differently [4, 117].

As I. A. Zimnyaya notes, «the general culture is defined by formation, resistance of the main plans of the relation to the world, to itself and nature of their expressiveness in behavior. It assumes internal culture (a step, advantage, respect of another, responsibility, self-adjustability)». This «internal culture» is no other than «psychological culture», i. e. a certain quality of internal mental human life as subject, the personality and identity [9, 174].

Today already there are many researches where various aspects are considered, levels or components of psychological culture, and also attempts somehow to define these phenomena are made. It should be noted the L. S. Kolmogorova’s works as the first attempt of system research of psychological culture as an independent psychological phenomenon. It enters concept of the general psychological culture, separating it from concept of professional psychological culture, and gives to it the following definition: «It is a component of basic culture of the personality as system characteristic of the person, allowing him to gain independence and self-actualization in life effectively, promoting successful social adaptation, self-development and satisfaction with life» [5, 27].

According to O.I. Motkov the psychological culture «is a complex of the developed special requirements, abilities and skills

of the person». The psychological culture, according to the author, along with an optimum way of life, provides steady harmonious functioning of the personality and is at the same time its expression [8, 9].

Thus, the psychological culture of the professional is the integrative new growth of the personality which is carrying out the design regulating function consisting in optimum self-realization of the personality in the course of interactions and implementation of professional activity at the level of socially desirable standards in the conditions of professional instructions and restrictions [4, 112].

Development of the professional is the complete process which is dynamically developed in time from formation of professional intentions till the full realization of a person in his activity. Professional development assumes use of methods of social impact on the personality, his inclusion in the different types of activity aiming to create system of qualities, necessary for the professional. Proceeding from it, based on the acmeological concept, we developed model of formation of psychological culture of the professional (fig. 1) as one of perspective methods of scientific knowledge is the modeling allowing to receive information in a certain measure, to compensate insufficiency of the system, complex researches demanding big material and time expenditure.

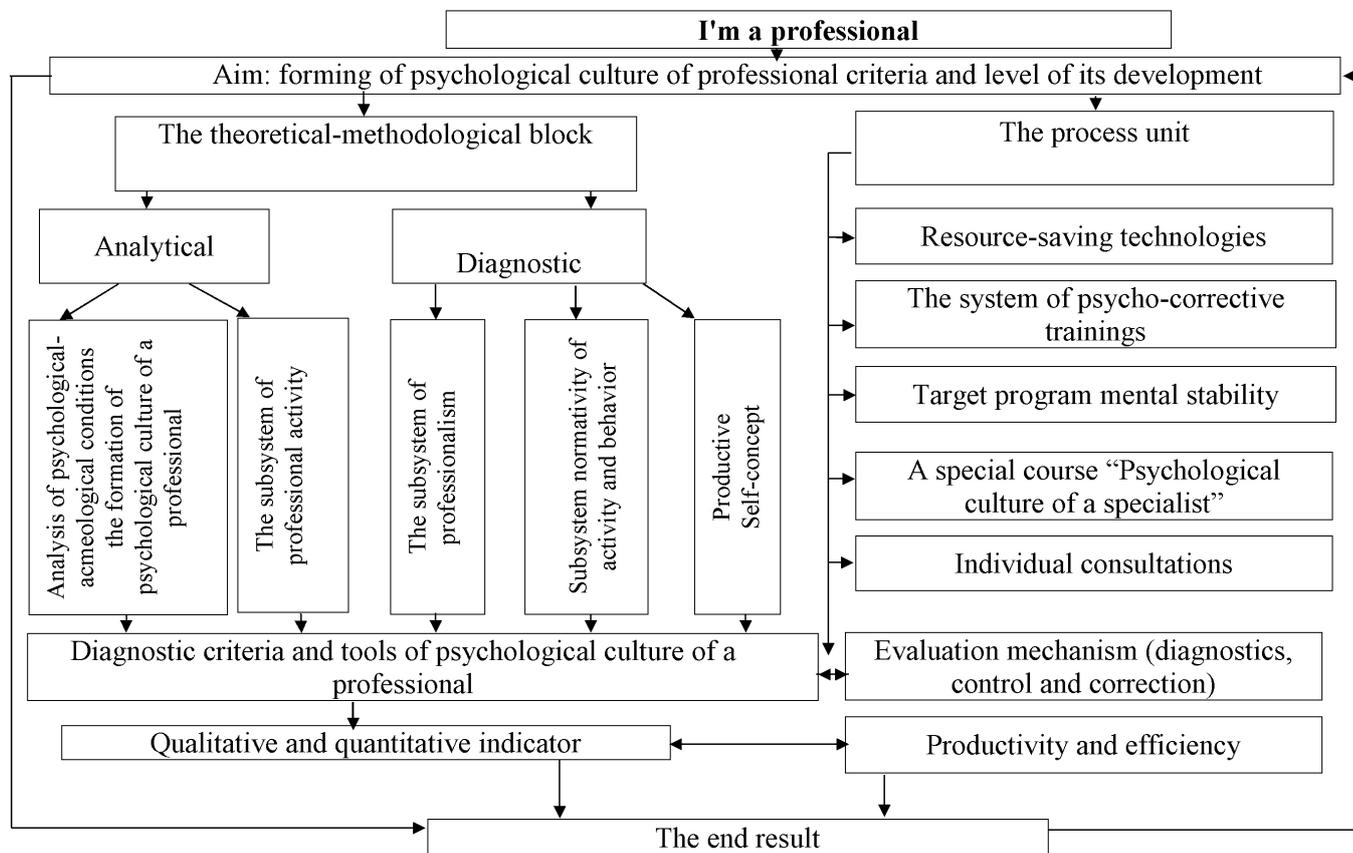


Fig. 1. Model of formation of psychological culture of the professional (scheme of the author)

The offered model shows the integrity of a solution of the problem of formation of psychological culture as criterion and the level of development and is to some extent predictive.

The model has hierarchical degree of structure, each of components in the block is coordinated, defines and proves the maintenance of the following. The block can be considered as independent system where elements are in certain relations and communications with each other.

We counted expedient to turn on the following blocks in structure of the developed model: theoretical-methodological and technological.

The theoretical-methodological block includes analytical and diagnostic components. The analytical component assumes the analysis of the psychological-acmeological conditions of formation of psychological culture of the professional as criterion and the level of his development, determination of the difficulties arising in the course of professional formation.

This analysis was a basis of a diagnostic component of this block and allows to allocate necessary indicators (signs) of psychological culture of the professional: a subsystem of professionalism of activity, a subsystem of professionalism of the personality, a subsystem of a normativity of activity and behavior, existence of the

productive I-concept and cultural and psychological behavioural manifestations which will be opened further by us.

The technological block assumes the use of the following components: system of psycho-correctional trainings, resource-saving technologies, target programs of optimization of mental stability, special course «Psychological culture of the professional» and individual consultations.

We will open the maintenance of the most significant components of development of the professional.

Subsystem of professionalism of activity

The subsystem of professionalism of activity is characterized by a harmonious combination of high professional competence, professional skills at the level of professional skill, and also the acmeological invariants of professionalism acting as special basic abilities.

Professional competence — the main cognitive component of a subsystem of professionalism of activity, the sphere of professional maintaining, constantly extending system of knowledge allowing to carry out professional activity with high efficiency. Psychological competence represents the structured system of knowledge of the person as the individual, identity, the subject of work and the personality included in individual or joint activity, which is carrying out professional and other interactions.

T. E. Egorova studied autopsychological competence. In the autopsychological competence the properties of the personality allowing to direct activity of the person on self-knowledge, an adequate self-assessment, self-checking and self-government are accentuated [11, 117].

Development of the autopsychological competence with orientation to biopower indicators allows, according to the author, actively to influence functional states and by that to raise resistance to stress and working capacity.

Professional skills are the main regulatory component of a subsystem of professionalism of activity realizing the professional knowledge put in professional competence.

Professionalism of activity has close functional connections with professionalism of the personality.

Subsystem of professionalism of the personality

The subsystem of professionalism of the personality contains requirements to a level of development of various characteristics and properties of the subject of work which in many respects define high efficiency of professional activity in broad understanding. These properties, qualities and characteristics have various psychological contents. We will note the most important of them.

K. K. Platonov believed that professionalism of the personality is reached in many respects in development of abilities and their enrichments.

I. N. Semenov emphasized that distinctive feature of the informative sphere of the professional is active reflection of reality and ability to good guidance in it [10, 21].

Professionalism of the personality depends and on a level of development of professionally important qualities of the subject of work, i. e. such qualities of the personality which influence productivity of activity. Professionally important qualities are defined in the course of researches of conditions and factors of development of professionalism. Professionally important qualities often are integrated with mental properties of the personality (attention, memory, imagination), and also psychological characteristics (emotional warmth, charm, stability, patience, etc.). In the acmeological researches the role of the strong-willed qualities of the personality which are a necessary condition for achievement of the set large-scale objects and the internal regulator of self-development and

self-improvement is highlighted. The professional is interested in personal and professional development in that case when it has motives of professional achievements and professional self-realization.

Subsystem of a normativity and activity of behavior

The true professional, whose standards of quality of professional activity are high, forms rather rigid system of standard regulation. This regulation also induces it to adhere constantly to these standards which, in turn, act as the moral regulator of behavior and the relations. Ethical standards of the professional can find the reflection in professional and group and social norms.

Formation of standard system of regulation of activity, behavior and the relations is a basis of professional and moral culture. Professional and moral culture — the sign of the true professional which is in close connection with his psychological culture [2, 134].

Subsystem of formation of the productive I-concept

Development of the professional is impossible without productive I-concept, that is without realized as unique system of representations of the subject about itself. For development of the productive I-concept some things are necessary:

- gnostic ability to analyze a situation, characteristics of subjects and objects of activity and interactions;
- design ability adequately to represent the existing cause and effect and functional communications;
- constructive ability to build and correct system of behavioural, activity and relational strategy;
- communicative ability to establish, realize and correct relationship, adequately to govern the relations in group, to come into emotionally positive contacts, to operate and influence behavior and the relations;
- reflexive ability to react adequately to a situation and subjects of interaction;
- social and perceptual ability to choose the corresponding role position, to carry out cooperation, to work taking into account specific features of subjects of interaction.

On the basis of this system of representations the entity builds its relations and interaction. Adequate views allow you to create realistic personal and professional standards, program development and self-development, to build a harmonious and productive professional interactions and relationships.

The awareness of man's professional development inevitably leads him to the understanding of inconsistency, mismatch of this process, the uneven formation of the individual aspects of its development (when, for example, aspirations and motives ahead of real opportunities) or to understand the balance, harmony (when new goals require back-breaking effort, representing all the reserves of the body and personality). The source of disharmonies in the development may be too early or belated professionalization. Maintaining the balance in the waste of mental forces and the acquisition of new resources also characterizes the man as the subject of his professional development.

There are many points of view on the relation between the “subject of professional development” and “professional”. A. A. Derkach proposes the following distinction of these concepts. “The subject of professional development — a person who knowingly organizes this process that sets goals, implements them, deliberately enriching experience, communication. The subject of development — a man in transit, moving along the path of professionalization. A professional is a worker who have already achieved high levels of objectively perform professional activities. Therefore, not every person of professional development comes to the level of professional” [3, 228].

Psychological and acmeological psychological understanding of culture enables the professional to approach the description of the process of his development through a qualitative characteristic of his personality, given his personal characteristics, the subject of potential, abilities of self-determination of his own life.

Formation of psychological culture should be seen as a holistic phenomenon of professional development, which provides the freedom of operating creative abilities and ways of perfection of professional and personal positions in one's professional activities. N. T. Selezneva (1997) showed that the formation of psychological culture is not only the growth of its psychological components: it is, above all, the development of the integrity of the system of psychological culture and its essential characteristics. Formation of psychological culture is seen as a holistic process that embraces a progressive, regressive, quantitative and qualitative changes within the system.

The process of formation of psychological culture as the process of integration is based on psycho-physiological, psychological, personal and subject-activity development of a professional, but is not limited to any of them, as revealed in the quality of their natural synthesis as a new qualitative characteristic that enhances the personality as a subject of activity. Psychologically acmeological concept of professional culture allows to reveal stadial-level nature of the development of psychological culture and subjective features of the mechanisms of self-development, objective terms (goals, objectives,

requirements, constraints). Regularities of formation of psychological culture uncover a variety of ratios individual level, psychological, personal and socio-psychological features that provide the fulfillment of a professional.

In general, using well-developed psychological culture of the person harmoniously takes into account both the internal requirements of the personality, the psyche, the body, and external requirements of social and natural environments of life.

Highly developed psychological culture of personality includes a set of consciously developed special aspirations, inherent in man initially, and ensure their implementation natural abilities.

The professional development was presented with conceptual acmeological position as the process and outcome of systemic changes of developing person, including the interconnected progressive changes of the four subsystems. These subsystems, which include a plurality of components, can be diagnostic signs of psychological culture of a professional. At the same time acmeological approach allows you to select criteria, indicators, levels of psychological culture of a professional, a theoretical justification for the empirical data; to identify and study the regularities of formation of psychological culture as an integral phenomenon of the individual professional, to identify the factors to achieve its optimal level. This creates the possibility of optimal functioning of the system of formation of psychological culture of a professional criteria and level of his development.

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Section 7. Technical sciences

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Ways of reducing superfluous communications in battant mechanism of weaving looms

Abstract: In this article, new scheme of cam and lever battant mechanism with compound hinges, including elastic elements of weaving looms are investigated. The technique of liquidation and decrease in superfluous communications in kinematic steams of battant mechanism of the weaving looms are presented.

Keywords: weaving loom, beater, cam, lever, elastic element, inertiaforces, reactionforces, superfluous communications, mobility degree, and kinematic pair.

The main technological function of battant mechanism of the shuttle-weaving loom is nailing the weft yarn to the edge of the fabric. Besides, the battant mechanism carries out a number of additional functions: it provides the movement of the shuttle on the beam, sets in motion the mechanisms of commodity and main regulators, automatic change of bobbins, unloading valves and others. On battant mechanism of shuttle-weaving looms mount multi-shuttle devices, safety devices from a start of a shuttle and control mechanisms wrap threads. Battant mechanism of these machines consists of the fighting mechanism, picking stick, which performs translational motion together with battant [1].

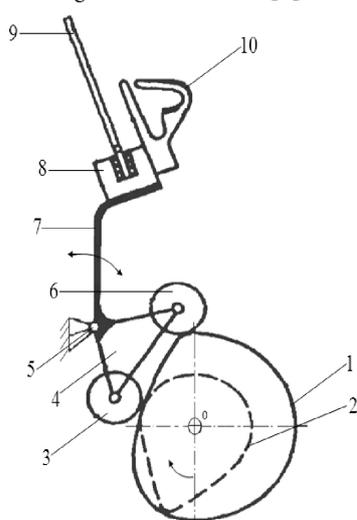


Fig. 1. Battant mechanism of the STB weaving loom

On battant mechanism of the shuttle-less looms are installed guide combs for moving the thread-plotter or special channel-confuser for pneumatic or hydraulic machines [1]. The battant mecha-

nisms can be divided by type into two main groups — crank and cam drive. Shuttle weaving looms contain most widespread mechanisms of the first group. Cam drive battant mechanism widespread in shuttle-less weaving looms.

Battant mechanisms must satisfy the following technological and technical requirements:

- swing reed must be the least to avoid strong grinding teeth reed warp yarns; weft thread to the edge of the fabric to be nailed smooth pressure and not blow;
- the mass of the batten should be small and sufficient to meet all technological and mechanical operations of the mechanism;
- bounded speed driving modes due to large inertial forces and reactions in kinematic pairs due to redundant links in the mechanism; rapid failure of bearings, and low resource mechanism.

To ensure the necessary technological requirements and increase the effect of the work mechanism Battant recommended method to reduce redundant links in the mechanism by the use of elastic elements in the kinematic pairs [2].

Fig. 1 is a diagram of the battant mechanism, which is used on looms. Cams 1 and 2 are rotating about shaft O. The cam 1 contacts with the roller 6 and the cam 2 contacts with the roller 3, which are installed on the crank 4, the latter is located on the shaft 5. On blades 7 mounted beam 8 and reed blade 9. The blades are significantly shorter than blades of conventional shuttle machines. On the beams of the battant from the edge of the fabric fixed comb, made from steel plates 10. They are guide when moving the thread-plotters through the throat (on machines ATPR, plate 10 is not mounted on pneumatic looms, confuse attached to the beam 8). Battant mechanism is considerably facilitated, as it has no shuttle boxes and the mechanism warning a separation of the basic threads at thread plotter (last one moves in a pharynx on directing combs). For the given mechanism, we define quantity of superfluous communications according to [3].

$$q = W - 6n + 5P_5 + 4P_4 + 3P_3 + 2P_2 + P_1, \quad (1)$$

where, W — degree of mobility of the mechanism, P_5, P_4, P_3, P_2, P_1 — quantity of kinematic pairs of fifth, fourth, third, second and first classes; n — quantity of mobile links. In the considered mechanism Fig. 1, it agree, $W = 5, n = 4, P_5 = 4, P_4 = 2$ and accordingly the quantity of superfluous communications will be $q = 3$.

It is known that, superfluous communications appear because axes are not parallel kinematic pairs. Thus, there are great strengths of reactions in kinematic steams and their fast failure. To eliminate of superfluous communications, usually reduce a class of corresponding kinematic pairs [3]. We have to eliminate redundant links recommended to perform hinge components include elastic elements. In addition, each coordinate or direction of elastic deformation elements respectively eliminates a redundant link in the mechanism.

Fig. 2 shows battant mechanism which comprises a housing 1, a cam 2, counter-cam 3 mounted to the main shaft 4. Compound rollers 5 and 6 are hinged to the lever 7 and trehplechem contact with profiles (surfaces) of the cams 2 and 3. The rollers 5 and Compound 6 include hinges 9 and 12 are impaled on the resilient rubber bushings 13 and 14. The thickness of the rubber sleeve 13 is twice larger than the thickness of the elastic rubber sleeve 14. The lever 7 mounted pivotally on a shaft 8. The third lever arm 7 connected rigidly to the timbers 10 and 11.

Shoulder reed 7 of three-humeral arm further connected to the shaft 8 with a torsion spring 15. The elastic rubber bushings 13 and 14 are made of oil-resistant rubber stamps.

Following formula is recommended for definition of superfluous communications of the proposed mechanism:

$$q = W - 6n + 5P_5 + 4P_4 + 3P_3 + 2P_2 + P_1 - K, \quad (2)$$

where, K —quantity of elastic elements in kinematic pairs of the mechanism or coordinate of their deformation.

For recommended battant mechanism $K = 3$, then $q = 0$, superfluous communications are eliminated. For the following кулачкового the mechanism it agree rice 3, superfluous communication will be a rhubarb to unit, as in mechanism $K = 2$.

For the next cam mechanism according to Fig. 3, excessive communication will be the rhubarb unit, as in the mechanism of $K = 2$.

Fig. 4 shows a diagram of the four bar crank-hinge mechanism used as a battant mechanism of weaving looms.

The mechanism consists of a crank 1, rod 2, the rocker 3, and carrying reed 4 of rider 5. According to the method described in [3], for this mechanism would be:

$$W = 3n - 2P_5 - P_4 = 3 \cdot 3 - 2 \cdot 4 = 1;$$

$$Q = W - 6n + 5P_5 - 4P_4 = 1 - 18 + 20 = 3.$$

To eliminate redundant links in the lever battant mechanism, the kinematic pairs made components; including elastic elements (see Figure 5).

Battant mechanism of the weaving machine consists of a frame 1, crank 2, connecting rod 3 and the rocker 4, interconnected by hinges 7, 8, 14, 15. The rocker arm 4 carries a reed 5 and rider 6. Hinge 7 between the two crank and connecting rod 3 is made integral, comprising an axle 12 rigidly connected to the rod 3, on which the elastic sleeve 13 is pushed over the concave curved shape forming. In the elastic sleeve 13 is mounted with a hub 11 corresponding to the convex curved shape forming the inner surface. The sleeve 11 is rigidly connected to the crank 2. Hinge 8 also made compound includes an axle 9, is rigidly connected to the axis of the rocker 4. At axle 9 planted elastic sleeve 10 with an elliptical cross-section, on which a sleeve 11 is rigidly connected to the rod 3.

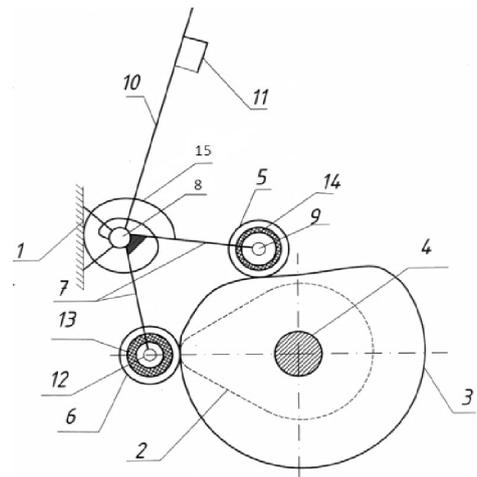


Fig. 2. Battant mechanism of a weaving loom with compound cam rollers

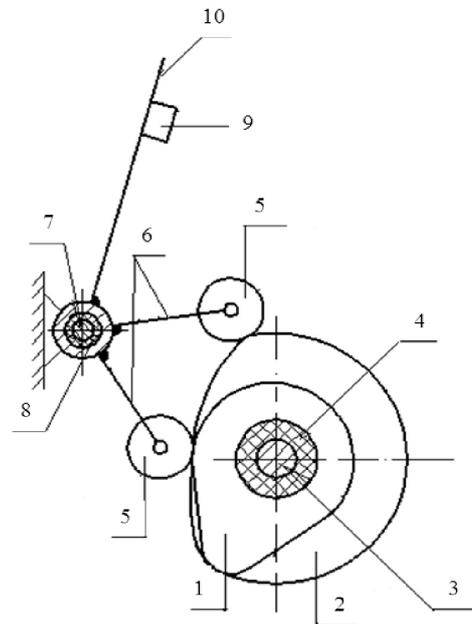


Fig. 3. Battant mechanism of a weaving loom with elastic elements

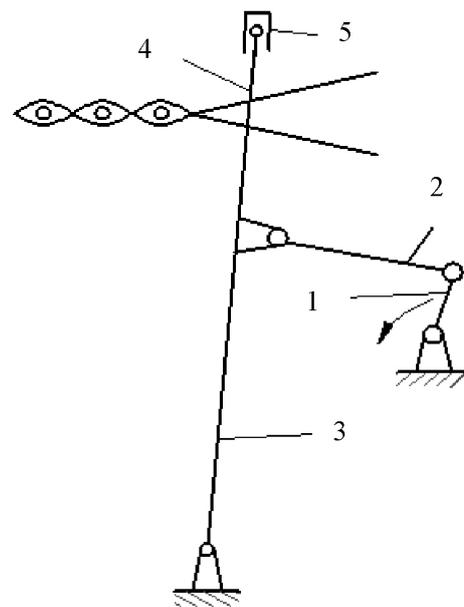


Fig. 4. Four bar crank-hinge mechanism

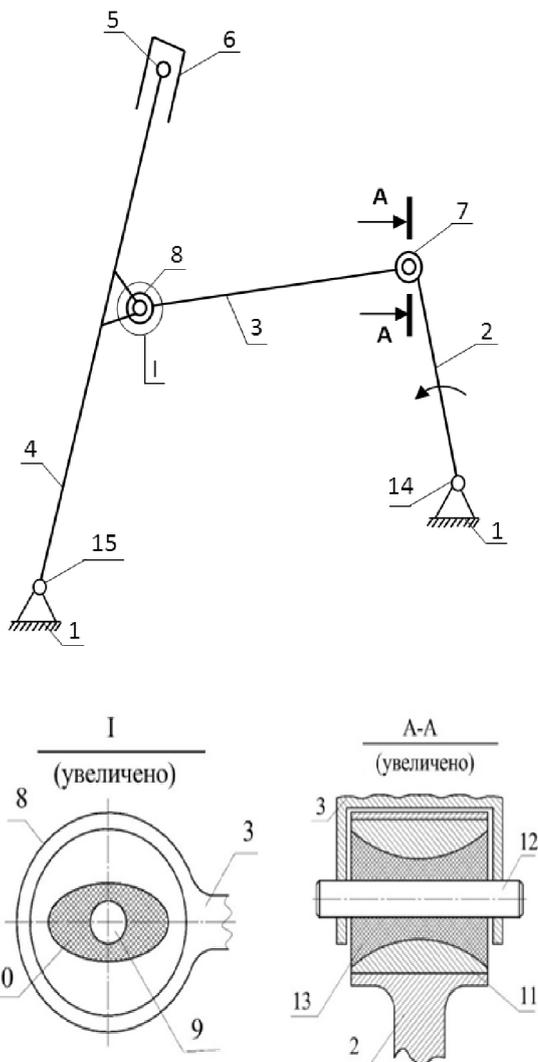


Fig. 5. Lever battant mechanism of the loom with composite joints

Table 1. – Shows the main indicators discussed in battant mechanism of weaving looms

№		n	P ₅	P ₄	q	W	K
1	Cam drive battant mechanisms (fig. 1)	4	4	2	3	5	0
2	Battant mechanism of a weaving loom with compound rollers and cam with elastic elements (fig. 2)	4	4	2	0	5	3
3	Battant mechanism of a weaving loom with elastic elements (fig. 3)	4	4	2	1	5	2
4	The scheme four bar slider mechanism (Fig. 4)	3	4	0	3	1	0
5	Lever battant mechanism of a weaving loom with compound hinges (Fig. 5)	3	4	0	0	1	3

Taking into account that the elastic elements in the hinge beater provide deformation along three dimensions, by their marks in the form of an ellipse and a concave curved way, then K=3. At the same time, respectively, will be eliminated redundant links in the kinematic pairs of mechanism.

Conclusions

New schemes of battant mechanism with elastic elements of weaving looms are recommended. The technique of elimination of superfluous communications in kinematic pairs of battant mechanism is developed.

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Boundary problems of elastic rods and their solution by finite difference method in various approximations

Abstract: Boundary conditions of elastic rods are considered in the paper on the basis of Lagrange variation principle. The computing algorithm of finite difference method in various approximations is developed. On the basis of comparison and analysis of numeric results an effective computing scheme for the solution of the problems of basic and applied researches are offered.

Keywords: Thin-walled rod, variation principle, equation of balance, boundary problems, finite difference method, approximation, computing algorithm, cell matrixes and vectors.

On the basis of specified theory of rods, offered by V. Z. Vlasov, G. Yu. Djanelidze, V. K. Kabulov [1], the expressions of displacements of the points of a rod under joint action of longitudinal, transverse and torque forces may be presented in the form:

$$\begin{aligned} U_1 &= U - z\alpha_1 - y\alpha_2 + \phi v + a_1\beta_1 + a_2\beta_2; \\ U_2 &= V + z\theta; \quad U_3 = W - y\theta \end{aligned} \quad (1)$$

where U, V, W — are the displacements of central line of the rod; α_1, α_2 — the tilt angles of tangential line in relation to elastic one; β_1, β_2 — the angles of transverse shears; θ — the angle of torsion; v — the linear twist, j — the function of torsion, coefficients $a_1 = \psi_1(y) - y$ and $a_2 = \psi_2(z) - z$ in S. P. Timoshenko-V. L. Bidermann representation [1]:

$$\psi_1(y) = \frac{3}{2K} \left(y - \frac{4}{3} \frac{y^3}{h^2} \right), \quad \psi_2(z) = \frac{3}{2K} \left(z - \frac{4}{3} \frac{z^3}{h^2} \right), \quad K = \frac{6}{5}.$$

Then, according to Cauchy formula with consideration of (1) one could calculate the components of strain:

$$\ell_{11} = \frac{\partial u_1}{\partial x}; \quad \ell_{12} = \frac{\partial u_2}{\partial x} + \frac{\partial u_1}{\partial y}; \quad \ell_{13} = \frac{\partial u_3}{\partial x} + \frac{\partial u_1}{\partial z}; \quad \ell_{22} = \ell_{33} = \ell_{23} = 0. \quad (2)$$

Stress and strain components are related by the following way:

$$\begin{aligned} \sigma_{11} &= E\ell_{11} = E \frac{\partial u_1}{\partial x}; \quad \sigma_{12} = G \left(\frac{\partial u_2}{\partial x} + \frac{\partial u_1}{\partial y} \right); \quad \sigma_{13} = G \left(\frac{\partial u_3}{\partial x} + \frac{\partial u_1}{\partial z} \right); \\ \sigma_{22} &= \sigma_{33} = \sigma_{23} = 0. \end{aligned} \quad (3)$$

Relationships (1) and Lagrange variation principle [1] are used to derive a fundamental differential equation of equilibrium of the rod:

$$\delta(-\bar{\Pi} + \bar{A}) = 0. \quad (4)$$

Variation of potential energy $\delta\bar{\Pi}$ in this statement has the form:

$$\delta\bar{\Pi} = \int_V \sum_{i=1}^3 \sigma_{ii} \delta\ell_{ii} dV$$

Taking into account Cauchy relationships (2) and Hooke's law (3) one has the following:

$$\delta\bar{\Pi} = \int_V \left[E \frac{\partial u_1}{\partial x} \delta \frac{du_1}{dx} + G \left(\frac{\partial u_2}{\partial x} + \frac{\partial u_1}{\partial y} \right) \delta \left(\frac{\partial u_2}{\partial x} + \frac{\partial u_1}{\partial y} \right) + \right. \\ \left. + G \left(\frac{\partial u_3}{\partial x} + \frac{\partial u_1}{\partial z} \right) \delta \left(\frac{\partial u_3}{\partial x} + \frac{\partial u_1}{\partial z} \right) \right] dV. \quad (5)$$

Opening the brackets we could fulfill integration operation in parts:

$$\begin{aligned} \delta\bar{\Pi} &= \int_V \left(\sigma_{11} \delta u_1 + \sigma_{12} \delta u_2 + \sigma_{13} \delta u_3 \right) \Big|_x + \iint \sigma_{12} \delta u_1 \Big|_z + \iint \sigma_{13} \delta u_1 \Big|_y - \\ &- \int_V \left[\frac{\partial \sigma_{11}}{\partial x} \delta u_1 + \frac{\partial \sigma_{12}}{\partial x} \delta u_2 + \frac{\partial \sigma_{13}}{\partial x} \delta u_3 + \frac{\partial \sigma_{12}}{\partial y} \delta u_1 + \frac{\partial \sigma_{13}}{\partial y} \delta u_1 \right] dV. \end{aligned}$$

Sought for functions $U, \alpha_1, \alpha_2, v, \beta_1$ and β_2 are the functions of x , therefore, boundary conditions in y and z drop off. Here with

consideration of Hooke's law (3) similar items are given and an integral in rod section is singled out:

$$\begin{aligned} \delta\bar{\Pi} &= \iint_{yz} \left[E \frac{\partial u_1}{\partial x} \delta u_1 + G \left(\frac{\partial u_2}{\partial x} + \frac{\partial u_1}{\partial y} \right) \delta u_2 + G \left(\frac{\partial u_3}{\partial x} + \frac{\partial u_1}{\partial z} \right) \delta u_3 \right] dx + \\ &- \iint_x \left[\left(E \frac{\partial^2 u_1}{\partial x^2} + G \left(\frac{\partial^2 u_2}{\partial x \partial y} + \frac{\partial^2 u_1}{\partial y^2} + \frac{\partial^2 u_3}{\partial x \partial z} + \frac{\partial^2 u_1}{\partial z^2} \right) \right) \delta u_1 \right] dF + \quad (6) \\ &+ \iint_F \left[G \left(\frac{\partial^2 u_3}{\partial x^2} + \frac{\partial^2 u_1}{\partial x \partial y} \right) \delta u_2 \right] dF + \iint_F \left[G \left(\frac{\partial^2 u_3}{\partial x^2} + \frac{\partial^2 u_1}{\partial x \partial z} \right) \delta u_3 \right] dF dx. \end{aligned}$$

Variation of the work of external forces $\delta\bar{A}$ in (4) is taken in the form:

$$\delta\bar{A} = \int_V \sum_{i=1}^3 P_i \delta U_i dV + \int_S \sum_{i=1}^3 f_i \delta U_i dS_1 + \int_{F_1} \sum_{i=1}^3 q_i \delta U_i dF \Big|_x, \quad (7)$$

where P_i, f_i, q_i — are volume, superficial and end components of the force.

Single out an integral in rod section:

$$\begin{aligned} \delta\bar{A} &= \int_x \left[\int_F P_1 \delta u_1 dF + \int_F P_2 \delta u_2 dF + \right. \\ &+ \left. \int_F P_3 \delta u_3 dF + \int_l f_1 \delta u_1 dl + \int_l f_2 \delta u_2 dl + \int_l f_3 \delta u_3 dl \right] dx + \\ &+ \left[\int_F q_1 \delta u_1 dF + \int_F q_2 \delta u_2 dF + \int_F q_3 \delta u_3 dF \right] \Big|_x. \end{aligned} \quad (8)$$

Variations of potential energy (6) and of the work of external forces (8) are substituted into Lagrange variation principle (4):

$$\begin{aligned} \delta(-\bar{\Pi} + \bar{A}) &= \int_x \left[\left(\left(E \frac{\partial^2 u_1}{\partial x^2} + G \left(\frac{\partial^2 u_2}{\partial x \partial y} + \frac{\partial^2 u_1}{\partial y^2} + \frac{\partial^2 u_3}{\partial x \partial z} + \frac{\partial^2 u_1}{\partial z^2} \right) + P_1 \right) \delta u_1 \right) dF + \right. \\ &+ \left. \int_F \left(\left(G \left(\frac{\partial^2 u_3}{\partial x^2} + \frac{\partial^2 u_1}{\partial x \partial y} \right) + P_2 \right) \delta u_2 \right) dF + \int_l f_2 \delta u_2 dl + \right. \\ &+ \left. \int_l f_1 \delta u_1 dl + \int_F \left(\left(G \left(\frac{\partial^2 u_3}{\partial x^2} + \frac{\partial^2 u_1}{\partial x \partial z} \right) + P_3 \right) \delta u_3 \right) dF + \int_l f_3 \delta u_3 dl \right] dx + \\ &+ \int_{yz} \left[\left(-E \frac{\partial u_1}{\partial x} + q_1 \right) \delta u_1 + \left(-G \left(\frac{\partial u_2}{\partial x} + \frac{\partial u_1}{\partial y} \right) + q_2 \right) \delta u_2 + \right. \\ &+ \left. \left(-G \left(\frac{\partial u_3}{\partial x} + \frac{\partial u_1}{\partial z} \right) + q_3 \right) \delta u_3 \right] dz dy = 0 \end{aligned}$$

equation (9).

Expressions u_i from relationship (1) are substituted into Lagrange variation principle (9). We will introduce the following dimensionless values: $x = \bar{x}$, $y = b_0 \bar{y}$, $z = h_0 \bar{z}$, $U = h_0 \bar{U}$, $V = h_0 \bar{V}$ and $W = h_0 \bar{W}$, and perform the integration operation in rod section. As a result in variation equation of equilibrium (9) there are the following sought for functions: W , α_1 , β_1 , V , α_2 , β_2 , U , θ and v . Formed equation of variation exists in any volume of discussed object.

Besides, variations of sought for functions do not equal to zero. Therefore, from formed variation equation of equilibrium (9) one obtains the system of equations with nine unknowns and corresponding boundary conditions.

Introducing the displacement vector \vec{V} and the vectors of external forces \vec{F} , \vec{Q} in (9), we would obtain the system of differential equations with natural boundary conditions in a vector form:

$$\frac{d}{dx} \left[A \frac{d\vec{V}}{dx} + B\vec{V} \right] + C \frac{d\vec{V}}{dx} + D\vec{V} = \vec{F} \quad (10)$$

and boundary conditions:

$$\left\{ A \frac{d\vec{V}}{dx} + B\vec{V} - \vec{Q} \right\} \delta \vec{V} \Big|_{\Gamma} = 0, \quad (11)$$

where \vec{V} — is a sought for vector of the function; A , B , C and D — quadratic matrices of the ninth order with corresponding elements a_{ij} , b_{ij} , c_{ij} and d_{ij} ($i = j = 1, \dots, 9$), presented in details in [2]. To illustrate it we would present the elements a_{11} and a_{18} : $a_{11} = \frac{l^2}{3I_0} F$; $a_{18} = -\frac{l^2}{3h_0 I_0} S_z$, here I_0 — is an inertia of cross section, the area of cross section of the rod — F and static moments — S_z are determined from the following integral relationships:

$$F = \iint_F dF; \quad S_z = \iint_F y dF.$$

Usually there are geometric, static and mixed boundary conditions.

Boundary conditions (11) are written at $x=0$ and $x=l$:

$$\begin{aligned} K_0 A_0 \frac{d\vec{V}}{dx} + T_0 B_0 \vec{V} &= \vec{Q}_0, \quad \text{at } x=0; \\ -K_N A_N \frac{d\vec{V}}{dx} + T_N B_N \vec{V} &= \vec{Q}_N, \quad \text{at } x=N, \end{aligned} \quad (12)$$

here K_0 , K_N , T_0 and T_N — are forming coefficients of boundary conditions.

To compare and analyze the results we would solve the formed boundary problem (10)–(11) by finite difference method in approximations [3; 4]:

- I. Central difference scheme (CDS);
- II. A. A. Samarsky – I. V. Fryazinov modification (SFM).

Consider computing algorithms of solution of a boundary problem with geometric boundary conditions.

I. CDS. Re-write the formulated problem (10)–(11) with geometric boundary conditions, when $P = (B + C)$:

$$A \frac{d^2 \vec{V}}{dx^2} + P \frac{d\vec{V}}{dx} + D\vec{V} = \vec{F}; \quad (13)$$

$$\vec{V}_0 = 0; \quad \vec{V}_N = 0. \quad (14)$$

Using approximation of central difference scheme, the boundary problem (13)–(14) is written in the form [3]:

$$\bar{A}_i \vec{V}_{i+1} - \bar{B}_i \vec{V}_i + \bar{C}_i \vec{V}_{i-1} = \bar{F}_i; \quad (15)$$

$$\vec{V}_0 = 0, \quad \vec{V}_N = 0, \quad (16)$$

where $\bar{A}_i = \frac{1}{h} A_i + \frac{1}{2} P_i$; $\bar{B}_i = \frac{2}{h} A_i - h D_i$; $\bar{C}_i = \frac{1}{h} A_i - \frac{1}{2} P_i$ and $\bar{F}_i = h \vec{F}$.

Boundary problem (15)–(16) is solved by run method, with the following recurrent formula:

$$\vec{V}_i = \alpha_i \vec{V}_{i+1} + \beta_i, \quad i = N-1, \dots, 1; \quad (17)$$

here: $\alpha_i = (\bar{B}_i - \bar{C}_i \alpha_{i-1})^{-1} \bar{A}_i$, $\beta_i = (\bar{B}_i - \bar{C}_i \alpha_{i-1})^{-1} (\bar{C}_i \beta_{i-1} - \bar{F}_i)$. (18)

II. SFM. In A. A. Samarsky – I. V. Fryazinov modification the vector equation (10) is approximated by the difference scheme divided in two groups. Introducing analytical grid $\omega_n = \{x_i = ih\}$ ($i = 1, 2, \dots, n-1$) in the domain G , we approximate the equation (10) by the following difference schemes up to the order of $O(h^2)$ [4]:

$$\begin{aligned} & \frac{1}{h} \left(\frac{A_{i+1} + A_i}{2} \frac{\vec{V}_{i+1}^{(1)} - \vec{V}_i^{(1)}}{h} - \frac{A_i + A_{i-1}}{2} \frac{\vec{V}_i^{(1)} - \vec{V}_{i-1}^{(1)}}{h} \right) + \\ & + \frac{B_{i+1} \vec{V}_{i+1}^{(2)} - B_i \vec{V}_i^{(2)}}{h} + \frac{C_i \vec{V}_{i+1}^{(2)} - C_i \vec{V}_i^{(2)}}{h} + D_i \vec{V}_i^{(1)} = \vec{F}_i^{(1)}; \\ & \frac{1}{h} \left(\frac{A_{i+1} + A_i}{2} \frac{\vec{V}_{i+1}^{(2)} - \vec{V}_i^{(2)}}{h} - \frac{A_i + A_{i-1}}{2} \frac{\vec{V}_i^{(2)} - \vec{V}_{i-1}^{(2)}}{h} \right) + \\ & + \frac{B_i \vec{V}_i^{(1)} - B_{i-1} \vec{V}_{i-1}^{(1)}}{h} + \frac{C_i \vec{V}_i^{(1)} - C_i \vec{V}_{i-1}^{(1)}}{h} + D_i \vec{V}_i^{(2)} = \vec{F}_i^{(2)}. \end{aligned} \quad (19)$$

In the system of equations (19) we will introduce the following denotations:

$$A_{i+\frac{1}{2}} = \frac{A_{i+1} + A_i}{2}; \quad A_{i-\frac{1}{2}} = \frac{A_i + A_{i-1}}{2}, \quad (20)$$

then, the equation (19) acquires the following form:

$$\begin{aligned} & \frac{1}{h} \left(A_{i+\frac{1}{2}} \frac{\vec{V}_{i+1}^{(1)} - \vec{V}_i^{(1)}}{h} - A_{i-\frac{1}{2}} \frac{\vec{V}_i^{(1)} - \vec{V}_{i-1}^{(1)}}{h} \right) + \\ & \frac{B_{i+1} \vec{V}_{i+1}^{(2)} - B_i \vec{V}_i^{(2)}}{h} + \frac{C_i \vec{V}_{i+1}^{(2)} - C_i \vec{V}_i^{(2)}}{h} + D_i \vec{V}_i^{(1)} = \vec{F}_i^{(1)}; \\ & \frac{1}{h} \left(A_{i+\frac{1}{2}} \frac{\vec{V}_{i+1}^{(2)} - \vec{V}_i^{(2)}}{h} - A_{i-\frac{1}{2}} \frac{\vec{V}_i^{(2)} - \vec{V}_{i-1}^{(2)}}{h} \right) + \\ & + \frac{B_i \vec{V}_i^{(1)} - B_{i-1} \vec{V}_{i-1}^{(1)}}{h} + \frac{C_i \vec{V}_i^{(1)} - C_i \vec{V}_{i-1}^{(1)}}{h} + D_i \vec{V}_i^{(2)} = \vec{F}_i^{(2)}. \end{aligned} \quad (21)$$

$$\vec{V}_0^{(\alpha)} = 0, \quad \vec{V}_N^{(\alpha)} = 0; \quad (22)$$

where $\alpha = 1, 2$.

Introduction of the vector $\vec{U}_i = [\vec{V}_i^{(1)} \quad \vec{V}_i^{(2)}]^T$, into the system of equations (21) is presented in the form:

$$\hat{A}_i \vec{U}_{i+1} - \hat{B}_i \vec{U}_i + \hat{C}_i \vec{U}_{i-1} = \hat{F}_i; \quad i = 1, 2, \dots, N-1; \quad (23)$$

$$\vec{U}_i = 0 \quad \text{at } i=0 \quad \text{and } i=N; \quad (24)$$

here $\hat{A}_i, \hat{B}_i, \hat{C}_i$ — are cell matrices, \hat{F}_i — cell vectors in the form:

$$\begin{aligned} \hat{A}_i &= \begin{vmatrix} \frac{A_{i+\frac{1}{2}}}{h} & B_{i+1} + C_i \\ \theta & \frac{A_{i+\frac{1}{2}}}{h} \end{vmatrix}; \\ \hat{B}_i &= \begin{vmatrix} \frac{A_{i+\frac{1}{2}}}{h} + \frac{A_{i-\frac{1}{2}}}{h} - h D_i & B_i + C_i \\ -B_i - C_i & \frac{A_{i+\frac{1}{2}}}{h} + \frac{A_{i-\frac{1}{2}}}{h} - h D_i \end{vmatrix}; \\ \hat{C}_i &= \begin{vmatrix} \frac{A_{i-\frac{1}{2}}}{h} & \theta \\ -B_{i-1} - C_i & \frac{A_{i+\frac{1}{2}}}{h} \end{vmatrix}; \quad \hat{F}_i = \begin{vmatrix} h \vec{F}_i^{(1)} \\ h \vec{F}_i^{(2)} \end{vmatrix}. \end{aligned}$$

To solve the formulated Cauchy problems (23)–(24) the method of matrix run is used.

The solution is sought in the form

$$\vec{U}_i = \hat{\alpha}_i \vec{U}_{i+1} + \hat{\beta}_i, \quad \text{at } i = N-1, \dots, 1; \quad (25)$$

where $\hat{\alpha}_i$ and $\hat{\beta}_i$ — are yet undetermined cell matrices and vectors. For the calculation of these parameters one may get the following recurrent formulae:

$$\hat{\alpha}_i = (\hat{B}_i - \hat{C}_i \hat{\alpha}_{i-1})^{-1} \hat{A}_i, \quad \hat{\beta}_i = (\hat{B}_i - \hat{C}_i \hat{\alpha}_{i-1})^{-1} (\hat{C}_i \hat{\beta}_{i-1} - \hat{F}_i). \quad (26)$$

Boundary problem is solved with geometric boundary conditions under the following initial data: geometric and mechanical

characteristics of the rod: $l = 200 \text{ cm}$, $h_0 = 20 \text{ cm}$, $b_0 = 15 \text{ cm}$, $E = 2 \cdot 10^6 \text{ kg/cm}^2$, the values of external load: $f_1^+ = 12$; $f_1^- = 6$; $f_2^+ = 10$; $f_2^- = 2$; $f_3^+ = 8$; $f_3^- = 4 \text{ kg/cm}^2$.

Vector components \vec{F} in differential equation (10) are formed as follows:

$$f_1 = \frac{l^4}{Eh_0J_0} [(h_0 + b_0)(f_3^+ + f_3^-)]; f_2 = \frac{l^3}{2EJ_0} [b_0(f_1^+ - f_1^-)];$$

$$f_3 = \frac{l^3b_0}{Eh_0J_0} \left[f_1^+ \left(-\frac{h_0}{12} \right) + f_1^- \left(\frac{h_0}{12} \right) \right]; f_4 = \frac{l^4}{Eh_0J_0} [(h_0 + b_0)(f_2^+ + f_2^-)];$$

$$f_5 = \frac{l^3}{EJ_0} \left[\frac{b_0}{2} (f_1^+ - f_1^-) \right]; f_6 = \frac{3l^3}{EJ_0} \left[f_1^+ \left(-\frac{b_0}{12} \right) + f_1^- \left(\frac{b_0}{12} \right) \right];$$

$$f_7 = \frac{l^4}{Eh_0J_0} [(h_0 + b_0)(f_1^+ + f_1^-)];$$

$$f_8 = \frac{l^4b_0}{2Eh_0J_0} [(f_2^+ - f_2^-) + (f_3^+ - f_3^-)];$$

$$f_9 = \frac{l^3h_0b_0}{8Eh_0^2J_0} [(h_0 + b_0)(f_1^+ - f_1^-)].$$

Table 1. – Numeric results of design of boundary problems in approximations: CDS and SFM

$\max(\vec{V}_i(x))$	I. CDS II. SFM	Approximate solutions under different values of nodes number				
		$N=10$	$N=20$	$N=40$	$N=80$	$N=160$
$w(0.5)$	I.	0.264553	0.404896	0.471792	0.492521	0.498021
	II.	0.482354	0.495291	0.498693	0.499582	0.499809
$\alpha_1(0.2)$	I.	0.671438	1.076926	1.269323	1.328727	1.344461
	II.	1.349723	1.349757	1.349778	1.349787	1.349789
$\beta_1(0.1)$	I.	0.085271	0.148715	0.178511	0.187567	0.189950
	II.	0.186052	0.189709	0.190524	0.190701	0.190743
$v(0.5)$	I.	0.322373	0.590028	0.758660	0.818209	0.834672
	II.	0.809080	0.832241	0.838231	0.839785	0.840183
$\alpha_2(0.2)$	I.	0.868041	1.672228	2.177690	2.355813	2.405001
	II.	2.421581	2.421735	2.421813	2.421844	2.421854
$\beta_2(0.1)$	I.	0.076457	0.197457	0.272994	0.299344	0.306593
	II.	0.304416	0.308341	0.308956	0.309051	0.309069
$u(0.5)$	I.	0.026250	0.026250	0.026250	0.026250	0.026250
	II.	0.026250	0.026250	0.026250	0.026250	0.026250
$\theta(0.5)$	I.	0.091964	0.092554	0.092754	0.092811	0.092826
	II.	0.092153	0.092608	0.092769	0.092815	0.092827
$v(0.1)$	I.	0.060032	0.063666	0.064754	0.065045	0.065120
	II.	0.061358	0.063994	0.064836	0.065066	0.065125

Table 1 gives the approximate numeric results of design of the problem under the following boundary conditions $\vec{V}|_{x=0} = 0$ and $\vec{V}|_{x=l} = 0$. Maximum values of sought for functions $\vec{V}_i \cdot 10^2$ are given by two values. The first of them corresponds to CDS solution, and the second — to SFM solution with different values of the grid step h at $N = 10, 20, 40, 80$ and 160 .

On the basis of the Table data one may conclude that at $N = 10$ and $N = 20$ the deflection W and turning angle α_1 coincide up to two or three signs, at $N = 40$ and $N = 80$ coincide up to three or more signs in SFM. In CDS at $N = 40$ and $N = 80$ near the ends ($x = 0.1$) the values coincide up to two signs, and in the middle of the rod up to one sign. From the table and the graphs it is seen that to obtain more accurate solution of the boundary problem in

CDS it is necessary to choose the number of nodes $N = 80$ and more. In SFM it is sufficient to take $N = 10$ or $N = 20$.

Based on results obtained (Table 1) one may conclude that numeric results in approximation by A. A. Samarsky-I. V. Fryazinov Modification approach faster a stable (asymptotic) solution compared with central difference scheme of the second order of accuracy.

Figure 1 shows the parameters of the vector of displacement \vec{V}_i along the length of the rod. The graphs are built on the basis of numeric results in SFM at $N = 20$.

So, the use of approximation by A. A. Samarsky-I. V. Fryazinov modification shows its merits in solving the problems of fundamental and applied nature, described by differential equations of linear and non-linear types.

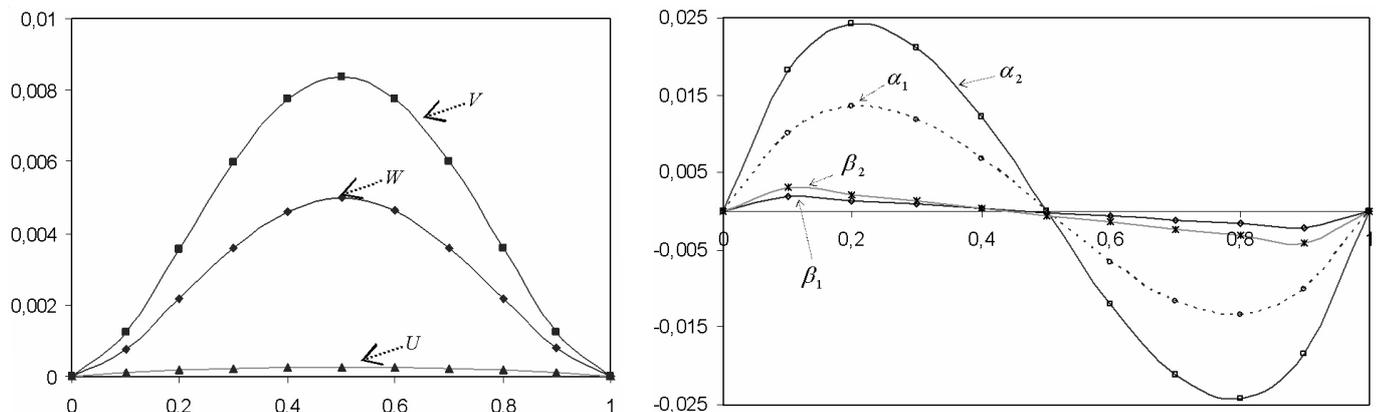


Fig. 1. State of design values W , V , U , α_1 , α_2 , β_1 , β_2 along the length of the rod

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Determine the resource elements that affect confidence level of two lined cotton harvesting machines “Case-2022”

Abstract: In the article the results of the research work are brought about determine the resource elements that affect confidence level of two lined cotton harvesting machines “Case-2022” in Uzbekistan.

Keywords: cotton collecting machine, resource elements, spindle, extractor drum, humidifying unit, a ball lifter, air system, spindle drum.

In the desire to determine the resource elements (item, node) that affect confidence indicator line two cotton collecting “Case-2022” machine’s testing results were sorted. The testing was done between 1996–2000 by the Certification and testing center of the Agriculture technologies and technics of the Republic of Uzbekistan [1; 2].

It is seen that by the data, below are the conclusions which were made according to results (table-1) of the experiments (1996, 1999, 2000) of two and four lined HSM “Case-2022” that were taken at the “Testing and certification center of irrigation technologies and technics of Uzbekistan”.

The main part of the total 299 breakings happened with the spindle (66.2%), the extractor drum (17.4%) and the humidifying unit. Share of the prop shaft, jack pneumatics and spindle

drum is 3.25%. And the share of problems in the system, receiving chamber of the machine, basket and wheels are 0.33–0.66%. Malfunctions in the spindle: Conical gear rod was broken to 27 mm. in length (in 166 cases), teeth of conical gear which turns the rod (in 13 cases) and the cartridge which is stem of the rod was mutilated (in 19 cases).

All 52 malfunctions in the extractor drum are involved with corrosion of the trapezoid teeth of the extractor disks.

Plastic support of a humidifier pad was broken 22 times. This figure belongs to all breakings that happened in the humidifier unit.

Unhealthy spindles will be changed only to new ones, because their design is not meant to be repaired, its basement conic gear and the surface cogs are part of the same body and they are made in a very complex way.

Table 1. – The number and percentage of problems in the components that have arisen during the experiment of two and four lined horizontal spindle machines «CASE-2022»

№	Component parts	1996 year	1999 year	2000 year	Sum	
1	Spindle	80	47	71	198	66.20 %
2	Extractor drum	7	0	45	52	17.40 %
3	Humidifying unit	20	0	2	22	7.30 %
4	Cardan shaft of cotton collecting machine		0	1	9	3.25 %
5	A ball Lifter	3	0	2	5	1.60 %
6	Air system	3	0	2	5	1.6 %
7	Spindle drum	0	3	0	3	0.66 %
8	Hydraulics	2	0	0	2	0.33 %
9	Cable unit of a device	1	0	0	1	0.33 %
10	Basket	1	0	0	1	0.33 %
11	Wheel	0	1	0	1	0.33 %
12	Sum	125	51	123	299	100 %

It is very difficult job to change pump spindle with the new one; in order to change one spindle it must be removed from the spindle cassette (rotor) drum, washed, unhealthy spindle will be removed, and replaced with a new one and the cassette is will be installed back to its place.

If the extractor drum’s teeth are mutilated at all, they will be changed to only new ones, because the disk and lower trapezium

teeth are made of a rubber material. In order to change the unhealthy disc, the extractor drum must be removed from the frame unit, disks are separated from the shaft, instead of unhealthy disc will be set new ones and the drum will be set back into its place.

Machine operator or for replacement of one spindle, extractor drum with mutilated teeth and for a broken plastic support of the humidifier pad spends an average of 20, 62 and 11 minutes respectively.

A conic spindle and an extractor disk are source components of the cotton collecting machine. Increasing their reparability can be considered as one of serious, scientific technological problems.

The conical spindle and disk extractor are one of the main structural parts of the harvesting machine. Enhancement their reparability can be considered as an actual problem.

Three year results of examinations of “Case-2022” HSM which were done at the “Testing and certification center of irrigation technologies and technics of Uzbekistan” showed that mostly problems are related to conic spindle cane and trapezoid teeth of the extractor drum disks. With regard to these, 66.2% and 17.4% of common problems are related to above mentioned breakings.

Extractors and spindles are not repairable. Because the bevel gear which is base of the spindle shaft and the lower teeth and both rods are one solid metal; the extractor disk and trapezium teeth are made of the same elastic metal and modeled in alloy style.

That is why unhealthy spindle and extractor disk require to be changed to new ones. Such a negative situation on the one hand is the reason for increasing costs during preparation and use of machines in the cotton picking season, and it is the cause of increasing price of cotton picking in one hectare of field or to collect one ton of cotton on the other.

Despite of this, until now not any scientific and technological researches have been done in Uzbekistan regarding cone-shaped spindle and development of repairable extractor disks.

The main purpose of the current research material is to reach a technical improvement through increasing of reparability of HSM spindles and extractors. In order to achieve the target below mentioned scientific technological issues should be solved:

– To select a geometric shape of repairable disk-shaped extractor cogs;

– To find an experimental and a theoretical fundamental principles of technological width between a surface of the cone-shaped

spindle and cogs as well as to find constructive principles of the disk-shaped cogs;

– To study the level of energy potential of an extraction process of cotton from horizontal cone-shaped spindle through the trapezoid cogs of the disk;

– To find constructive principles of experimental disk extractor and spindle cogs;

– To arrange test works in the fields and at special labs.

Conclusions

1. During three years (in 1996s, 1999s, 2000s) of examinations (examinations took place at the “Testing and certification center of irrigation technologies and technics of Uzbekistan”) of the two and four lined “Case-2022” HSM the main malfunctions happened with the spindle (66.2%) and with humidifier unit (7.3%).
2. Malfunctions in the spindle: the rod with cone-shaped teeth was broken to 27 mm in length (in 166 cases).
3. All 52 malfunctions in the extractor drum are involved with corrosion of the trapezoid teeth of the extractor disks.
4. Unhealthy spindles and extractor disk units are only being replaced with the new ones, because their design is not meant to be repaired.
5. These are the reparability requirements set for HSMs that are standardized and defined according to their technical and exploitation features: providing a technical service, repairing, keeping and transportation and technical diagnosis of a machine.
6. There were groups and categories developed in regards with the data evaluation of reparability of the HSM. And elements (a spindle, an extractor drum, a humidifier unit, cardan-shaft of the mechanism and others) were determined that impact to reliability of the machine.

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Climate change and its impacts on Amudarya river runoff

Abstract: This article analyzed the changes of River Amudarya during a long-year period, also had been collected and studied long-year database on air temperature changes over Uzbekistan. Based on the analyses have been given assessment on climate change impacts on the water runoff of the river Amudarya at present and in future.

Keywords: Amudarya river, climate, annual mean temperature, water resource, water-sheds.

Introduction. At present taken both globally or locally the annual mean temperature during the last 30–40 years keeps growing everywhere, which is already a recorded objective fact. According to the figures of researchers the level of the world sea waters during the last 100 years increased about 10–25 cm. and these changes took place due to air global temperature grow. It is known that because of human industrial activities at the last decades concentration of greenhouse gases grew in the atmosphere and it could be the main reason of temperature grow.

For all Central Asian Republics including also Uzbekistan which have enormous land farming recourses and agro-technical potentials the further climate aggravation (temperature changes, air pollution, precipitations, wind force and speed) could lead to equality destruction of interrelated system earth — water — climate.

Background materials. Our Scientific Research Institute of Irrigation and Water Problems during the last 30 years keeps a constant survey on air temperature changes, river runoff, water level, water supply and water use for agriculture needs. We collected a

huge database on water and climate change over Uzbekistan which now help us to make a conclusion how these changes took place and how they are going to develop in future.

Results and their discussion. It is known that water resources at the Aral Sea basin are entirely consummated and limited. And water resources shortage exists at present too. The main causes are:

1. Enlarging irrigation areas at the river basin and consequently the increase of water usage for irrigation.
2. Man-made control for regulating seasonal and annual river streamflow by building of big water-pools.

Certainly the first factor is — enlargement of irrigation areas and increasing river water gates coming from river for irrigation all over the Basin of Amudarya River. Naturally the intensive growth of population in Central Asia is objective reality and food security consistently demands irrigation areas enlargement. The future enlargement of land must go side by side with implementation and development of high-tech water saving technology.

The second factor is the changes of Amudarya water routine system caused by big watersheds buildings at the issue of the river (as in Kirgizstan and Tajikistan).

According to its hydrological character Amudarya River is snow-glacier nutrition type of river. Formatting waters in natural conditions river is powerful enough to satisfy water needs all over the regions. However during the recent years connected with some big watershed buildings river started to function as a source of energy power system. Such man-made implied energy function at present leads to water shortage over the basin.

The third factor is the impacts of global and local climate change on river runoff.

The main index of global climate change considered to be above ground air temperature. In this given case that is at the down streams of river Amudarya climate change indexes are affected by following factors:

1. Impacts of global climate change.
2. Impacts of Aral Sea desertification.
3. Cutting the areas of irrigated lands inside the lake systems and wetlands.

As a rule, the first factor is a global problem and its impacts spread over the entire world.

The second factor is the Aral Sea desertification including delta lakes. This factor impacts only on a given area embracing the coastal belt of the sea.

The third factor is the desertification of an enormous lake and wetland areas, located inside irrigation lands and also reducing of rice plots (in 1980–1985 this area makes 110 thousands of ha.). These above mentioned objects some how could control the climate change factors forming this way a definite type of microclimate.

In whole global temperature change both over the basin and its downstream could be affected by the factor of global temperature increase, which in its turn causes air pollution and greenhouse gas emission. It is proved that even insignificant grow of air temperature could lead to extremely adverse impacts such as river water reduction and consequently reduction of irrigated lands and also public health aggravation.

Based on recorded materials has been made a graph of air temperature change (mid vegetation period) over Uzbekistan ($t^{\circ}C$) and runoff of river Amudarya at the hydro-station of Kerki and Samanbay. Using data by Chub B. E. (2000) we tried to find interrelations between air temperature changes over Uzbekistan and Amudarya river runoff at the hydro-stations Chatli, Samanbay and Kerki.

In order to define the character of interrelation between air temperature and river water volume (W) using data by Chub B. E. (2000), have been made crooked graphs of mid annual index $W = f(t^{\circ})$.

The changeable volume of river runoff over long year period depends mainly on two factors:

- outgoing water gates dynamics for irrigation,
- climate change indexes.

It is known that during the initial period 1936–1955 (I, II, III, IV periods) water gates sizes for irrigation had been minimal. Since 1975 when intensive process of new land reclamation started consequently outgoing river water gates volume for irrigation rapidly increased, (Karshi steppe reclamation at the down stream of Amudarya and so on.).

The maximum indexes for water gates are noticed from 1980 to 1987 and starting from 1987 these indexes considerably decreased connected with reclamation of huge new irrigation lands. Figure 1 shows a diagram of air temperature changes at 1926–2014 and expected ones.

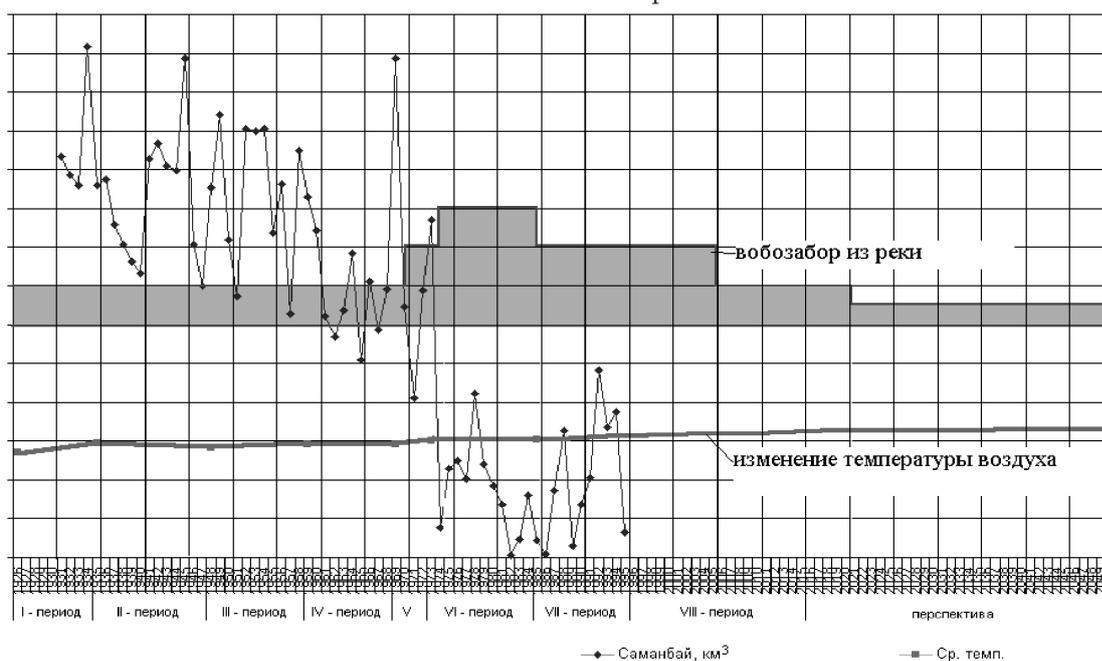


Fig. 1. Water gates sizes from the river and air temperature across Uzbekistan

As we see from the fig. 1 at the period 1926 to 1960–1965 water volume at the hydro station Samanbay was relatively unchangeable and shuttled between 30 to 65 km³. Later connected with reclamation of enormous irrigating territories at mid and down stream of the river the volume of outgoing river water started to increase.

As it was mentioned above the main reason of runoff volume change of the river Amudarya during the vegetative period (April–October) mainly depends of two factors:

- water gates from the river (main factor);
- climate index changes.

At the period of 1926–1967, which embrace first three periods the volume of first factor (water gates for irrigation) was minimal. That's why river stream volume was relatively stable (with succession of full water and insufficient water years). Later started from 1967–1970 its volume decreased connected with the increasing of water gates for irrigation.

Maximum sizes of water gates noticed during the period of 1972–1985 and later during 1986–2005 its sizes became stable even during last years appeared to be a bit decreased.

According to researchers' anticipations in perspective at the period 2015–2025 is expected insignificant decrease of water gates for irrigation (in case insignificant or unchangeable sizes of irrigated

area). For achieving this it is necessary a development and implication of water saving technology in the region.

What concerns to air temperature changes, so could be added that in future expected its incensement.

Conclusion:

The analyses of database on climate change indexes and river runoff shows the following:

1. Amudarya river runoff changes could be occurred affected by climate change factors which is mainly air temperature, and the water gate sizes out flowing from the river for irrigation could be stable or even decreased if in future water saved technology would be implied over the whole region.

2. In future, during 20–30 years is expected river runoff incensement due to air temperature grow, which will take place simultaneously with decreased glaciers and finally future decreased of the volume of the river streamflow.

3. We must take into consideration that global climate change is unavoidable and ceasing these processes demand enormous efforts with integrated activities and long period for results. However, must be taken steps to study air temperature growing on local and regional scale. Such activities are quite available and they will stop huge territory desertification, will develop sand fixation and create man-made wetlands and other processes.

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Water resources: the basis for the socio-economic development in the lower reaches of the Amudarya: a case study of Karakalpakstan

Abstract: The article analyzes the socio-economic situation of the lower reaches of the Amudarya river, caused by the shortage of water resources in the region. Studied in detail the condition and use of water resources in the region, identified the existing problems and on their basis conclusions are given.

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

Introduction. The fate of the Priaralie region and further agricultural development in the lower reaches of Amudarya depend entirely on the water policies of Tajikistan, Uzbekistan and Turkmenistan. The emergence of a critical water situation during low water years (2000–2003), when the water availability in the upstream and middle-stream of the river fluctuated in the range of 80–85 %, and declined to 16 % in the northern regions of the Republic of Karakalpakstan, is evidence of this dependence. In low water years, ecological objects and agriculture in the lower reaches of Amudarya suffered from the lack of water in low-water years, whereas in the high water periods a critical situation emerged due to dam and structures breakages in the river delta.

The main causes of the emergence of such situations are:

- Lack of integrated policy on water resources management along the Amudarya River.
- Inconsistent operation regime of large reservoirs, such as Nurek and Tuyamuyun.
- Lack of accurate accountability of water withdrawal volumes along the river.
- No recognition of ecological water requirements of the river delta and the Aral Sea by the states.

The reduction in inflow of the river run-off to the Priaralie region has caused huge socio-economic damage, associated with deterioration of the environmental situation and loss from agricultural

production resulting from the shrinkage of crop areas and decline in crop yield.

Results and their discussion

Socio-Economic Damage Caused by Aggravation of the Ecological Situation

The reduction in water supply for the lower reaches has resulted in the following unfavorable outcomes:

- Loss of the Aral Sea;
- Losses in fisheries, muskrat breeding and livestock sector;
- Irreversible character of natural changes due to the desertification of the river delta;
- Creation of a new desert area on the dried bottom of the Aral Sea, which results in salt and dust transport to irrigated lands;
- Loss in recreational value of the sea.

Decrease of the Aral Sea Level

Although great efforts and policies on the stabilization of the sea level have been undertaken, decisions concerning the guaranteed water supply to the sea remain difficult to fulfill. In these circumstances, it should be acknowledged that if water allocation and use policies in the Aral Sea basin remain the same, the sea level will continue to fall. At present, the water is discharged into the sea on the residual principle. This means that one can expect an entire extinction of the sea in the future if no measures are undertaken (The Aral Sea Expedition — 2004, EC IFAS, Dushanbe, 2005).

A two-stage approach should be applied in order to deal with the Aral Sea problem: In the initial stage (stage I), a project should be developed with the involvement of interested donors (IFAS, GEF and others.). Meanwhile, feasibility studies aiming at determining the future of the Aral Sea are to be carried out based on project outcomes. If the project justifies saving the sea in a reduced, yet stable basin, then it can proceed to Stage II which aims at reaching an interstate consensus on the shared contribution of each republic to the amount of water that will be supplied to the sea. Since the future of the Aral Sea entirely depends on the policies of Central Asian countries, it will be necessary to clarify the following positions:

- Whether the Aral Sea is considered a problem by all Central Asian states, and if it should be solved;
- Will all Central Asian countries agree to direct water saved in their territories to the Aral Sea;
- Will Central Asian countries agree to allow Basin Water Organization (BWO) "Amudarya" and BWO "Syrdarya" to take full responsibility for guaranteed water supply (according to limits) to Priaralie and the sea.

Losses in Fisheries and Muskrat Breeding

Before 1970, there were 34 species of fish inhabiting in the Aral Sea. Of these, more than 20 species were caught. At the same time, the sea supplied more than 4500 ton of commercial fish, among which valuable species were prevailing. They included thorn, pike-perch, silurus, aral barbel, and carp. The Aral Sea ranked first in the former Soviet Union in terms of fish catch. Currently it has lost its importance as a fishery resource.

In 1957–1958, more than one million units of valuable muskrat skins were obtained from lakes in the lower Amudarya. However, after the critical low water years of 2000–2001, their population has completely disappeared.

The coastal zone has lost its vital attractiveness and landscape value, due to decreasing water volume in the lower reach of the river. By now, the area of lakes in the Amudarya delta has declined from 300,000 to 40,000 ha. Moreover, mineralization of water has sharply increased and in some places, water contains up to 60 g/l of dissolved solids (Lake Agushpa).

Increase in the Area of the Dried Bottom of the Sea

As the natural landscape zone of the Amudarya delta with its tugai flora and specific wildlife degraded, wildlife numbers fell sharply. The salt-dust from the dried sea bottom together with the declining sea level resulted in desertification and a decrease in natural bonitet of lands in large territories. The reed areas that were used as the main pasture areas for livestock were sharply reduced (30-fold). The intensive process of drying up of the sea initially took place in the sea bays Jiltirbas and Adjibay. The speed of coastline regression in Jiltirbas bay zone was 2.7–3 km. annually. The intensive drying process corresponded to the period 1980–1985 and its area accounted for 2,387 km² (in the south).

Assessment of Loss in Agricultural Production

From 1965 to 1996, the total area of irrigated lands increased from 220,000–500,000) ha, while rice crop area increased from 5,400–110,000 ha in the Republic of Karakalpakstan. During some years, 448,500 t of cotton and 368,300 t of rice were produced. In low water years a 35, 3 and 30 — fold decrease was observed in the areas of irrigated land, cotton and rice respectively.

The value of gross yield of crops depends on water availability. The production of the highest and most stable yields correspond to the period from 1983 to 1993, when water availability in the river was enough to meet crop water requirements. During this period, the average values of gross cotton and rice yields amounted to:

- Cotton: 337,500 ton;
- Rice: 301,000 ton.

Meanwhile in low water years, the shortfall in yield fell to 250,000 t. (Fig. 1).

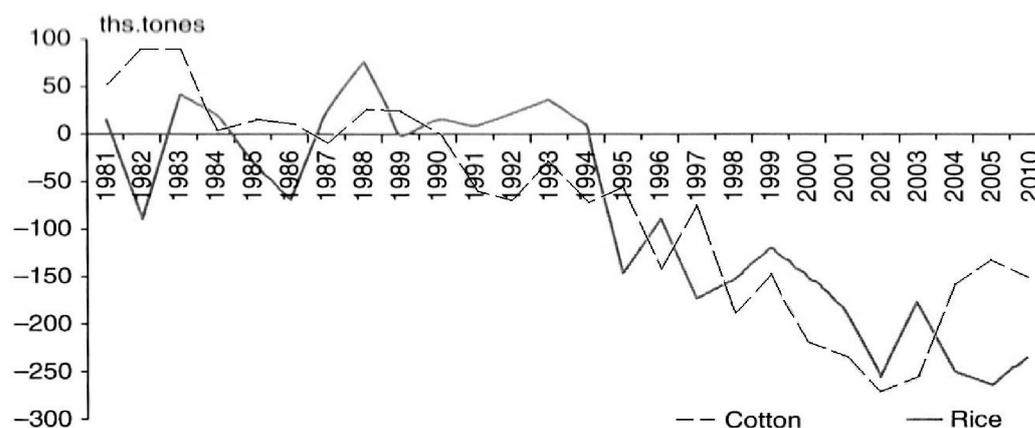


Fig. 1. Losses in the gross yields of cotton and rice in the Republic of Karakalpakstan for the period 1981–2010

For ecological objects and the agricultural sector only, the losses caused by water shortages amount to 219.8 million USD in low-water years, 164.3 million USD during average water availability years and 144.8 million USD in high-water years. For mitigating unfavorable ecological conditions and the socio-economic situation in the lower reaches of Amudarya, it is necessary to make decisions at a regional level.

The main conclusions:

- Development of a long-term concerted policy for Central Asian countries on water supply to the Priaralie

region, on the principle of existing international counterparts.

- Increasing the role authority of BWO “Amudarya” by transferring all water withdrawal objects, large water works and reservoirs to the balance sheet of this organization so it can ensure a guaranteed water supply to Priaralie region.
- Further increase in agricultural production in the Aral Sea basin should be achieved by increasing the efficiency of irrigated hectare, rather than land reclamation.

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Step-by-step mechanical treatment of the dried grapes and its physical interpretation

Abstract: The gradual processing of dried grapes in the drum-typed grapes stemming machine ensured in the form of separate graph, which is implemented in the sequence of the technological process cycle. Partial grinding in a blade dozing unit, screw conveyor, in dismembratore, blade-brush area and the final separation of a crushed grapes mixture in the aerodynamic flow. Testing of the stemming machine showed that the purification ratio amounted 0.95, but the defectiveness of berries less than 4 %.

Keywords: grapes, raisins, drying, processing, stemming machine drum, dismembrator, disc, fingers, blade.

Uzbekistan is the in leadership position among the former Soviet Union countries on production of the dried grapes products. As in 2015 it there were produced the raisins in amount of 63.5 thousand tons, and by 2020 its production volume should be increased to 100 tons when the population of Uzbekistan is 31.5 million people and 3.17 kg. of product will be equal per capita [1]. Regardless the drying method (an air, a sun, sun drying method or kiln (artificial) drying the dried grapes are delivered to the point of primary processing and machine treatment by means of the technical means.

In the result of the scientific research activities carried out by the Gulistan State University staff a modernized drum typed high-tech stemming machine based on the impact-centrifugal effect has been developed (Fig. 1) [2].

Stemming machine consists of the following: shown in the fig. 1 — rotating drum inside surroundings of which the blades 3 are fixed at radial side; eccentrically at the axis 4 two couples of the outline-typed 5 and brush-typed 6 drums. The last ones are activated by means of the electrical engine 7 and wedge-belt 8. The main drum 2 is rotated at the account of frictional drive 9 and chain drive 10. At the loading area of the drum's head the rotor is installed coaxially, that represents dismembratore consisting of the internal stationary disc 11 and externally mounted disc 12, which is installed with possible rotation from the electrical engine 13. Throughout the peripheries, the fingers 14 are installed at concentrically surroundings on the discs fabricated from the elastic-distorting material, e. g. a rubber. The both discs form the ring tolerance to where the tray railing 15 of the screw conveyor machine [4] is directed to of the conveying machine 16 connected to the feeding blade-typed dozing unit 17 is the junction with the silo 18. The pneumatic separator 19 is mounted under the outlet of the drum end point.

Processing of a dried grapes can be ensured in the form of separate graphs, which is implemented in the sequence of the technological process cycle (fig.2) [3].

The dried grapes is supplied through the steeply-sloping bucket elevator into the feed silo 18 and then from the silo it is delivered through feeding blade dozing unit into the screw-typed conveying machine 16 in dose parts. When passing through the dozing unit and moving throughout the screw-typed conveying machine a racemation of the dried grapes are partially grinded until it becomes to separate grape berries and penicils.

Furthermore, the formed heavy multicomponent grapes mixture is supplied throughout the sloped blade 15 to the dismembrating unit of the stemming machine. In this processing unit a product is delivered into the ring-typed tolerance formed between movable 12 and stationary 11 discs of dismembrating unit; it hit onto the fingers 14 and grinded until it becomes the separate grape berries, combs and fruit stems.

Then the three-component dried grapes mixture is delivered to the slatted zone where it passes through the additional mechanical treatment. In this case mixture is caught by the blades 3 and at the top part is overturned to the side of being rotated slatted drums 5. When it hits onto the bars and in process of flying-out of the certain berries of fruitstems flying-out are torn-off. Then the torn-off berries together with fruitstems are delivered into the brushed-type drums 6, where due to the brushes friction throughout the inside part perforated surface of the drum 2 there occurs the final tear-out dividing of the fruitstems.

Torn-off berries and stalks fall through the drum sieve into the sloped chute and supplied to the aerodynamic separation process. Thereafter the separation occurs under the influence of the sloped

directed airflow. Combs and stalks, as the lighter fractions having more sail abilities, fly-out and stand at a greater distance, and berries settle at no longer distance.

Practical tests of the stemming machine implemented in one of the farmers of Samarkand region showed that the cleaning process rate was 0.92–0.95, and the berries defectiveness amounts less than 4%.

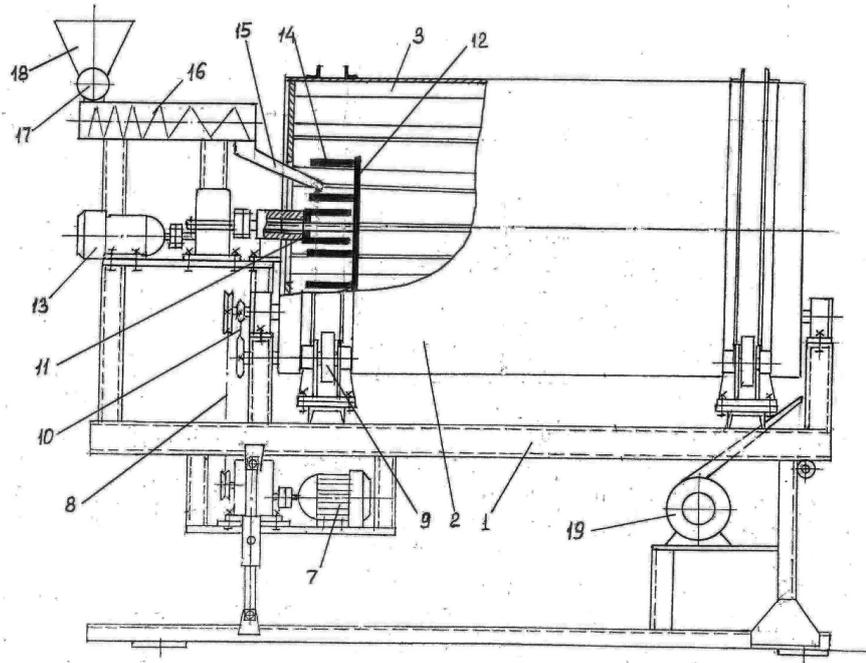


Fig. 1. Process diagram of the drum typed stemming machine of with impact-centrifugal action

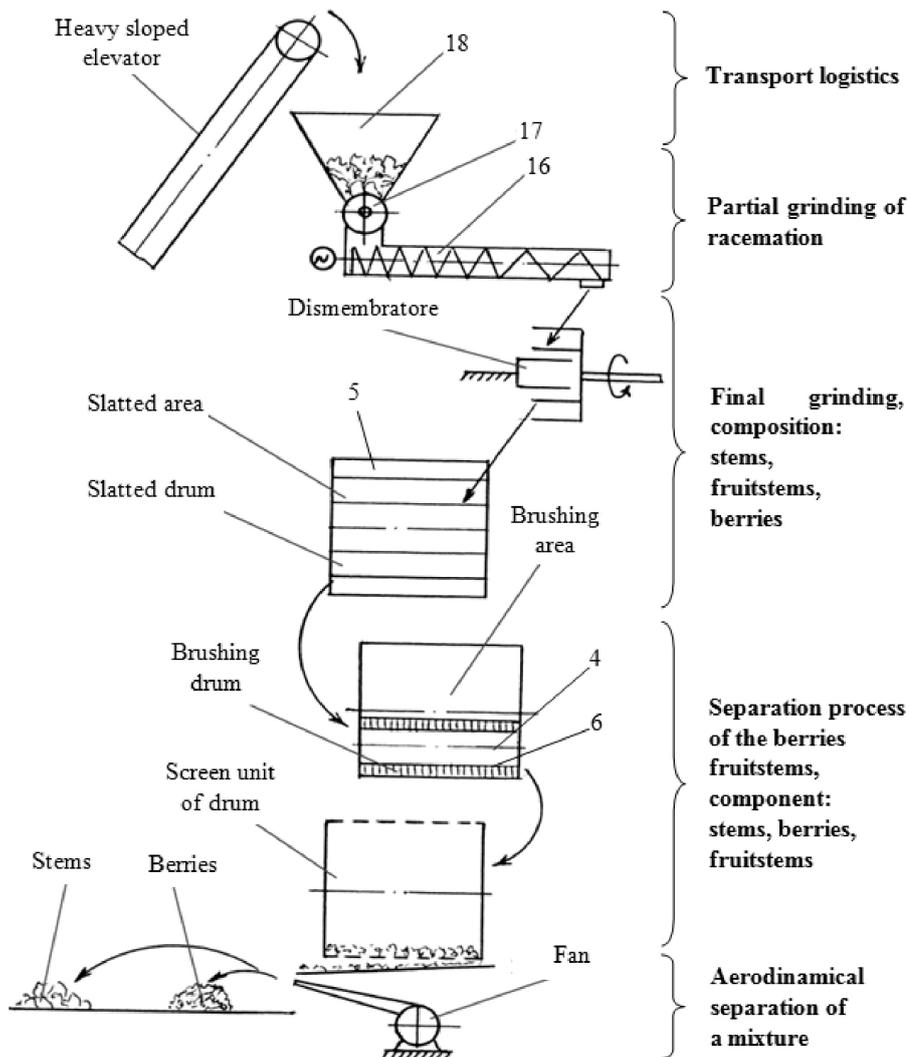


Fig. 2. Stages of the mechanical treatment of dried grapes

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Analysis of calculation pressing force of raw cotton to the surface of dielectric drum separators

Abstract: The article provides a new design of the dielectric separator for sorting cotton seeds of raw cotton in the degree of maturity of the fibers. There were discussed in detail the principle of operation of the proposed design of the dielectric separator. The analysis of design models to determine the force pressing cotton seeds in their longitudinal and transverse locations in the area between the electrodes of the dielectric drum. The analysis of the formulas for determining the electric force pressing cotton seeds to the surface of the drum which for the considered two options of the location cotton seeds in the area between the electrodes of the separator. Analyzed estimated parameters of the separator and required design values cotton seeds pressing force to the surface of the dielectric separator bowl. Noting the relevant calculation results with the results of preliminary experiments in the laboratory.

Keywords: dielectric separator, sorting, fiber, maturity, cotton seeds, raw cotton.

The quality of the resulting yarn depends on the maturity of raw cotton fiber. If the yarn obtained from fibers of cotton with different maturity, the yarn turns nonuniform and lower specification [1, 89–120]. Therefore, used different design separators that allow sorting of raw cotton fiber maturity [2; 3]. We have developed a new design of the dielectric separator.

It should be noted that during the sorting of raw cotton fibers at maturity can be divided into four phases: feeding, charging, setting in

motion of the particles and formation of the final product. The first step determines the initial conditions of entry of particles in an electric field, the second — the amount of electric power the electric field in the raw cotton. In the third step shown character movement of seed cotton by the action of the resultant of the applied forces, and the fourth — is determined by the trajectory of the seed cotton, after separation from the working body. The seed cotton to the actuator is usually solved by constructive-regime parameters of the supply unit solutions.

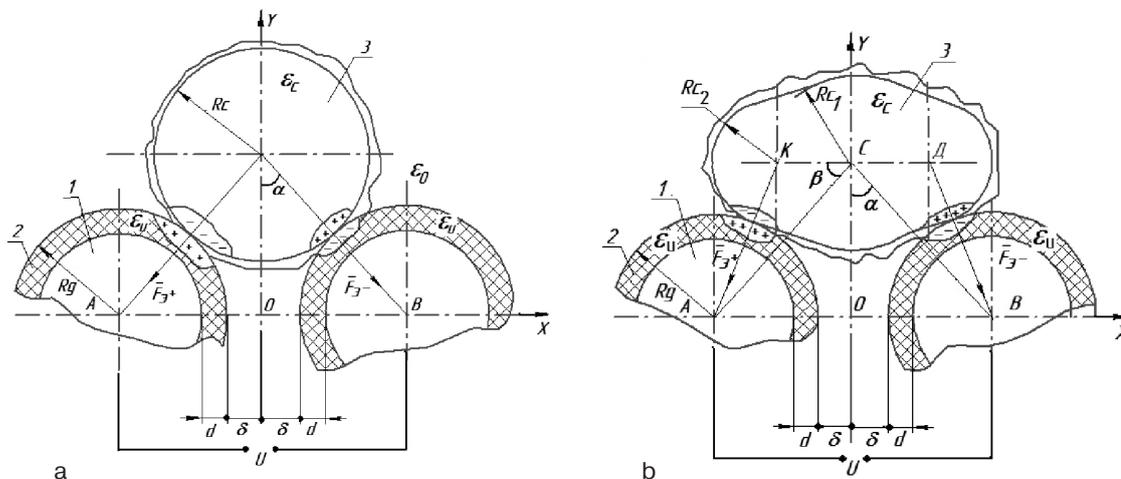


Fig. 1. Calculated circuit: a) to determine the electrical force of attraction of the seed cotton at its lengthwise location in the space between the electrodes; b) to determine the electrical force of attraction of the seed cotton at its transverse disposition in the space between the electrodes

Principle dielectric sorting based on the action of the electric field of opposite polarity electrodes on raw cotton according to their quality indicators associated with the physical properties. Action field on raw cotton primarily estimated amount of electric power arising from the internal physical processes in the particle and raw cotton [4, 98–103]. To determine the electric force pressing the electrodes of different polarities of raw cotton in the insulating separator drum, we assume that seeds of raw cotton (the tough part) has an enlarged form with a radius R_s and R_{s2} . Seeds may be located in the interelectrode space along the long axis (Fig. 1a) and transversely (Fig. 1b) cylindrical electrodes. Assume also that the electrodes filed a constant voltage U , that is between the electrodes has a direct current electrostatic field. Power of the electric induction flux lines emanating from the positive electrode, penetrate the insulation of the electrode layer with a thickness of d , the lower part of the volume of the seed cotton along the path length lc , the insulation layer and the negative electrode conductor shorted to the negative electrode. As a result of polarization on the outer surface of the insulating layer of the positive electrode layer is formed of positive charges, and the facing surface portion of the seed cotton — a layer of negative charges $-Q$. On the opposite side of the seed cotton surface facing the negative electrode layer is formed of positive charges $+Q$.

We assume that the electric field between the contacting surfaces of the elementary layers of insulation and the seed is uniform because of their smallness. The left part of the seed polarized by the electric field of bipolar electrodes is attracted to the positive electrode force \vec{F}_s^+ , and the right side — with F to the negative electrode.

Total electric polarization contact force is the seed of the electrodes:

$$\vec{F}_s = \vec{F}_s^+ + \vec{F}_s^- \quad (1)$$

The magnitude of the resulting electrical force, since the symmetry of the system, the longitudinal arrangement of the seed in the interelectrode space is equal to (Fig. 1):

$$F_{s2} = \frac{\varepsilon_0 \varepsilon_c \varepsilon_u^2 (\varepsilon_c - 1) S_{II} U^2 \sqrt{KC^2 - (R_c - \delta)^2}}{2 \left[KC^2 - (R_s + R_{c2})^2 + 2(R_s + R_{c2})(R_s + \delta) \right]} \cdot \left[\varepsilon_c d + \frac{\varepsilon_0 R_{c2} (R_s + \delta)}{\sqrt{KC^2 - (R_s + R_{c2})^2 + 2(R_s + R_{c2})(R_s + \delta)}} \right] \quad (3.7)$$

In order to calculate the electric force pressed against the seed will take the following parameters of the average pubescent cotton seed: length $a = 12 \cdot 10^{-3}$ meters; width $b = 6.4 \cdot 10^{-3}$ meters; $R_c = 3.3 \cdot 10^{-3}$ meters. Electrodes made of cables PK-75-4, parameters are:

$$\varepsilon_u = 4, 0; R_s = 3, 65 \cdot 10^{-3} \text{ meters}; R_1 = 2, 6 \cdot 10^{-3} \text{ meters}.$$

When applying to the electrodes a voltage of 3–4 kV. electric power value becomes comparable with the force of gravity G of the seed. When F/m magnitude electric power at a voltage of 4.0 kV. electrode is 40% gravity seed. Pressing force is applied in the range $(400-1900) \cdot 10^{-5}$ N first embodiment arrangement of seeds of raw

$$F_s = 2 |\vec{F}_s^+| \cos \alpha, \quad (2)$$

where $\alpha = \arccos \sqrt{1 - [(R_s + \delta)/(R_s + R_c)]^2}$ — corner placement particle, degree.

Here $R_c = b/2$ — minor axis of raw cotton, m.; δ — half of the gap between the electrodes, m.

However, according to [4] electric contact force of raw cotton seeds to the surface of the dielectric drum is determined from the expression:

$$F_s = \frac{\varepsilon_0 \varepsilon_c \varepsilon_u^2 (\varepsilon_c - 1) S_{II} U^2 \cos \alpha}{2 (\varepsilon_0 R_c \sin \alpha + \varepsilon_c d)^2}, \quad (3)$$

where S_{II} — polarized area of cotton seeds one electrode m^2 ;

U — voltage between adjacent electrodes;

$\varepsilon_0 = 8, 85 \cdot 10^{-12}$ F/m — the dielectric constant;

$\varepsilon_c, \varepsilon_u$ — the relative permittivity of seed cotton and the insulation layer;

d — the thickness of the electrode insulation, meters.

In the second variant the location of the seeds of raw cotton (Fig. 1 b) electric force pressing seed 3 depends on the angle α with respect to location of the seed 3 electrodes 2 drum 1. Thus from ΔCOB :

$$\sin \alpha = \frac{R_s + \delta}{CB}. \quad (4)$$

Accordingly, from the ΔAKC using the cosine theorem, we have:

$$KC^2 = (R_s + R_{c2})^2 = CB^2 - 2(R_s + R_{c2})CB \cos \beta. \quad (5)$$

Substituting (4) into (5) $\beta + \alpha = \pi/2$ given after some transformations:

$$\alpha = \arcsin \frac{R_s + \delta}{\sqrt{KC^2 - (R_s + R_{c2})^2 + 2(R_s + R_{c2})(R_s + \delta)}} \quad (3.6)$$

Using the method for determining the electrical force pressed against the seeds of raw cotton to the drum is following expression:

cotton in the interelectrode space. In a second embodiment, the location of the seeds of raw cotton (Fig. 1b) electric contact force is reduced to $(320-1650) \cdot 10^{-5}$ N. Therefore, for normal operation of the dielectric separator requires an application electrodes 4.0–5.0 kV. Preliminary results sufficiently confirm the theoretical results of the research.

Thus, the new design of the dielectric separator for sorting seeds of cotton fibers at maturity; formulas for determining the electrical contact force seed cotton to the drum when the longitudinal and transverse arrangement of seed cotton in the interelectrode space of the separator; recommended design values.

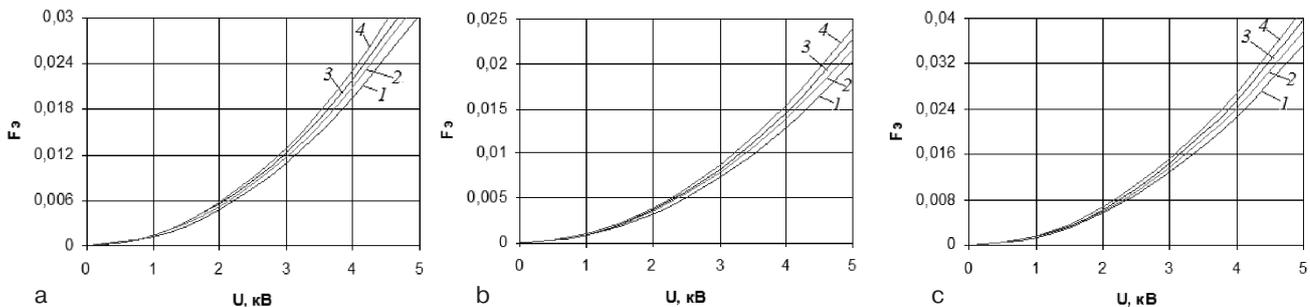


Fig. 2. The dependence of the electrical force of attraction of cotton seeds to the surface of the drum by varying the voltage electrodes: 1 — $E_c = 5$; 2 — $E_c = 7$; 3 — $E_c = 10$; 4 — $E_c = 20$.
Fig. 2a — $S_{II} = 0.00002 \text{ m}^2$, $\alpha = 30^\circ$; Fig. 2b — $S_{II} = 0.00030 \text{ m}^2$, $\alpha = 30^\circ$; Fig. 2c — $S_{II} = 0.00035 \text{ m}^2$, $\alpha = 30^\circ$

To analyze the influence of parameters justification voltage electrodes on the power of attraction of raw cotton seeds is the surface of the drum. Fig. 2 presents a graph of changes in electrical pressing force of raw cotton seeds to the surface of the drum when changing the voltage electrodes.

The graphs in Fig. 2a. it is seen that with increasing of voltage electrodes up to 5.0 kV, the pressing force increases non-linear patterns to $0.021 \div 0.0245$ N at $S_{\pi} = 2.0 \cdot 10^{-5} \text{ m}^2$, $\alpha = 30^\circ$. With increasing in the polarized area (contact area) seeds to $3/5 \cdot 10^{-5} \text{ m}^2$ at $\alpha = 30^\circ$ the force of attraction of seed is doubled and reaches $0.036 \div 0.045$ N at $U = 5$ kV.

It should be noted that the emerging intensity of electric field E_c is also affected to change F_p . So with increasing intensity from 5.0 to 20.0 attraction force increases to 0.005 N at $S_{\pi} = 2.0 \cdot 10^{-5} \text{ m}^2$ and $\alpha = 30^\circ$, and when $S_{\pi} = 3.5 \cdot 10^{-5} \text{ m}^2$ F_p increases to 0.016 N.

This means that increasing in the area of the polarization of raw cotton increased in proportion to the intensity of the effect of the force of gravity on the seeds of raw cotton in the insulating separator.

From these expressions (3) and (7) for calculating the attractive force seed raw cotton to the surface of the drum, and from the

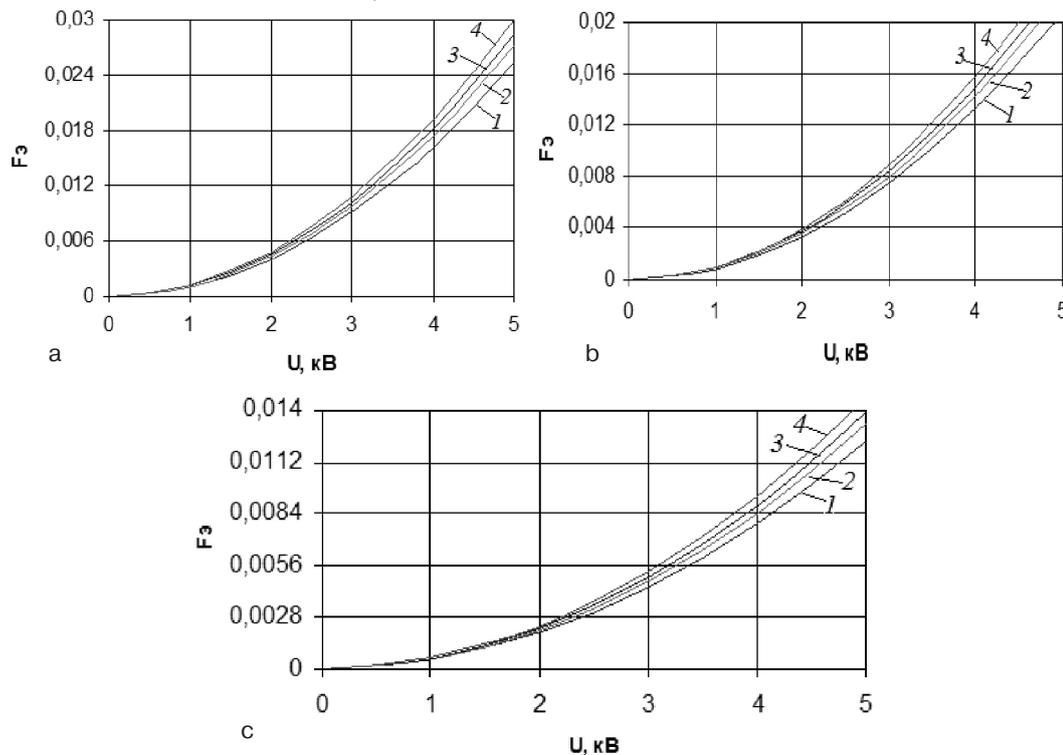


Fig. 3. The dependence of the electrical force of attraction of raw cotton seeds to the surface of the drum by varying the voltage of the electrodes at the location of the seeds of raw cotton at a different angle:

1 — $E_c = 5$; 2 — $E_c = 7$; 3 — $E_c = 10$; 4 — $E_c = 20$. Fig. 3a — $S_{\pi} = 0.000025 \text{ m}^2$, $\alpha = 30^\circ$;

Fig. 3b — $S_{\pi} = 0.00025 \text{ m}^2$, $\alpha = 45^\circ$; Fig. 3c — $S_{\pi} = 0.00035 \text{ m}^2$, $\alpha = 65^\circ$

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Research on the status of single-channel systems of the grains harvesting combines

Abstract: As it is specified that Poisson and steady flows of customers demand are delivered to the Corporate technical service (FTS) system by inoperable (faulty) grains harvesting combines; with an increase in production capacity of combine harvesters to the 2000–2500 operating hours and it is required more and more mobile workshops.

Keywords: grains harvesting combine, the corporate technical service system, mobile workshop, the average number of customers demand, waiting time, standing time of one customer demand in the system.

In effort to organize the corporate technical service (CTS) to the grains harvesting combines of model Case in Uzbekistan JV «UzCaseservice» is founded and it has regional service centers. Those centers are equipped with mobile workshops (servicing maintenance devices), that implement service and maintenance works, including troubleshooting cases occurred with harvesting combines.

As a rule, in the harvesting season the 8–10 units of grain harvesting combines are maintained by a single mobile workshop that means a single-channeled CTS is formed (as shown in Fig. 1).

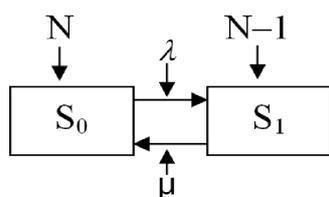


Fig. 1. The status scheme of a single-channeled CTS system without a turn

We have found that from the harvesting combines Poisson and steady flow demands are delivered to the system with λ intensity, and they are serviced by a workshop mechanical with average intensity of μ . When the harvesting combines had a production capacity of 500–1500 operating hours, certain expectations with respect to the system status were found as following: S_0 status — during t time there was no demand delivered from a customer and during Δt time they were not received; that is all N harvesting combines are in working condition for operating the device is free; S_1 state — during t me time one demand is received (number of working combines $N-1$), during t time it was served, and the device is no longer received. The standing expectation of one ($K=1$) demand [1] in the system.

$$q_1 = q_0 \psi = (1 - \psi) \psi,$$

where $\psi = \lambda / \mu$ — a device load factor;

$q_0 = 1 - \psi$ — the expectance in system idleness.

When the production capacity of combine harvesters has reached 2000–2500 operating hours the customer demands with number K ($K > 1$) and the expectancy $q_k = (1 - \psi) \psi^k$ began to reach to the system and it resulted in a change in the system status.

In this case the average number of customers demand in the system [2; 3].

$$L = \frac{\psi}{1 - \psi}. \quad (1)$$

The average number of customers demand, standing in a turn:

$$L_q = \frac{\psi^2}{1 - \psi}. \quad (2)$$

Average waiting time of a single unit:

$$W_q = \frac{\psi}{(1 - \psi) \mu}. \quad (3)$$

In the event if the average servicing time is added to the average waiting time $t_{serv} = 1 / \mu$, then can be obtained the average time of staying of a single unit in the system:

$$W = \frac{1}{\mu(1 - \psi)}. \quad (4)$$

As it is considered after made analysis (1)–(4), when $\psi = 0$ or $\lambda = 0$, that mean in case if the intensity of units is equal to zero (all the machines are good operation) $L = L_q = W_q = 0$; $W = \frac{1}{\mu} = t_{serv}$.

In case if $t_{serv} = 2,16$ hours; $\lambda = 0,3$ unit/hour; $\mu = 0,462$ servicing/hour can be obtained the following: $\psi = 0,649$; $L = 1,85 \approx 2,0$; $L_q = 1,19 \approx 1,0$; $W_q = 4$ hours; $W = 6$ hours. From above it is obvious that $W > W_q > t_{serv}$. Afterwards in order to ensure normal functioning of CTS need to increase the number of mobile workshops.

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The analysis of influence of parameters of chain transfer on change of force of deformation of the elastic element of the compound conducted asterisk

Abstract: In article the technique of definition and calculations of deforming force and factor of rigidity of an elastic element of a compound conducted asterisk of chain transfer is resulted. Results of the analysis of the constructed graphic dependences of change deforming forces of the elastic plug of a conducted asterisk of chain transfer are resulted. Necessary parameters of system are proved.

Keywords: Chain transfer, asterisk, the elastic element, deforming force, rigidity factor, angular speed, weight, radius, tension roller, resource.

It is necessary to take into consideration the factor of deformation of flexible element when interconnection of gear with chain transmission. In figure-1 the impact of tension roller and scheme of bearing gear us shown. When chain 2 is co-worked with

gear 1 the following forces are generated [1]: tension forces F_1 and F_2 , chain 2 and trailing gear 1 generalized force Q_c . The system to be in balance:

$$\bar{F}_1 + \bar{F}_2 + \Delta\bar{F}_2 + \bar{F}_v + \bar{Q}_c = 0. \quad (1)$$

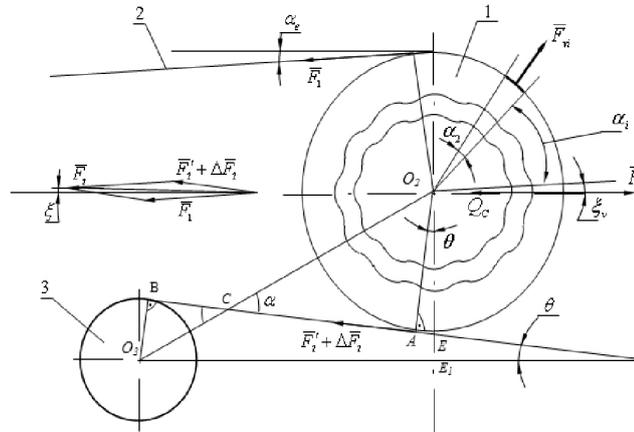


Fig. 1. Scheme of chain transmission trailing gear, where 1-component trailing gear, 2-chain, 3-tension roller

If we take tension forces of general horizontal axis organizer:

$$F_i \cos \xi = F_1 \cos \alpha_e - (F_2 + \Delta F_2) \cos \theta, \quad (2)$$

where, ξ, α_e, θ - angles, generated by horizontal axis vectors.

If we define chain weight as q , tension force of AB length is calculated taking into consideration [1; 2]:

$$F_i = F_1 \frac{\cos \alpha_2}{\cos \xi} - \left[(r_2 + r_3) Ctg \left(\frac{\pi}{2} + \theta - \arccos \frac{O_2 E_1}{O_2 O_3} \right) + \Delta F_2 \right] \cos \theta \quad (3)$$

In general chain connected with trailing gear, as per projection center escape affecting forces:

$$F_v = \frac{m_2 \omega_2^2 r_2}{\cos \xi} \left[\begin{aligned} &\cos \left(\alpha_{21} + \frac{\alpha_2}{2} \right) + \cos \left(\alpha_{22} + \frac{\alpha_2}{2} \right) + \\ &+ \cos \left(\alpha_{23} + \frac{\alpha_2}{2} \right) + \dots \cos \left(\alpha_{2i} + \frac{\alpha_2}{2} \right) \end{aligned} \right] \quad (4)$$

In the condition shown above we will determine flexible element deformation force:

$$Q_c = -m_2 \omega_2^2 r_2 \left[\cos \left(\alpha_{21} + \frac{\alpha_2}{2} \right) \right] + \frac{F_1 \cos \alpha_2}{\cos \xi_v} + \left[(r_2 + r_3) Ctg \left(\frac{\pi}{2} + \theta - \arccos \frac{O_2 E_1 + \Delta F_2}{O_2 O_3} \right) \right] \frac{\cos \theta}{\cos \xi_v} \quad (5)$$

Hardness coefficient of flexible element of trailing gear is determined by the following expression:

$$C_k = \frac{1}{\delta_A} \left\{ \begin{aligned} &m_2 \omega_2^2 r_2 \left[\cos \left(\alpha_{21} + \frac{\alpha_2}{2} \right) \right] - \frac{F_1 \cos \alpha_2}{\cos \xi_v} - \\ &- \left[(r_2 + r_3) Ctg \left(\frac{\pi}{2} + \theta - \arccos \frac{O_2 E_1 + \Delta F_2}{O_2 O_3} \right) \right] \frac{\cos \theta}{\cos \xi_v} \end{aligned} \right\} \quad (6)$$

where, δ_A - is distance shift of gears of flexible element.

Thus it is recommended to determine distance between gear axis:

$$A = t_3 \cdot n_3 / \cos \alpha_c - \delta_A, \quad (7)$$

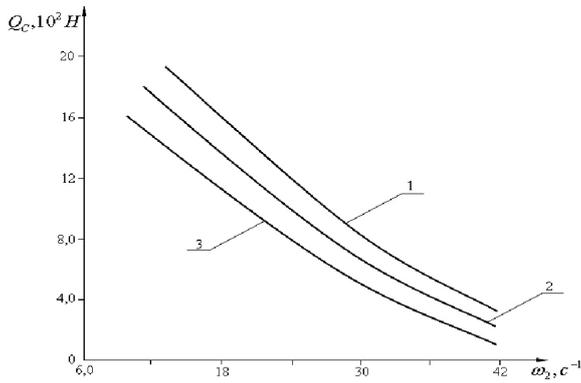
where, t_3 – is the step of between teeth of gear; n_3 – number of sections in the branch of trailing gear.

To get solutions as per expressions (5), (6), (7) the calculation parameters are taken in the following values:

$$t_3 = 15.0 \div 21.0 \text{ mm}; n_3 = 200 \div 400 \text{ min.}^{-1}; [P] = 28 \div 31 \text{ MPa};$$

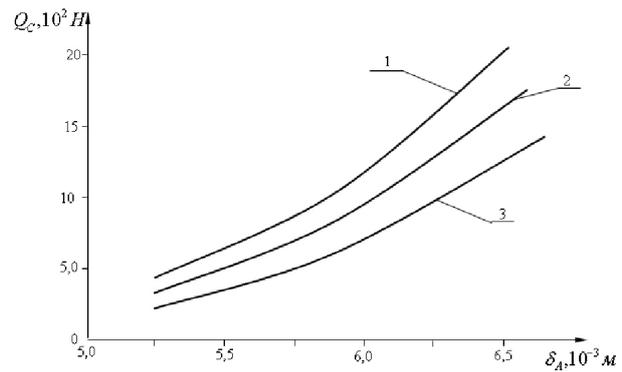
$$n_3 = 98, z_1 = 22, Z_2 = 25; r_2 = (5.5 \div 6.5) \cdot 10^{-2} \text{ m};$$

$m_2 = 0.015 \div 0.035 \text{ kg}$.
In the fig. 2a the chain transmission trailing gear deformation force is shown in values generated in additional tension. The obtained diagram connections show that the increase of angle speed brings to nonlinear decrease. The tension belt working in transmission brings to increase Q_c force. When additional tension force increases from 60 H . to 105 H . and the difference between force is $\omega_2 = 18 \text{ c}^{-1}$ and when $4.15 \cdot 10^3 \text{ H}$ is generated by it is generated pro ratio.



1 – $\Delta F_2 = 105 \text{ N}$; 2 – $\Delta F_2 = 80 \text{ N}$; 3 – $\Delta F_2 = 60 \text{ N}$

The main reason for it is the tension rolling influence in rotating frequency is not high, i. e. in this the momentum role is increased. It is necessary to state that the force which deforms flexible element by increasing radius of gear. We can see it the diagram already reviewed before. This law can be explained as follows. When the branches of chain the more its momentum force i. e. it decreases deformation force of flexible element. However, the long term operation of transmission is affected by deformation of flexible element. The deformation around axis of chain transmission with trailing element to be avoided from increase $2.0 \sqrt{3.0} \text{ mm}$ when radius of gear is $r_2 = (5.5 \div 6.5) \cdot 10^{-2} \text{ m}$ it is good select $(3.2 \div 5.4) \cdot 10^3 \text{ N/m}$. It is necessary to state that trailing gear shaft is working body connected with plug drum. Resistance fluctuation is decreased significantly at the expense of flexible element. I. e. vibration coming from clay brick to chain come with decreased force.



1 – $m_2 = 0.015 \text{ kg}$; 2 – $m_2 = 0.025 \text{ kg}$; 3 – $m_2 = 0.036 \text{ kg}$.

Fig. 2. a – Diagram of chain transmission connected with angle speed; b – diagram bound with change of radius force and deformation of flexible element

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Research and application of acousto-optical tunable filters for modern telecommunications systems

Abstract: In article are considered integrated acousto-optical tunable filters, the analysis of possibility of adjustment of the surface acoustic wave is carried out and acousto optical conversion of modes on their basis, integration of optical technologies also is inspected.

Keywords: Acoustic waves, Electro-optical tunable filter (EOTF), Acousto-optic tunable filter (AOTF), Optical and Acoustic beam, interdigital transducer (IDT).

The idea of acousto-optical tunable filters (AOTF) was proposed in 1969 by Harris and Wallace [1] and was demonstrated by Harris and his colleagues. The flat (planar) integrated elements of acousto-optics, including filters, frequency switchers and modulators have been discussed in [2]. In this paper, the integrated AOTF

are inspected according to them, the surface acoustic wave and acousto-optical mode conversion is analyzed as well as the integrated optical technology is considered.

The processes involved in the work AOTF are quite complex. The piezoelectric wave linked to a surface acoustic wave can

produce secondary periodic electro interaction. This acoustic-electro optical interaction complicates the relatively simple batch representation induced birefringence, but a detailed source of effective acousto-optical interaction does not work at the primary frequency.

The development evolution of AOTF is presented in Table 1. The evolution progress was manifested in the movement from the volume of the optical wave and an acoustic wave to the volume of serial narrowing optical and acoustic rays to reduce the requirements for the power (energy) and to increase the interaction length.

Table 1. – Development evolution of AOTF

Date	Author	Development
1970	Harris	Volumetric Optical AOTF
1977	Ohmachi and Noda	Planar optical, IR filter
1980	Binkh and Livingston	The channel acousto-optical waveguide low power
1983	Goto	Spatial converter AOTF
1985	Khinkov	The technique of proton exchange
1988	Heffner	Frequency division for integrated optics
1989	Cheyung	The use of multi-frequency switching systems
1989	Smith	Highly integrated AOTF

AOTF can be performed based on various materials. Table 2 shows the characteristics of AOTF on the basis of a single crystal of quartz, Tantalus-lithium, and Niobe-lithium.

In the development of counter-doweled transducer (IDT) on the harmonics of the fundamental frequency, the response method is used piecewise approximation instead of synthesizing a smooth

Ohmashi and Noda used flat (planar) optical waveguides and surface acoustic wave in the first version of an integrated optical filter. The approach by Binh and his colleagues is limited to optical beam in single-mode optical waveguides and lowered power consumption by limiting the surface acoustic wave. Hink has been a pioneer in the use of patch installation laser for optical and acoustic waveguide. Goto developed the acousto-optic spatial mode converter, which had the same principle of phase comparison, as polarization mode converters, but this device is guided the filtered and unfiltered components to various waveguides [3].

envelope of the impulse. This approximation is accurate enough when working on harmonics 3, 5, 7 in the synthesis of narrow-band (less than 2% for niobate LiNbO₃ and Tantalus-lithium, less than 0.5% for the silica and zinc oxide films) filters with the most common designs suggesting GSW, transducers with capacitive weighing electrodes [4].

Table 2. – Technical characteristics of AOTF

Parameter	Units	The single-crystal quartz	Tantalate Lithium	Niobate-Lithium
Spectral range	nm.	750 ... 850	1000 ... 1150	1500 ... 1700
The range of frequency control	MHz.	600 ... 690	430 ... 500	100 ... 250
Input window	mm.	4×4	4×4	4×4
Input angular aperture	Deg.	2.8	3.4	2.2
Maximum driving power	W.	3	3	3
The diffraction efficiency	%/nm/W	20/800/1	15/1150/1	7/1550/1
Impedance	Om.	50	50	50

On the basis of the data in Table 2 it can be concluded that the most promising acousto-optical filters are AOTF based on niobate-lithium, which has the best technical parameters for use in fiber-optic data transmission systems (FDTS), and can improve the spectral characteristics of the emitted signal.

All integrated optical AOTF listed above should have some form of fiber, to be compatible with fiber optic communication networks, but one group bypassed the fiber compound, the problem by making a AOTF compatible with all types of fibers.

Narrowband mode conversion is achieved using a birefringent acousto-optic interaction medium. In this environment, the two polarization components — TE (horizontal) and TM (vertical) — and fall out of phase with the intrinsic beating length:

$$L_{bienv} = \lambda / \Delta_n, \quad (1)$$

where Δ_n — material birefringence; λ — emission wavelength.

If the applied DC voltage, the photoelastic effect produces a consistent TE — TM transformation and reverse transformation to a half wavelength, producing very little conversion for interaction lengths more L_{bienv} — in fact, the resulting effective length of the element has a uniform voltage across its length and in most cases is $L_{bienv}/2$, regardless of the length of material interaction. The only way to produce transformation events is to alternate the polarity of the voltage synchronously with the relative stage variable orthogonal polarizations.

The AOTF is achieved by moving the acoustic wave. The exact criteria for constructive interference or appropriate stage could be the fact that the wavelength of sound is equal to the length λ_{ak} beats $\lambda_{ak} = L_{bienv}$. This leads to an equation relating the electrical frequency f_o and a favorite source of wavelength λ :

$$f_o = (V_{sound} \Delta n_{eff}) / \lambda, \quad (2)$$

where V_{sound} — speed of sound, Δn_{eff} — the difference between the effective indicators.

An overall idea of a filter band width should be of constructive interference immunity test. The increment of wavelength is required to complete destructive interference, such that the first half of device interaction is in phase, while in the second half of device interaction is shifted in phase, leading to the complete quenching mode conversion.

This suggests the characteristic parameter band width of the filter:

$$\Delta = \lambda^2 / L \Delta_n. \quad (3)$$

Fig. 1 shows a linear scale of the ideal transfer characteristic AOPF proportional to the square of the sinus.

If conversion is incomplete, the filter band width and sidelobe spectrum changes. The intensity (strength) of the side lobes in this case is relevant to the inter-channel interference for the operation of a multiple wavelength AOTF.

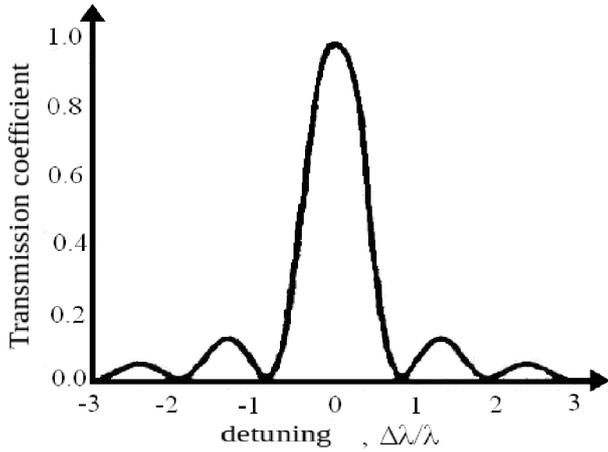


Fig. 1. Characteristic of ideal AOTF

The gain of the ideal AOTF as a normalized function of the wavelength can be represented as an analogue electro-optic tunable filter (EOTF) [5], because the physics of the two devices (elements) is very similar. AOTF and EOTF have the same optical transmission as a function of wavelength, but they differ in two important features. AOTF reached an appropriate stage through periodic electrodes and Δ_n is adjusted only slightly, leading to a modest adjustment range. The filter described in [6] only a tuning range was 15 nm., as offset adjustment — DC voltage. AOTF can filter only one band of the wavelength at a time, making it more versatile AOTF.

Therefore, for use in the AOTF in IDT it must have the ability to switch any number of channels (operating at different frequencies) simultaneously and independently of each other. The lightweight set-up and strengthening of the optical radiation of either is discussed in [7], [8] and [9].

To calculate the characteristic AOTF, the following relationship is used:

$$H(\omega) = \sum_{n=0}^{14} (-1)^n a_0 \exp(-j\omega T_n) = a_0 - a_0 \exp(-j\omega T_0) + a_0 - a_0 \exp(j\omega 2T_0) + \dots + a_0 - a_0 \exp(-j\omega 14T_0) = 1 - \exp(-j\omega T / 14) + \dots + \exp(-j\omega 2T / 14) + \dots + \exp(-j\omega 14T / 14) \quad (4)$$

This equation can be written as follows:

$$H(\omega) = \sum_{n=0}^{14} (-1)^n a_0 [\cos \omega T_n - j \sin \omega T_n] = \sum_{n=0}^{14} (-1)^n a_0 \cdot \cos \omega T_n - j \cdot \sum_{n=0}^{14} (-1)^n a_0 \cdot \sin \omega T_n \quad (5)$$

To calculate the module (ψ) AOTF characteristics:

$$\psi = H(\omega) = \sqrt{\left(\sum_{n=0}^{14} (-1)^n a_0 \cdot \cos \omega T_n \right)^2 + j \cdot \left(\sum_{n=0}^{14} (-1)^n a_0 \cdot \sin \omega T_n \right)^2} \quad (6)$$

To calculate the argument (ϕ) characteristics AOPF:

$$\phi = H(\omega) = \text{arctg} \frac{\sum_{n=0}^{14} (-1)^n a_0 \cdot \cos \omega T_n}{\sum_{n=0}^{14} (-1)^n a_0 \cdot \sin \omega T_n} \quad (7)$$

According to these calculations, for the wavelength $\lambda = 1.55$ microns most optimal number of pins turned 14 at the given size pin height of 1 mm., the distance between the electrodes is 1 mm and a thickness of 0.5 mm.

These discussions have the following key benefits:

- 1) wide tuning range (200 nm.);
- 2) narrowband;
- 3) short switching times;
- 4) Most importantly, the ability to switch between any number of channels (operating at different frequencies) simultaneously and independently of each other. The lightweight set-up and amplifiers;
- 5) The ideal selectivity.

In addition, the use of amplifiers, frequency acousto-optic tunable filters have almost rectangular amplitude-frequency characteristic (AFC) and provide the ideal selectivity, good mass and dimensions parameters as well as ease of configuration and adjustment of the amplifiers.

Also the set of main features of the characteristics, parameters and properties of AOTF are used in high-speed fiber-optic data transmission systems.

Thus, it is shown that the most promising acousto-optical filters are AOTF based on niobate-lithium, that have the best technical parameters for use in IDF and can improve the spectral characteristics of the emitted signal.

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Determination of viscosity parameters in rigid body-soil interaction

Abstract: The paper is devoted to the determination of viscosity parameters of the interaction of rigid bodies (such as foundations and underground pipelines) with soil under arbitrary action of load on the former. Here on the bases of developed methods and tests results the viscosity coefficients are determined in the contact of body-soil interaction. They may be used in design of buildings and underground pipelines on seismic effects, utilizing Voigt or Maxwell-Kelvin's models.

Keywords: underground pipeline, foundation, soil, elasticity coefficients, viscosity parameters, model, seismic load.

As an example, consider the tests with underground pipelines, which are also true in the study of properties at foundation-soil interaction.

Assume that seismic load is arbitrary directed towards the axis of underground pipeline. Then, it would sustain longitudinal (N), transverse (Q) loads, and bending (M_u), torsional (M_k) moments. In [1], assuming that the relation between displacements and loads subject to a linear law, one may write the following:

$$q_i = k_i \Theta_i \frac{1}{2}, \quad (1)$$

where q_i – is one of the loads N, Q, M_u, M_k ; k_i – one of proportionality coefficients of pipe-soil interaction; Θ_i – one of the displacements of these loads.

The methods of determination of coefficients $k_i (k_x, k, k_\phi, k_\alpha)$ depending on various factors (diameter, length, depth of a pipeline bedding, soil characteristics, etc.) are given also in [1], based on tests results. Using dimensional theory and the principle of superposition, it is shown that if one of the coefficients k_x, k, k_ϕ, k_α is known, the others may also be determined:

$$k_j = a_j k_x, \quad (2)$$

where k_x – is a coefficient of interaction under longitudinal displacement of the pipeline relative to soil, $a_j = 2(1 + \mu_{soil})$ if $k_j = k$; at $k_j = k_\alpha$, $a_j = 8l / \beta D_H$; at $k_j = k_\phi$, $a_j = \frac{10}{\beta(1 + \mu_{soil})} \left(\frac{l}{D_H} \right)^3$; $\beta = \left(1 - \frac{D_B^4}{D_H^4} \right)$; D_B, D_H – internal and external diameters of the pipe; μ_{soil} – Poisson ratio and l – the length of a single pipe.

The tests show that the range of linear connection (1) is not wide. Figures 1 a, b present experimentally obtained graphs of longitudinal interaction of loamy soil (a) and gravel (b) with steel pipeline ($D_H = 0.089$ m., the length 3.869 m., the depth of bedding from the pipe top for a loamy soil 0.7 m., for gravel 0.4 m.) at different velocity of displacements. The time to reach a maximum load for the curves 1–3 is 240, 21 and 12 sec., respectively for a loamy soil and 180, 9 and 6 sec for gravel. At small displacements the relation between τ_α and u may be considered as nearly linear. Results of these tests show that even at small changes in velocity of displacements, the graphs of interaction $\tau_\alpha - u$ vary considerably.

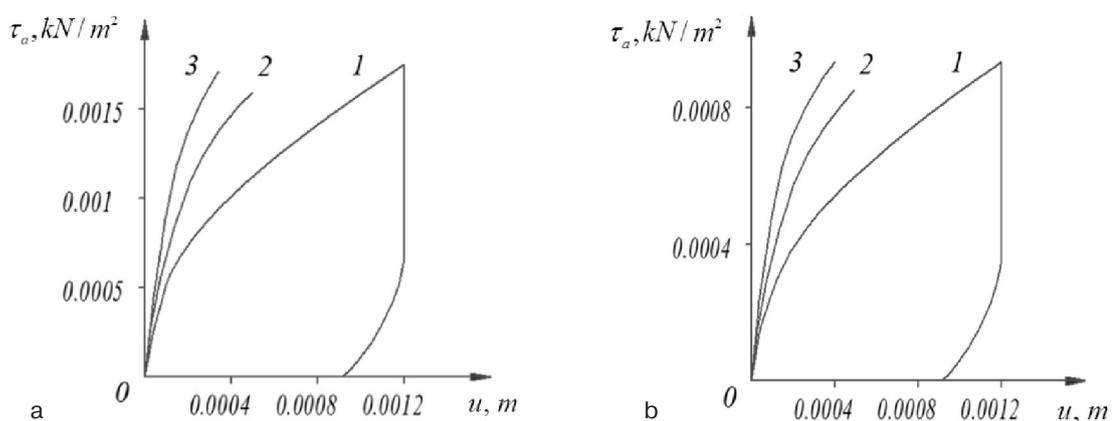


Fig. 1. Graph of longitudinal interaction (a, b)

The effect of displacement velocity on the dynamics of underground structures may be considered by the application of linear-viscous-elastic law to record the stresses at structure-soil contact through relative displacement. If elastic characteristics are determined through coefficients of interaction, viscous properties of interaction may be characterized by a coefficient of viscosity,

its values essentially effecting on the dynamics of underground structures.

When considering concrete problems in linear-viscous-elastic statement and to obtain numeric results which determine stress-strain state of underground pipelines it is necessary to know the values of viscosity coefficients of the interaction depending on differ-

ent factors which may be stated by tests results, using the methods discussed in [2].

Let the interaction of a pipeline with soil subject to deformation law of viscous-plastic medium. Simulating the medium element in the form of two springs and a damper (Fig. 2), their displacements will be written in the following form:

$$u = u_1 + u_2, \quad (3)$$

where u_1 and u_2 — are the displacements of the 1st and 2nd springs.

The relation between tangential stress and spring displacement is determined at loading as:

$$\tau_a = \phi_D(u_1), \frac{d\phi_D}{du_1} > 0, \frac{d^2\phi_D}{du_1^2} > 0, \quad (4)$$

$$\tau_a = \phi_2(u_2), \frac{d\phi_2}{du_2} > 0, \frac{d^2\phi_2}{du_2^2} > 0, \quad (5)$$

At un-loading the relation between τ_a and u_1 is:

$$\tau_a = \phi_R(u_1), \frac{d\phi_R}{du_1} > 0, \frac{d^2\phi_R}{du_1^2} > 0, \phi_R(u_1) \leq \phi_D(u_1), \quad (6)$$

And between τ_a and u_2 it is determined by equation (5), till the state $u_2 = u_{2max}$. Under further un-loading $u_2 = const$.

Damper resistance is taken in the form:

$$T = \mu(\tau_a)\dot{u}_2. \quad (7)$$

The displacements of the 1st spring are partially reversible, and of the 2nd spring and the damper- irreversible. If for the spring and damper $\tau_a = \phi_2(u_2) + \mu(\tau_a)\dot{u}_2$ then displacement velocity of the medium from (3-5), (7) is determined at $\frac{d\tau_a}{dt} > 0$:

$$\dot{u} = \frac{\dot{\tau}_a}{\frac{d\phi_D}{du_1}} + \frac{\tau_a - \phi_2(u_2)}{\mu(\tau_a)} = \frac{\dot{\tau}_a}{\frac{d\phi_D}{du_1}} + f(\tau_a, u - u_1), \quad (8)$$

at $\frac{d\tau_a}{dt} < 0, u_2 \leq u_{2max}$;

$$\dot{u} = \frac{\dot{\tau}_a}{\frac{d\phi_R}{du_1}} + f(\tau_a, u - u_2), \quad (9)$$

at $\frac{d\tau_a}{dt} < 0, u_2 = u_{2max}$;

$$\dot{u} = \frac{\dot{\tau}_a}{\frac{d\phi_R}{du_1}}. \quad (10)$$

Functions ϕ_D, ϕ_2, ϕ_R and μ may be determined from tests results at different \dot{u} , comparing then with design data.

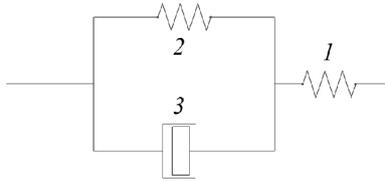


Fig. 2. Viscous-elastic model

When considering seismic waves rather distant from the blast site, load increase and decrease may be presented by the equations:

$$\begin{aligned} \tau_a &= \tau_{ak} \frac{t}{\tau}, \quad 0 \leq t \leq \tau, \\ \tau_a &= \tau_{ak} \frac{\tau_1 - t}{\tau_1 - \tau}, \quad \tau \leq t \leq \tau_1, \\ \tau_a &= 0, \quad \tau_1 \leq t. \end{aligned} \quad (11)$$

Let the relation between the load and the displacement of the pipeline relative to soil have the form:

$$\begin{aligned} \tau_a &= k_x^D u_1, \tau_a = k_x^S u, \\ \tau_a - \tau_{ak} &= k_x^R (u - u_k), \mu = const. \end{aligned} \quad (12)$$

corresponding to dynamic and static loading and un-loading (τ_{ak} and u_k — are the maximums of stresses and displacements u_1). Under continuous increase of load and its decrease, but at growing u_2 , substituting (12) into (8) and (9), we get:

$$\dot{u} = \frac{\dot{\tau}_a}{k_x^D} - \eta \left(\frac{\tau_a}{k_x^S} - u \right), \quad (13)$$

$$\dot{u} = \frac{\dot{\tau}_a}{k_x^R} - \eta \left(\tau_a \frac{k_x^D k_x^R - k_x^S k_x^R + k_x^S k_x^D}{k_x^S k_x^D k_x^R} + \tau_{ak} \frac{k_x^R - k_x^D}{k_x^D k_x^R} - u \right), \quad (14)$$

where $\eta = \frac{k_x^D k_x^S}{\mu(k_x^D - k_x^S)}$ — is a viscosity parameter. At $u_2 = const$ from (8) $k_x^R \dot{u} - \dot{\tau}_a = 0$.

Now substituting the 1st and 2nd from (11) into, respectively, (13) and (14), we obtain a differential equation:

$$\dot{u} + \mu u + At + B = 0, \quad (15)$$

differing only in the constants A and B, which are: at $t \leq \tau$:

$$A = -\frac{\eta \tau_{ak}}{\tau k_x^S}, B = -\frac{\tau_{ak}}{\tau k_x^D},$$

at $t > \tau$:

$$A = \frac{\eta \tau_{ak}(k_x^R - k_{x2})}{(\tau_1 - \tau)k_x^R k_{x2}}, B = \frac{\tau_{ak}}{(\tau_1 - \tau)k_x^R} - \frac{\eta \tau_{ak}(k_x^R + k_{x2})\tau_1}{(\tau_1 - \tau)k_x^R k_{x2}} - \frac{k_x^R - k_x^D}{k_x^D k_x^R} \eta \tau.$$

Integrating (15), we would find:

$$u(t) = -\frac{B}{\eta} - \frac{A}{\eta^2}(\eta t - 1) + Ce^{-\eta t}, \quad (16)$$

where:

$$C = -\frac{A}{\eta^2} + \frac{B}{\eta} \text{ at } 0 \leq t \leq \tau,$$

$$C = \left[u(\tau) + \frac{B}{\eta^2}(\eta \tau - 1) \right] e^{\eta \tau} \text{ at } t > \tau.$$

Displacement maximum under the load of the form (11) may be reached at $t \geq \tau$. The value of maximum time t_{max} is found from the equation:

$$\dot{u}(t_{max}) = -\frac{A}{\eta} - \eta C e^{-\eta t_{max}} = 0,$$

hence:

$$t_{max} = -\frac{1}{\eta} \ln \left(-\frac{A}{\eta^2 C} \right). \quad (17)$$

Determine approximate numeric values η of pipeline-soil interaction. For that we would compare tests values $u(\tau), t_{max}$ and $u(t_{max})$ with results, obtained from the model of viscous-plastic medium (see Table 1).

In relation to tests data for gravel soil in design it is taken as:

$$k_x^D = 37 \cdot 10^3 \text{ kN/m}^3, k_x^S = 25 \cdot 10^3 \text{ kN/m}^3, k_x^R = 90 \cdot 10^3 \text{ kN/m}^3, \tau_1 = 15 \text{ sec};$$

And for loamy soil:

$$k_x^D = 74 \cdot 10^3 \text{ kN/m}^3, k_x^S = 33 \cdot 10^3 \text{ kN/m}^3, k_x^R = 61 \cdot 10^3 \text{ kN/m}^3, \tau_1 = 30 \text{ sec}.$$

Comparison of these data shows that they are most identical at $\eta = 0.1 \text{ sec}^{-1}$. Viscosity coefficient μ of pipeline-soil interaction at $\eta = 0.1$, equals to $945 \cdot 10^3 \text{ kNsec/m}^3$ — for gravel and $595 \cdot 10^3 \text{ kNsec/m}^3$ for loamy soil.

If load-displacement relation is written in the form:

$$\dot{u} + \eta u = \frac{\dot{\tau}_a}{k_x^D} + \eta \frac{\tau_a}{k_x^S}. \quad (18)$$

Then, for the determination of viscosity coefficient, with $\dot{u} = const$ and $u = \dot{u}t$, from (18) we get:

$$\dot{\tau}_a + a\tau_a = bt + c, a = \eta \frac{k_x^D}{k_x^S}, b = \eta k_x^D \dot{u}, c = \frac{b}{\eta}. \quad (19)$$

Integrating (19) at initial condition $\tau_a(0)$, we would get

$$\tau_a(t) = \frac{b}{a^2}(at-1) + \frac{c}{a} + C_1 e^{-at}, \quad C_1 = \frac{b-ac}{a^2}. \quad (20)$$

Considering $t = \frac{u}{\dot{u}}$, we would find:

$$\tau_a(u) = \frac{bu}{a\dot{u}} + \frac{ac-b}{a^2} \left(1 - e^{-\frac{a}{u}}\right),$$

or:

$$\frac{\tau_a - k_x^s u}{1 - e^{-\frac{a}{u}}} = \frac{k_x^s \dot{u}}{\eta} \left(1 - \frac{k_x^s}{k_x^D}\right). \quad (21)$$

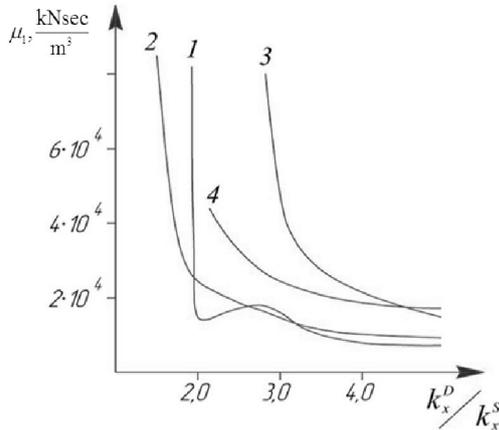


Fig. 3. Addition $\alpha_1 \sim k_x^D / k_x^S$

Solving the equation (21) graphically, we find the value η . Figure 3 shows the dependences α_1 from the relationship k_x^D / k_x^S built by determined values of η from (21). The curves 1 and 2 are built using tests results with loamy soils (presented in the Table), and the curves 3 and 4 at the values $\tau_a = 13.30$ kN/m², $\tau = 12$ sec., $u = 0.180$ mm. and $\tau_a = 6.55$ kN/m², $\tau = 15$ sec., $u = 0.180$ mm., respectively. Results of the study show that the values of α for carried out tests are within the range $(40 \div 400) \cdot 10^3$ kNsec/m³ or $\mu_i = \mu u = (78 \div 800)$ kNsec/m².

The values of α for other cases (under the effect of transverse force, bending and torsional moments) may be found by similar way. It is suffice to know the values of interaction coefficient under the effect of dynamic load with different velocity of loading. However the experimentations present a lot of difficulties. So, considering that, it is proposed to make use of the data found under the effect of longitudinal force N , when determining viscosity parameters under the loads Q , M_u and M_k . Here the expression (2) may be used with a high degree of accuracy in the following form:

$$\mu_i = a_j \mu_x, \quad (22)$$

where α_j – is one of viscosity coefficients under the effect of loads Q , M_u , M_k ; α_x – viscosity coefficient under longitudinal force N ; a_j – the same as in (2).

In [3], when investigating horizontal oscillations of buildings under seismic effect and using Voigt and Maxwell-Kelvin linear-viscous-elastic model, it is shown that even two order change in viscosity parameters insufficiently effects on design results. This is true for above given statements.

Table 1.

Soil	Tests data			Design data			
	τ_{ak} , kN/m ²	τ , sec	$u(\tau)$, mm	η , sec ⁻¹	$u(\tau)$, mm	t_{max} , sec	$u(t_{max})$, mm
Loamy soil	9.4	18	0.200	0.01	0.600	144	0.747
				0.1	0.207	14	0.130
Gravel	7.55	3	0.220	0.01	2.676	120	1.267
				0.1	0.203	17	0.48

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Role of the acid-base nature of interphase interactions in structurization of composite construction materials

Abstract: Modern ideas of polystructural theory of composite construction materials are presented in the article.

Keywords: polystructural theory, composite materials, acid-base centers, microstructure, mesostructure, macrostructure.

The modern perceptions following from the polystructural theory of the composite construction materials (PT CCM) with mineral, combined and polymeric binding agents are based on the concept of their structurization based on the community of the levels of structure created by the founder of PT CCM academician Solomatov V. I. [1].

In construction mastics, glues, solutions and concrete on the basis of various binding agents are most of use. On the basis of PT

CCM, it is expedient to consider their structure in the following large-scale levels:

- microstructure (mastics, glues, sealants, etc.);
- mesostructure (solutions);
- macrostructure (concrete).

From the standpoint of structurization of CCM the greatest scientific interest is represented by the microstructure since the surface area of its disperse phase makes 90 and more percent [1].

The microstructure is formed when hardening of the material received generally from mix of the binding and particulate filler. The composition of such materials depends on the type of the binding agent, for example on:

- mineral (binding agent, filler, water, modifying agent);
- combined (mineral binding agent, polymeric admixture, filler, water);
- polymeric (synthetic resin, filler, hardening agent, plasticizing agent).

In structurization of such materials the important role belongs to the nature of interphase interactions. As a result of the numerous researches of the author carried out together with students the ideas of the acid-base nature of interphase interactions in structurization, the technology of the directed change of CCM properties on micro-, meso- and macrostructures are formulated and experimentally confirmed. Taking into account the acid-base mechanism of interphase interactions specific consistent patterns of structurization, technology and properties of effective construction materials based on cement, slag-alkalescent binding agents with chemical admixtures and fillers, of polymer-cement compositions, including on the basis of dry mixes, and filled polymeric compositions (glues, mastics, solutions and concrete) on the basis of acetone-formaldehyde resin and furfural-acetone monomer, are determined.

It is demonstrated that when forming the microstructure of cement concrete the structure of the adsorptive layers and nature of their bond with the surface area of disperse phase depends on the type of functional group of the chemical modifier. On this basis the assumption is formulated that subacidic (OH) groups of organic modifiers promote formation of discrete adsorptive films, and strongly acidic (COOH) groups — complete, low-permeable films and their interaction with the surface area of disperse phase is of acid-base nature [2]. Information set forth herein was confirmed also at research of influence of composition and structure of polycarboxylate superplasticizing agent (PC SP) on formation of the adsorptive layer and nature of bond of the admixture molecules with the surface of particles of the hydrated cement [3]. Comb-shaped molecules of admixture of the PC SP are chemisorptived in the surface area of hydrated compounds of cement on acid-base mechanism and form around granules of the binding agent the water permeable adsorptive polylayers. Also the acidic carboxyl groups of PC SP chemically interact with strongly acidic ions of calcium, and amide groups and groups of base nature with acid ions containing aluminum phases of the binding agent.

In the work [4] it has been demonstrated that the properties of slag-alkaline binding agent of concrete (SABA) depend not only on the specific surface area and structural and mechanical indicators, but to a large extent on the nature of active centers on the surface of disperse phase that is confirmed on the example of domain slag mixed with soda-sulfate float (SSF) and the admixture of gossypol (GR) and acetone-formaldehyde resin. The author has received quantitative characteristics of the active centers on the surface of SABA components, has specified the acid-base nature of interphase interactions, the influence of the type and nature of chemical admixture on them. The influence of the admixture of water-soluble acetone-formaldehyde resin of alkaline nature of hardening on the processes of hydration and curing of SABA, and also the bond of structure of the adsorptive film of polymer and kinetics of phase transformations in the binding agent are presented.

The interrelation of structural and physicochemical characteristics of the surface of particles of blown sand, concentration of the acid-base centers and the space occupied by one center with properties of fine concrete on the basis of SABA has been determined.

It is known that properties of the polymer-cement CCM with admixture of water-soluble resins depend not only on the structurization of the mineral binding agent but also on the formation of polymeric phase and its role in interphase interactions. It is demonstrated that proceeding from the acid-base nature of the latter, the use of admixtures of acid nature at receiving the polymer-cement CCM is ineffective, due to their negative effect on the processes of structurization of the mineral phase. On the example of acetone-formaldehyde resin it has been established that for receiving effective polymer-cement CCM it is more preferable not to use polymeric admixtures with the prevailing content of OH groups of alkaline curing. At the same time in the surface area of disperse phase the polymolecular adsorptive water permeable layers are formed. Along with that only some part of polymeric admixture on acid-base mechanism will be adsorbed on particles of binding agent or nuclei of hydrated newgrowths. The bigger part of the admixture, increasing viscosity of the liquid phase, will cover the surface of crystalline hydrates. Thus, in the polymer-cement CCM not so much surface activity of polymeric additive, as the nature of bond of reinforced adsorptive layers and volume properties of the disperse structures formed by them is used.

It is known that the need of application of fillers for cement CCM is dictated by incomplete hydration of clinker minerals of cement, technical, economic and ecological reasons. Taking into account possible topochemical reactions, the acid-base interactions in the surface area of disperse particles and phase interface we have drawn a conclusion on inexpediency of co-milling of cement clinker with mineral substances at receiving mixed binding agents and it is recommended to carry out introduction of fillers and admixtures of chemical modifiers at preparation of cement CCM. For confirmation of the above-stated researches on determination of force and concentration of the acid-base centers on the surface of particles of portland cement, fly ash, burnt clay, phosphoric sand slag, mixed binding agents and binary fillers on their basis have been executed for the first time [2; 5].

The criterion of activity of mineral disperse substances estimated by the relation of the sum of concentration of the acid and base centers of the surface is offered, which provides new scientifically based approach to the choice of fillers for cement and polymeric binding agents, comparative assessment of efficiency of processing methods of modification and activation of mineral disperse substances [2].

Taking into account this criterion, the efficiency of complex use of coarsely dispersed fillers (with dispersion twice lower, than cement) and the hydrous additives like acetone-formaldehyde resins for receiving economic concrete based on dense filler has been established. The role of finely dispersed (fly ash) and coarsely dispersed fillers (burnt clay and phosphoric slag) in processes of structurization, hydration and curing of cement stone, and the role of formation of morphology and pore volume of the microstructure are specified. The bond between dispersion, contents, acid-base properties of the surface of filler, the mechanism of action of additives of acetone-formaldehyde resin and the properties of cement mixtures and concrete has been demonstrated [2].

Reckoning with the nature of the active centers on the surface of mineral substance allows making the scientifically based choice of disperse filler for cement concrete. So, in that respect, in the work [3] the efficiency of use of basalt filler has been proved, the role of basalt filler in interphase interactions with cement has been specified and their experimentally acid-base character has been determined for receiving of high-strength cement concrete on the

basis of an ordinary portland cement as M-400 and an additive of polycarboxylate superplasticizing agent. It has been demonstrated that on the surface of filler particles there are strongly acidic and base centers caused by the presence of basalt of oxides of iron and

aluminum, and also alkaline metals in the composition. That pre-determines the possibility of their chemical interaction with the basic calcium-containing and acidic aluminum-containing phases of the binding agent, hardening of cement stone and concrete.

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Substantiation of reliability of the trailer frame at designing

Abstract: Article looks through the justification of the projected frame reliability of the trailer and its components.

Given desired level of reliability for the frame as a whole promoted calculation of the required parameters of reliability, including the probability of failure-free operation and mean time between failures elements of the trailer frame.

Keywords: trailer, frame, method, testing, dependability, reliability, endurance tests, cycle of loading, complexity.

The importance of the calculated values of reliability standards in the manufacture of trailers and their structural elements is that they should serve as the main reference point in the design process in the manufacture, including the development of methods of calculation and choice of testing equipment.

The problem of distribution in general requirements for the reliability of the frame elements can be formulated as follows: the desired reliability index for the frame consisting of n elements is set; you need to determine what changes should have the norm of each element. For solve this type of problem are applied techniques given in the research [1].

It is most comprehensible to our calculations is the method based on the utility theory in the distribution requirements for non-failure operation of components of the system on the basis of the account of their complexity [2].

It is known, that the probability of non-failure operation (PNFO) of any difficult technical system consisting of n elements is estimated under the formula

$$P_s = \prod_{i=1}^n P_{ei}, \tag{1}$$

where $P_{e1}, P_{e2}, P_{e3}, \dots, P_{en}$ — according PNFO of each individual element of the system.

It should be noted that the trailer is the complex technical system consisting of large number of components and, therefore, make calculations for evaluating the reliability of the formula (1) represent the difficult mathematical task.

We propose to carry out calculations on the valuation of reliability of structural elements of the trailer according to the structurally functional scheme (SFS) of the trailer shown in figure 1 and data of the complexity of each frame member.

The standard of reliability of the element of higher level of hierarchy is the standard of reliability for elements of subordinate level of hierarchy. The demanded PNFO of elements calculated under the formula [2]:

$$P_{ei} = P_s^{K_i}, \tag{2}$$

where K_i — the coefficient characterising the quantitative measure of complexity of i — basic element of the trailer (complexity).

The complexity is defined by expression:

$$K_i = \frac{2(n-i+1)}{n(n+1)}, \quad 0 < K_i < 1, \quad \sum_{i=1}^n K_i = 1, \tag{3}$$

where n — quantity of elements in the ranked series; i — number element in the ranked series.

This method of calculation P_{ei} is most comprehensible at the design stage of trailers, in the absence of operational data about their refusals.

In the production of frames important indicator of reliability is mean time between failures (MTBF) t_x , which will serve as the main reference in the test frame and its components. Definition of MTBF t_x , it is proposed to carry out the following steps: it is appointed PNFO P_s for the trailer in whole (in many cases P_s of the trailer it is equal P_s a tractor towing the trailer); composed of SFS of the trailer; it produced a ranking of the main

constituent elements of the respective levels of the hierarchy of the SFS trailer; using the formula (3) values of coefficients are defined K_i ; under the formula (2) there are demanded values P_{ei} (for each level of the trailer SFS); at known dot values P_{ei} and the kind of the law of distribution MTBF t_{ei} the basic components of the trailer are defined.

For the illustration of the distribution approach of requirements set forth above on reliability between trailer components, we will consider an example of calculation P_{ei} for II-level of hierarchy SFS of the projected trailer:

1. Demanded PNFO of the trailer it is appointed on the basis of the given analogues of the similar trailers used in other industries, $P_s = 0.7$;
2. SFS for II-level of hierarchy it is represented to the design of the trailer in the kind presented on figure 1;
3. Ranging of the basic components of II-level of hierarchy SFS of the trailer carried out according to their complexity on number of elements of i -component (table 1, columns 3, 4);
4. Complexities K_i of elements of the construction of the trailer, (table 1, column 5) are defined;
5. Demanded PNFO of elements of II-level of hierarchy, P_{ei} , (table 1, column 6) are defined.

Calculations of MTBF of elements t_{ei} it is connected with knowledge of laws of distribution of a random variable — refusals. The calculation of MTBF of elements of the construction of the projected trailer is carried out in the following sequence:

1. Laws of distribution of operating time to the full or between refusals for the trailer and elements of its construction are passed.

It is necessary to notice, that distribution Weibull takes the central place at research of characteristics of reliability of vehicles and their units.

Operating time to the full or on refusal of many restored and nonrestorable a product at which refusal comes because of fatigue

failure submit to this distribution.

The continuous random variable t is called as distributed under law Weibull if it PNFO it is calculated on the equation:

$$P(t) = e^{-\left(\frac{t-c}{a}\right)^b}, \quad (4)$$

where: a – scale parameter; b – form parameter; c – shift parameter.

2. Procedure of calculation PNFO — P_{ei} basic elements of the construction of certain level of hierarchy structurally function scheme SFS of the projected trailer is spent. The current value of operating time t , corresponding to, for example, $P_s = 0.7$ (for the trailer) can be determined from equation (4).

Calculated PNFO elements of II-level of hierarchy SFS of the projected trailer correspond, to for example current value $t = 8500$ km.

Conditionally accepting the version that operating time to first failure or between refusals of elements of II-level of hierarchy SFS of the projected trailer also submit to the law of distribution Weibull, their calculation t_{ai} is carried out.

For example, it is required to define t_{ai} an element № 1.1 — frame in number of ranking series (table 2) using the equations (4) at accepted coefficient of variation $V = 0.281$, coefficients $b = 4.0$, $K_b = 0.906 [1]$, conditionally we accept, that parameter of shift $c = 0$, then at $t = 8500$ km., $P_6 = 0.968$ (table 1, column 6), $a = 20000$ km.; $t_{a.frame} = a \cdot K_b = 20000 \cdot 0.906 = 18120$ km.

Similarly are defined t_{ai} for other elements of II-level of hierarchy SFS of the projected trailer, according to their place in the ranked series.

The results of calculations P_{ei} and t_{ai} are presented in table 1, columns 6 and 7.

The calculation of MTBF of elements of III-level of hierarchy SFS of the projected trailer is carried out similarly.

For example, the results of calculation of indicators of non-failure operation of elements of the frame (III-level of hierarchy SFS of the trailer) are presented in table 2 (on figure 1).

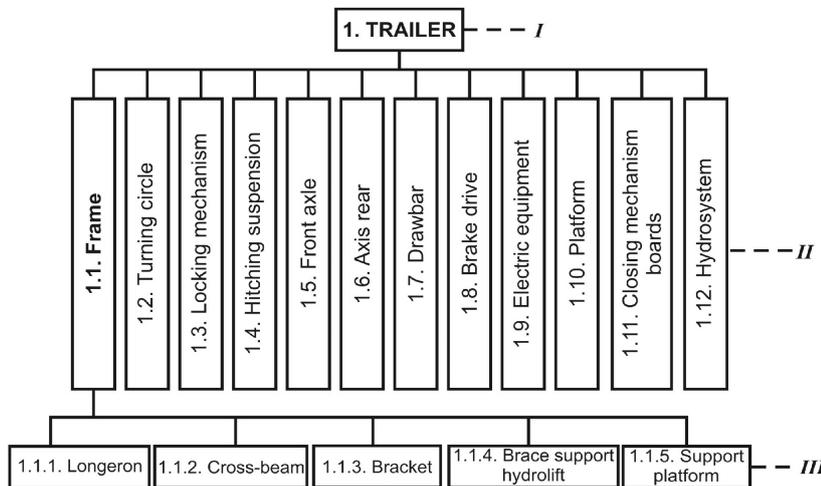


Fig. 1. SFS of the trailer: I, II, III- hierarchy levels

Table 1. – The calculation PNFO of basic elements of II-level SFS of the trailer

No	The name of assembly units (II-level of hierarchy SFS of the trailer)	Quantity of elements in the ranked series, n	Element number in the ranked series, i	Complexity of element, K_i	Probability of non-failure operation of elements at $P_s = 0.7$	MTBF of elements at $t_{a.frame} = 8500$ km
1	2	3	4	5	6	7
1.1	Frame	18	6	0.090	0.968	18120.0
1.2	Turning circle	1	12	0.013	0.995	28951.1
1.3	Locking mechanism	2	11	0.026	0.991	25003.2

1	2	3	4	5	6	7
1.4	Hitching suspension	9	8	0.046	0.977	19695.6
1.5	Front axle	38	2	0.141	0.951	16281.2
1.6	Axis rear	35	3	0.128	0.955	16632.8
1.7	Drawbar	9	9	0.051	0.982	20983.7
1.8	Brake drive	21	5	0.103	0.964	17582.2
1.9	Electric equipment	13	7	0.077	0.973	18968.1
1.10	Platform	45	1	0.154	0.947	15944.1
1.11	Closing mechanism boards	8	10	0.038	0.987	22784.0
1.12	Hydrosystem	24	4	0.115	0.960	17151.5

Table 2. – Calculation of indicators of non-failure operation of elements of III-level of hierarchy SFS of the trailer (frame elements)

№	The name of assembly units (II-level of hierarchy SFS of the trailer)	Quantity of elements in the ranked series, n	Element number in the ranked series, i	Complexity of element, K_i	PNFO of elements at $P_s = 0.7$	MTBF of elements at $t_{a.frame} = 8500$ km
1	Longeron	2	3	0.20	0.87	26838
2	Cross-beam	7	2	0.27	0.83	24999
3	Bracket	20	1	0.33	0.80	23889
4	Brace support hydrolift	2	5	0.07	0.95	34496
5	Support platform	2	4	0.13	0.92	30548

These calculated values should be provided by their manufacture and confirmed by corresponding tests at stands.

Thus, by the offered design procedure of indicators reliability of the trailer elements is possible on the design stage at a demanded MTBF for the trailer as a whole, to calculate MTBF of elements of the bottom levels SFS, which should be the basic reference point by their manufacture.

The calculated specifications of MTBF elements of the trailer should be confirmed by results accelerated bench or field tests.

Consider a technique of improving the tests concerning to manufacture of frame trailers.

The literature [3] data that at the expense of frequency increase of dynamic loadings influence at the frame construction acceleration of fatigue tests in 18 times and more is reached are cited.

The obstacles that simulate real conditions are removable for the purpose of restructuring the road for various tests (depending on the height of the roughness). For testing tractor trailers are used for fatigue resistance obstacle height 50, 70, 118 and 120 mm.

Therefore by the saved up experience of tests, theoretical calculations and trailer tests 2PTS-4-793 A the device allow terms to make fatigue tests in the shortest of such trailers has been developed.

The movement of the tractor trailers working in agricultural production is carried out basically on roads with a rough covering.

The speed of movement of the trailer is established on dependence:

$$V_p = 0,06 \cdot \omega \cdot l,$$

where ω — the natural frequency of the trailer, equal 120 q/min; l — the step of imitating roughness equal of 0.6 m.

The basic criterion at carrying out of the forced tests is the height of imitating roughness. To set its value putem selection of amplitude characteristics of voltage in nodes supporting structures of the trailer strain measurement method, it has been the identity of tension when the trailer on gravel with an average height of 6.5 cm. and overcoming simulation irregularities 8.0 cm. Average voltage at the nodes frame and body of the trailer in this case 76 MPa. Substituting this value of stress in the formula [3]:

$$N_p = \frac{N_0 \cdot \sigma_{-1}^m}{\sigma_0^m},$$

where N_0 — base number of cycles equal to $2 \cdot 10^6$;

σ_{-1} — the average endurance limit for welded frames of 40 MPa;

σ_0 — average statistical design voltage equal to 76 MPa;

m — the cotangent of the angle of the left branch of fatigue in logarithmic coordinates equal to 3, we find that the number of cycles until the destruction in the construction of the trailer equal $2.9 \cdot 10^5$.

Considering, that on a wheel 3 imitating roughnesses fasten, the general run of the trailer for $2.9 \cdot 10^5$ cycles will make 132 km. that is equivalent to 8 years of normal operation of the trailer in economic conditions [3].

Thus, 16.5 km. of the accelerated resource tests of the trailer correspond to 1 year of its operation in real conditions (245 days in a year with daily run of 30 km.) and $N_1 = 3.6 \cdot 10^4$ loading cycles.

One of the basic elements limiting reliability of the trailer is the welded frame which should provide necessary durability and reliability of the trailer for all appointed service life-8 years, taking into account operating repairs.

For the control of experimental data it is necessary $t_{a.frame} = 18$ 120 km. present a settlement time between failures km in the form of certain number of cycles loading of the frame. Taking into account that the MTBF failures of a frame $t_{a.frame} = 18$ 120 km. corresponds to 2.46 years of operation the settlement number of cycles loading makes trailer frames $N_2 = 2.46 \cdot 3.6 \cdot 10^4 = 0.886 \cdot 10^5$ cycles.

For check of results of calculation we had been carried out resource tests of bearing system of the trailer 2PTS-5-793D, and following results (to the full a system element) have been received: the left and right longerons — 6.4 years of operation; cross-beam № 1 – 6.36 years of operation; cross-beam № 2 – 2.46 years of operation; cross-beam № 3 – 2.65 years of operation; cross-beams № 4, № 5 – 5 years of operation; cross-beam № 6 – 5.2 years of operation; cross-beam № 7–6.6 years of operation.

The analysis of the results shows, that the first refusals of the frame fall to the cross-beam № 2 (2.46 years of operation). As it has been established, the settlement MTBF of the frame as whole makes $t_{a.frame} = 18$ 120 km. and in recalculation corresponds to 2.46 years of operation, that completely corresponds to test data.

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Method of calculation of vortical spillways with tangential swirlers

Abstract: In vortical spillways the danger of cavitations of surfaces and elements of spillway structural elements contacting water decreases or excludes, also the velocity of water in the outlet decreases to admissible levels. In present the most simple and efficient solution is vortical shaft spillways with tangential twisting device, located at the end of the shaft. The article gives the calculation of discharge capacity for vortical spillways with various geometries of swirling device, the calculation of hydraulic resistance and change of specific energy of swirled flow on the whole waterway. Calculation results can assist on designing such spillways.

Keywords: Vortical spillway, swirled flow, cavitation, slacking, swirling intensity, resistance.

Introduction

During designing and construction of high pressure hydrosystems, there arises necessity to solve complex problems of creating deep-laid spillways, which can effectively work under pressure over 100 m. and water velocities, reaching 50 ... 60 m/s. With mentioned values of determinant parameters it is necessary to: reliably defend flowing part of spillways from cavitation erosion; lower the dynamic loads on the structure elements; prevent the possibility of significant damage of tail-water supports and inadmissible bed washout.

As a rule, water passing hydrosystems which use positive effects of water flow swirling long since has attracted attention of specialists, especially for designing of high pressure hydrosystems. Spillways which use water swirling are known as vortical spillways.

In vortical spillways the danger of cavitations of surfaces and elements of spillway structural elements contacting water decreases or excludes. Effective slacking the flow energy in tunnel and suppression chamber allows to decrease water velocity in outlet from spillway route to admissible values, which in its part, simplifies the structure and its parts.

Most of the vortical spillway structures are not applied in practice for their complexity. In present the most simple and efficient solution is vortical shaft spillways with tangential twisting device, located at the end of the shaft [2; 3] (fig.1).

Research modeling

In the given work we research spillway operation, which is characterized with flow of various structures, i. e. when at the same time flow is in swirled, non-pressure, and aerated axial flow conditions.

For deferent tunnel with axial flow we determined the Frud number and the Reynolds number:

$$Fr_{o.t.} = \frac{\bar{g}_{o.t.}^2}{gh_n}, \quad (1)$$

$\bar{g}_{o.t.}$ — the average axial velocity in deferent tunnel;
 h_n — non-pressure flow depth in deferent tunnel.

$$Re_{o.t.} = \frac{\bar{g}_{o.t.} R_{o.t.}}{\nu}, \quad (2)$$

$R_{o.t.}$ — hydraulic radius of flow in deferent tunnel. The Frud number can change within 1.98 ± 0.15 , and the Reynolds number $0.7 \times 10^4 \div 5.4 \times 10^5$.

Main formulas for calculation

According to the results of model research we have got hydraulic estimates of such spillways.

Capacity of spillway is estimated with the formula [2]:

$$Q = \mu \omega \sqrt{2gH}, \quad (3)$$

where ω, H — correspondingly deferent tunnel free area and head;
 μ — discharge coefficient, estimated with following formula:

$$\mu = \frac{1}{\sqrt{1 + \xi_{nodes} + \xi_{s.y.} + \xi_{oms} + \xi_v}}, \quad (4)$$

where ξ_{nodes} — summed coefficient of loss in supply tunnel;
 $\xi_{s.y.}$ — loss coefficient of twisting device;
 ξ_{oms} — summed coefficient of loss in deferent tunnel;
 ξ_v — loss coefficient considering residual twisting at the outlet of their deferent tunnel.

Coefficient ξ_{nodes} is estimated with the following formula:

$$\xi_{nodes} = \left(\sum \xi_{II.M.} + \lambda \frac{\ell_{nodes}}{d_{nodes}} \right) \frac{\omega^2}{\omega_{II}^2}, \quad (5)$$

where $\sum \xi_{II.M.}$ — sum of loss coefficients on local resistances in supply tunnel;

ω_{II} — wetted section area of supply tunnel;

$\lambda, \ell_{nodes}, d_{nodes}$ — accordingly coefficient of hydraulic friction, length and diameter of supply tunnel.

Coefficient ξ_{oms} is estimated with the following formula:

$$\xi_{oms} = \sum_{i=0}^{i=n} (\xi_0 + \xi_{s,i}) \frac{\Delta \ell_i}{d} = \sum_{i=0}^{i=n} \xi_0 (1 + \phi_i) \frac{\Delta \ell_i}{d}, \quad (6)$$

where ξ_0 and $\xi_{s,i}$ — accordingly coefficients of loss for axial flow ($\xi_0 = \lambda \cdot 1$) and additional losses, caused by twisting in deferent tunnel;

$\Delta \ell_i, d$ — accordingly site length and deferent tunnel diameter.

Coefficient ξ_v is estimated as ratio of specific kinetic energy of flow twisting at the tunnel outlet to velocity head calculated with average discharge velocity:

$$\xi_v = \frac{V_u^2 / 2g}{V_{sp}^2 / 2g}. \quad (7)$$

As a initial approximation the value ξ_v can also be estimated by the following formula:

$$\xi_v = \frac{\Pi^2}{1 - \Pi^2}, \quad (8)$$

where, Π – the value of integral parameter at the end of deferent tunnel.

Π is the ratio of tangential component of shearing strength τ_u to full strength near wall τ or the ratio of peripheral velocity V_u to full velocity near wall V , which is practically the same ratio:

$$\Pi = \frac{\tau_u}{\tau} = \frac{V_u}{V} \tag{9}$$

Not changing the locations of supply and deferent tunnels on the plan, due to tangential cuttings, the geometry of tangential swirler and therefore the parameter A [1] can be changed.

$$A = \frac{\pi R_u \cdot R}{\omega_{ex}}, \tag{10}$$

where R — radius of existing deferent tunnel;

R_u — the distance from tunnel axes to inlet section axes;

ω_{ex} — the area of inlet section.

Calculation results

The value of initial integral parameter is accepted within $\Pi_0 = 0.6 \dots 0.8$ (the lower values of Π_0 are for lower heads) depending on the required extent of suppression of excess kinetic energy. The required value of Π_0 is provided by technical characteristics of twisting device. Knowing Π_0 we can get the value of geometric parameter of tangential swirler A from the graph on figure.2.

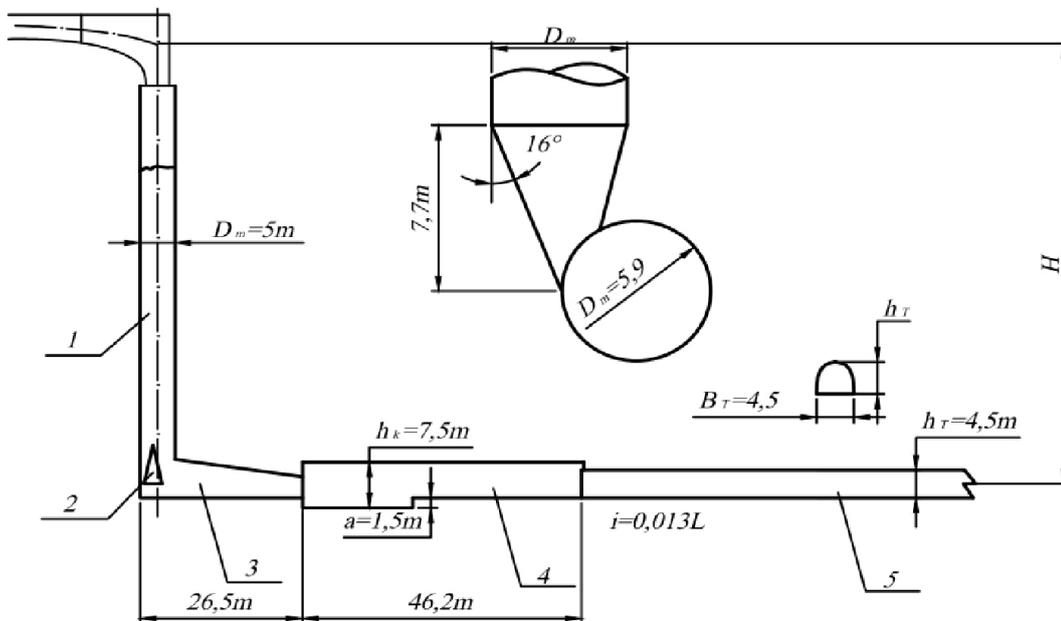


Fig.1. Schemes of vortical spillway deferent tunnels of Tupolang: 1 — shaft; 2 — tangential swirler; 3 — connecting element; 4 — suppression chamber; 5 — deferent tunnel

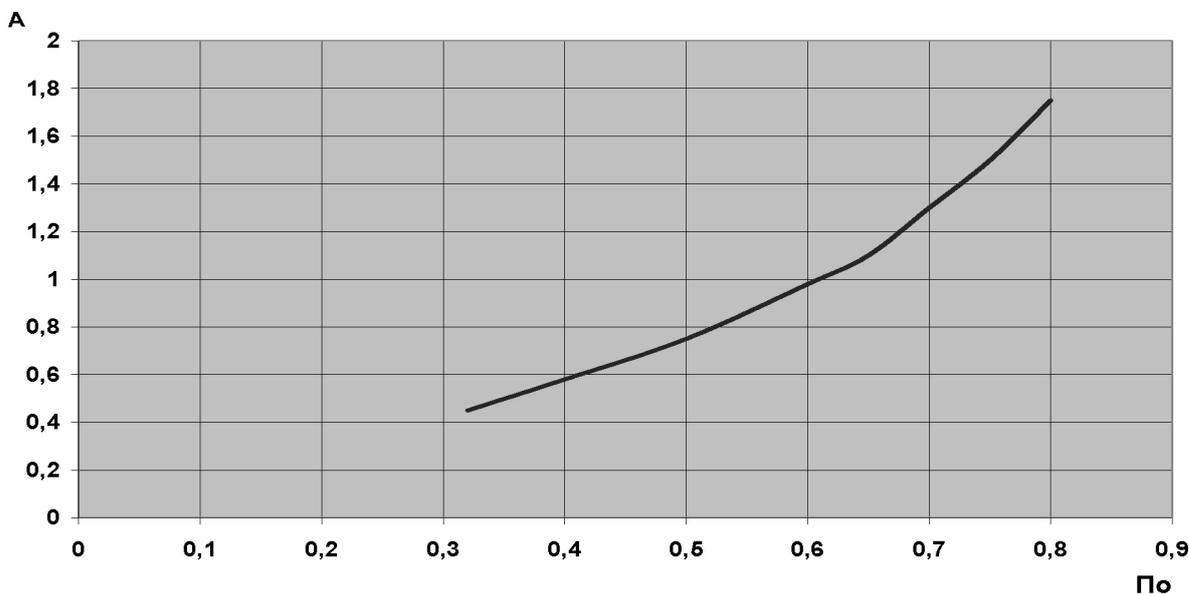


Fig. 2. Curve of $\Pi_0 = f(A)$ for tangential swirler

Swirler with flat cut or elliptical cut is selected. It is noted that with the constant parameter A swirler with elliptical cut has larger discharge capacity than the one with flat cut. With known parameter A we can get hydraulic resistance of the swirler $\xi_{a,y}$ from figure 3.

In order to estimate the value ξ_{oms} the deferent tunnel is divided into n sites, and for each of them the average value ϕ_i is esti-

mated. The estimation starts with finding the integral parameter of twisting Π .

Attenuation of twisting along tunnel is established by estimating the values of integral parameter of twisting Π for corresponding cross sections, located from the initial section $\bar{\ell}_0 = 4d$ at the distance $\bar{\ell} = \ell/d$.

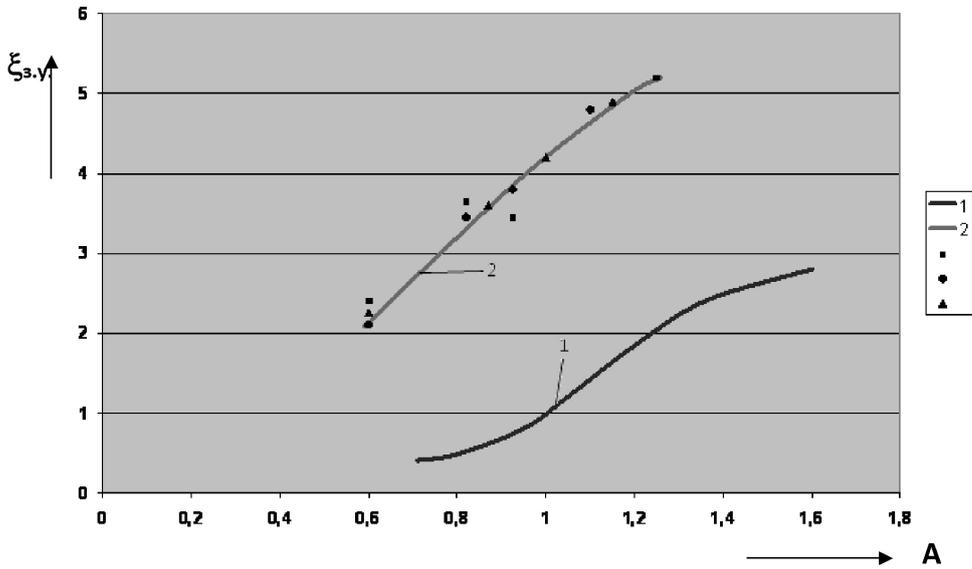


Fig. 3. Coefficient of hydraulic resistance of tangential swirler with flat cut vs. parameter A curve $\xi_{s,y} = f(A)$: 1 — with vortical water gate; 2 — with tangential swirler with air intake from shaft

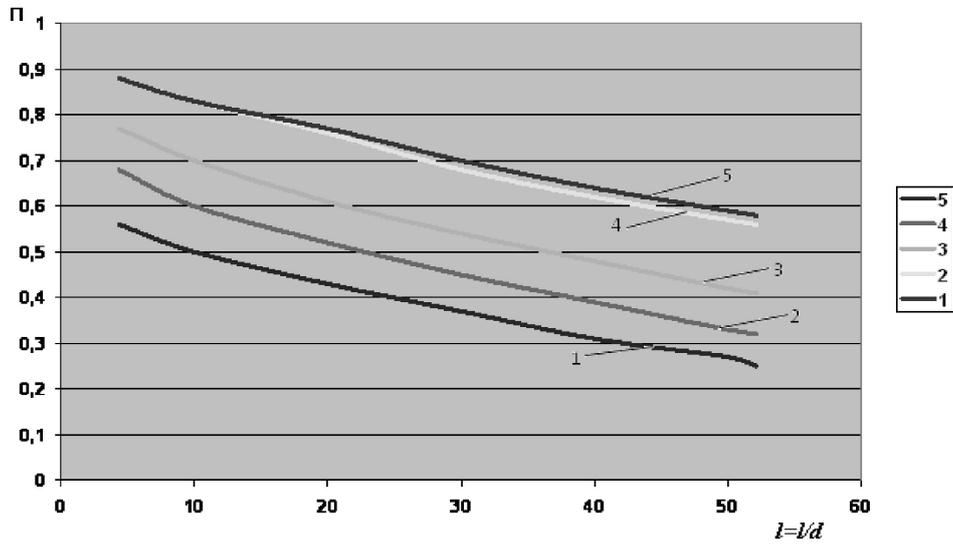


Fig.4. The change of integral parameter Π along circular section 1, 2, 3 — $A=0.6, 0.925, 1.245$ correspondingly; 4 — generalized curve for tunnel with vortical water gate; 5 — generalized curve for tangential swirler with air intake from shaft

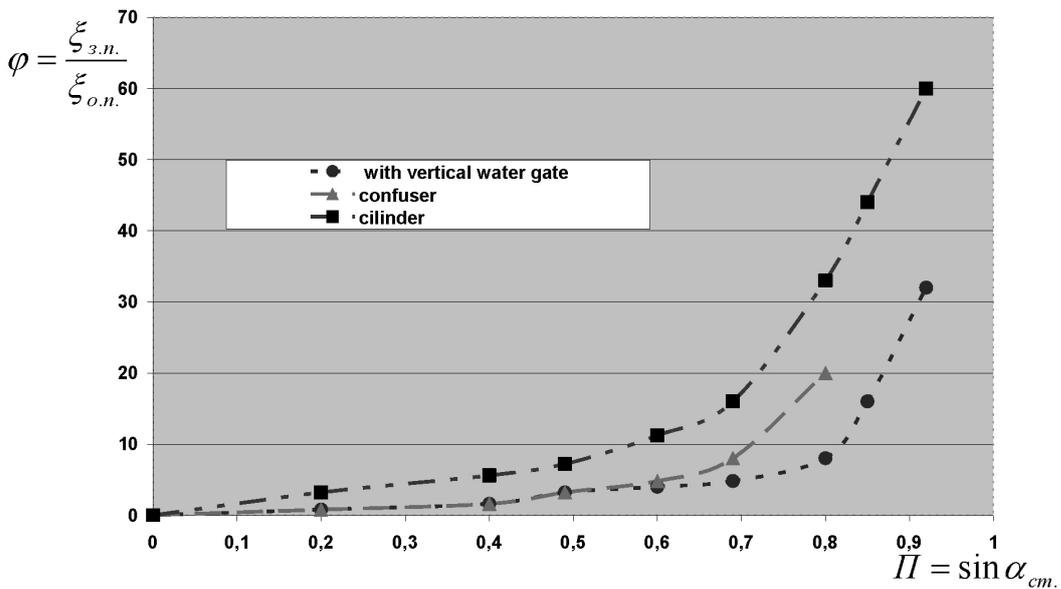


Fig. 5. Coefficient ϕ vs. parameter Π curve

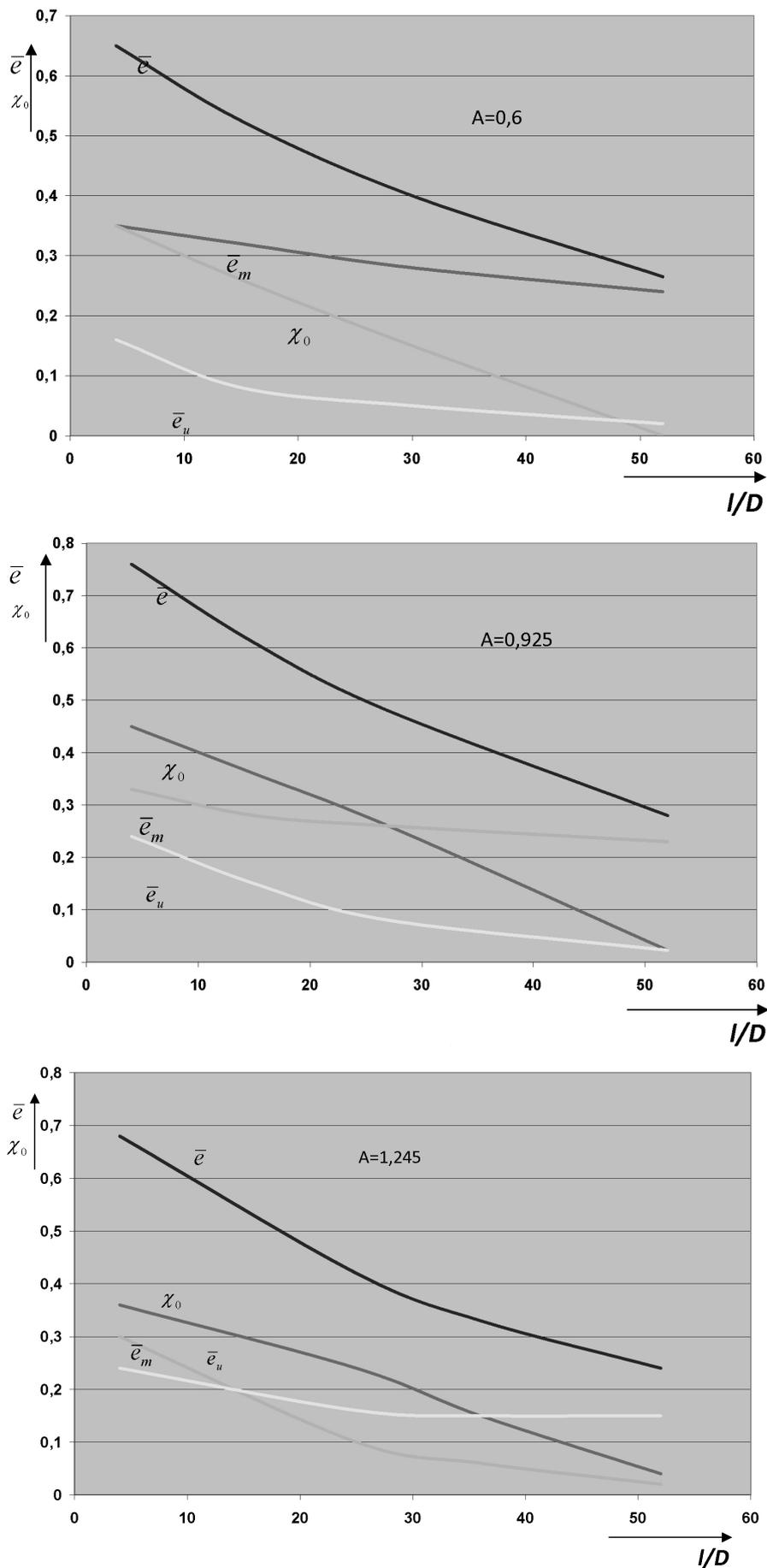


Fig. 6. The changes along tunnel with average values on section and discharge of full specific energy of twisted flow \bar{e} , kinetic energy of axial component velocity \bar{e}_m , kinetic energy of circular component velocity \bar{e}_u , on wall χ_0 , rated to head of 1 m., for various values of parameter A

The change of integral parameter Π along tunnel with circular section is shown in fig. 4. From the graph $\phi_i = f(\Pi_i)$ we find ϕ_i [4] (fig. 5).

The character of changes along tunnel with average values on section and discharge of full specific energy of twisted flow \bar{e} , kinetic energy of axial component velocity \bar{e}_m , kinetic energy of circular component velocity on wall \bar{e}_u , rated to head of 1 m., for various values of parameter A are shown in fig. 6.

The values of energy and pressure are estimated with the following formulas:

$$\bar{e} = \frac{E}{\rho g H_{ax}}; \bar{e}_m = \frac{E_m}{\rho g H_{ax}}; \bar{e}_u = \frac{E_u}{\rho g H_{ax}}; \chi = \frac{P_{cm}}{\rho g H_{ax}}. \quad (11)$$

The value of potential energy of flow is estimated as follows:

$$\bar{e}_p = \bar{e} - (\bar{e}_m + \bar{e}_u). \quad (12)$$

Hydraulic resistance of twisted flow in cylindrical tunnel is way larger than the resistance of axial flow. It is related to the change of flow structure, in particular to the increase of velocity and velocity gradient near tunnel surface and correspondingly to the increase of surface friction and internal friction, caused by the increase of turbulent pulsation intensity.

The loss of energy in twisted flow can be introduced as the sum of energy losses in axial flow ΔE_{oc} and energy losses, caused by flow twisting ΔE_s [2]:

$$\Delta E = \Delta E_{oc} + \Delta E_s. \quad (13)$$

It is known that energy loss on tunnel site with axial flow is:

$$\Delta E_{oc} = \lambda \frac{V_{cp}^2 \ell}{2g4R}, \quad (14)$$

where λ — hydraulic friction coefficient, $\frac{V_{cp}^2}{2g}$ — velocity head, estimated from averaged discharge velocity for simplicity, $V_{cp} = \frac{Q}{\omega}$ (ω — tunnel cross section area), $\frac{\ell}{4R}$ — relative length of tunnel, where the energy loss occurs.

Additional energy losses, caused by twisting can be introduced similarly:

$$\Delta E_s = \xi_s \frac{V_{cp}^2 \ell}{2g4R}, \quad (15)$$

where ξ_s — the coefficient of hydraulic friction from flow twisting.

If we consider $\frac{\ell}{4R} = 1$ and for sameness denote λ with ξ_{oc} , we get the following:

$$\Delta E = (\xi_{oc} + \xi_s) \frac{V_{cp}^2}{2g}. \quad (16)$$

The formula (10) can be presented as:

$$\Delta E = \xi_{oc} \frac{V_{cp}^2}{2g} \left(1 + \frac{\xi_s}{\xi_{oc}}\right). \quad (17)$$

The quantity ξ_s/ξ_{oc} in [2] is denoted with φ and characterizes the ratio of hydraulic friction coefficient to twisting and axial flow.

Then:

$$\Delta E = \xi_{oc} \frac{g^2}{2g} (1 + \varphi). \quad (18)$$

The calculation of hydraulic resistance of twisted flow in cylindrical tunnel is carried out as follows.

The initial twisting of flow Π_0 is determined from known characteristics of twisting device ($\Pi_0 = 0.6 \dots 0.8$).

The value of specific flow energy in initial section E_0 is established from known characteristics of twisting device, i. e. from the graph: $\bar{e} = f\left(\frac{\ell}{d}\right)$ (fig. 6).

Then the tunnel is divided into sites, on which the energy losses are found with consideration of twisting suppression along tunnel from site to site, starting from the initial section. The initial section is the section, located at distance $\frac{\ell}{d} = 4$ from the twisting device.

Twisting suppression is established by determining the values of integral twisting parameter Π for corresponding cross sections of tunnel, located at distance $\bar{\ell} = \frac{\ell}{d}$ from initial section from graph $\Pi = f\left(\frac{\ell}{d}\right)$ (see fig. 4).

The value of φ_i is estimated by the average value of Π_i for the given site from the graph $\varphi_i = f(\Pi_i)$ (see fig. 5).

The value of loss coefficients for the axial flow ξ_{oc} is established with the consideration of the actual roughness of tunnel walls from known formulas.

The values ξ_{oc} , φ_i and v_{cp} are determined, the sum of energy losses of twisted flow ΔE_i on the given site and consecutively along tunnel, and also the sum of energy losses $\Sigma \Delta E_i$ are calculated using formula (17)

Specific flow energy at the end of site E_{ki} is equal to:

$$E_{ki} = E_0 - \Sigma \Delta E_i. \quad (19)$$

The calculation starts from the initial site and consecutively conducted along tunnel. As a result the change of full specific energy of twisted flow along the whole tunnel is determined.

Conclusion

Vortical spillways are reliable from the point of view of noncavitational work and effective energy slaking. We received the values for swirled flow hydraulic resistance coefficient on the whole waterway in air intake conditions. From the above given consistency we can carry out calculation of discharge capacity of vertical spillway with various geometrical shapes of twisting device, calculation of hydraulic resistance and change of full specific energy of twisted flow along the whole tunnel.

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Section 8. Transport

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Development of improved technical means for transportation fruits and vegetables

Abstract: this article discusses the need to develop and use of containers for the fruits and vegetables transportation. It includes the requirements for the container construction and proposals of a new containers construction for the fruits and vegetables transportation. The article also provides for the theoretical studies of the stress-strain state of developed container construction.

Keywords: container, fruits and vegetable products, finite element model, operational load, stress-strain state, strength.

Introduction

For the last years in Uzbekistan the strategy of agriculture development is consistently implemented and this is aimed on ensuring food security of the country. This approach to the production of fruits and vegetables as an important part of the whole system of livelihood, maintaining their health, as well as the creation of conditions of employment has become one of the main vectors of economic and social policy of the state.

Today in the republic, a lot of attention is paid to the development of farming and annually over 17 million tons of fruits and vegetables are produced.

Thanks to measures taken by the system is steadily increasing export potential of the industry. In the last years Uzbekistan has become a major exporter of high quality and competitive fruits and vegetables products. In order to ensure it throughout the year a lot of attention is paid to the processing, storage and transportation. The geography of exports of horticulture and viticulture. Previously Republic traditionally supplied it mainly to Russia, Kazakhstan and other CIS countries, then today it is shipped from Uzbekistan to the markets of more than 100 countries.

The Republic of Uzbekistan has a powerful transport including a rail, road, air, pipeline and river. The main transport takes place in the railway transport, which accounts for over 60% of the total freight turnover in the international direction.

Railways in Uzbekistan are in good condition and suitable for operation of freight trains at a speed of 90 km/h, and some reconstructed road sections allow to pick up speed over 100 km/h.

Along with the ongoing work on the renew and reconstruction of railway lines, it is necessary to take measures to optimize the entire chain of the organization freight transportations. Many experts noted that the solution to this problem could be the widespread use of containers, as well as the modernization of infrastructure, locomotive and rolling stock fleet of JSC "Uzbekiston Temir Yullari" [1–3].

Multi-party system and manifold of transportation Horticulture products makes exploitation of such containers, which would create the conditions to ensure keeping quality of fruits and vegetables during transport, taking into account their biochemical composition and microbiological contamination related to the organization of transport — by road and rail.

Short description of researches

Therefore, it became necessary to create a structure of container that meets the requirements. The Tashkent institute of railway engineering staff conducted studies for the universal containers creating for fruits and vegetables transportation.

Researches construction of these containers were based on conceptual approaches and requirements, while providing the following possibilities:

- mechanized loading and unloading of products from containers;
- production loading and unloading operations using cranes and forklifts;
- stacking containers in two or three tiers of in warehouses and container areas;
- maintain of fixity on rolling stock;
- waterproofness for the goods, which "afraid" of atmospheric effects.

Types, basic parameters and sizes of specialized containers for transportation of bulk, piece and liquid cargo, perishables and foods without packaging, in packaging's and in a lightweight package, on platforms and open wagons railways, cars, trailers, boats and ships, and for the temporary storage on the storage areas are set to meet the requirements of the international standard [4].

On the results of research, using modern engineering programs was designed 3D model construction of container with hatches (Fig. 1) for transportation of fruits and vegetables. This construction of the container was designed on the basis of 20 and 40 foot universal containers.

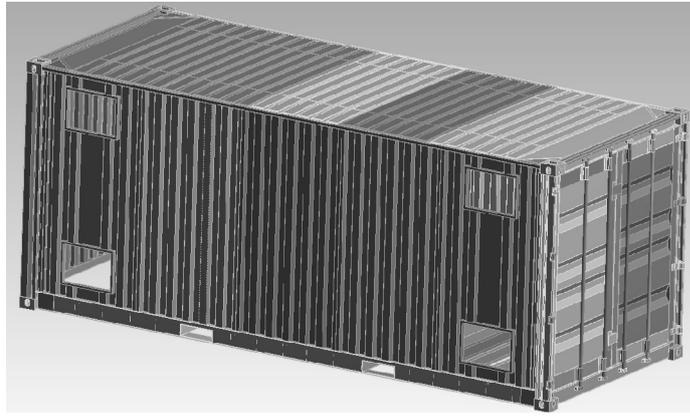


Fig. 1. General view of the 3D model of construction of the designed container for transportation fruits and vegetables

The main elements of the container construction for fruits and vegetables transportation are made of steel grade GOST 19281–89 09G2 C, which admissible voltage is 295 MPa [5].

The side walls of the proposed container have been equipped with hatches with size of 550×400 mm. for the natural ventilation of goods carried. To ensure the strength of the developed design of the container, place of the hatches around the perimeter of the hatches were reinforced stringers angular profile. For natural ventilation in line with international standards it is most expedient to place the hatches in the four corners side wall, respecting the distances indicated in Fig. 2.

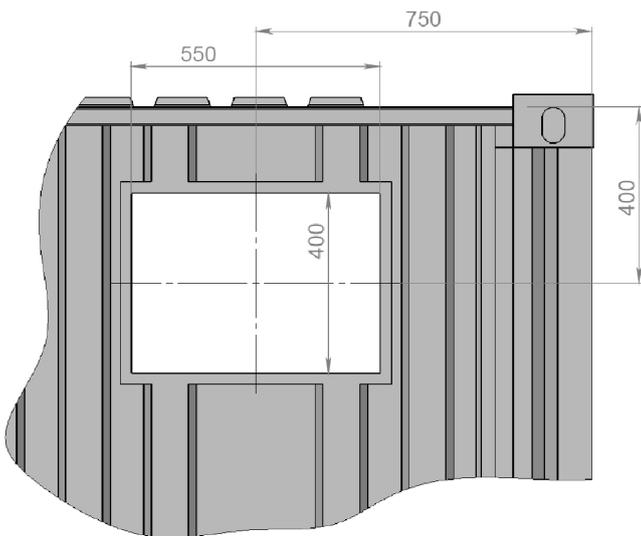


Fig. 2. The main sizes of the hatch of the container for transportation fruits and vegetables, mm

Researches of stress-strain state of designed construction of the container for transportation fruits and vegetables under the action of operating loads carried out using industrial software that implements the finite element method. The essence of the method and examples of its use for various calculations detailed in a lot of the literature [6–8].

In order to design scheme of the container for transportation fruits and vegetables as much as possible most accurately corresponds to the actual performance and character of the work to describe the elements of the container were used plate-rod finite elements.

Elements have six degrees of freedom at each node: displacement in the direction of axes X, Y, Z coordinate system node and turns around the axes X, Y, Z coordinate system node. Elements such as the mass connected with the elements of the carcass using an absolutely hard links. The design scheme of the construction container for transportation fruits and vegetables is shown in Fig. 1, and with the finite element mesh is shown in Fig. 3.

Calculated plate-rod finite element model of designed container for fruits and vegetables transportation includes 208 392 finite elements and 71 958 nodes.

The loads acting on the elements of the container during loading and unloading, transport, handling and storage operations are presented in detail in many sources [9–10].

In modeling, allowable stresses of elements of container had been taken in accordance with [3]. For all the steel modulus of elasticity was assumed to be $2.1 \cdot 10^5$ MPa and the Poisson's ratio — 0.3.

Selective results of distribution fields of equivalent stress in the elements of the container shown in Fig. 4, and Fig. 5 shows the results of field distribution equivalent to movements in the elements of the container for transportation fruits and vegetables.

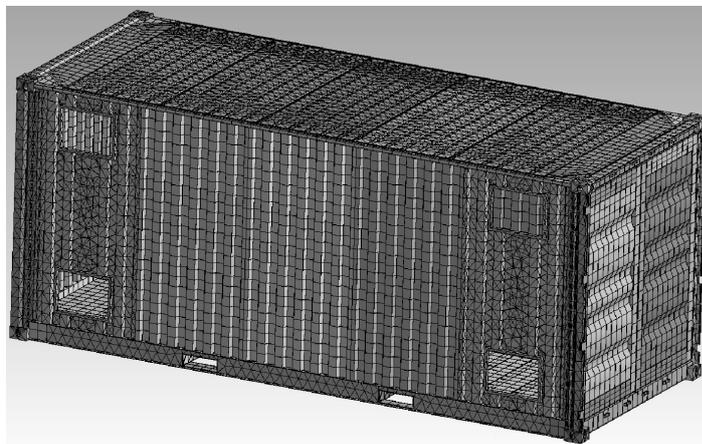


Fig. 3. General view of the finite element model of developed universal container for transportation fruits and vegetables



Fig. 4. The fields of distribution of equivalent stresses in the elements of the container for transportation fruits and vegetables, Mpa

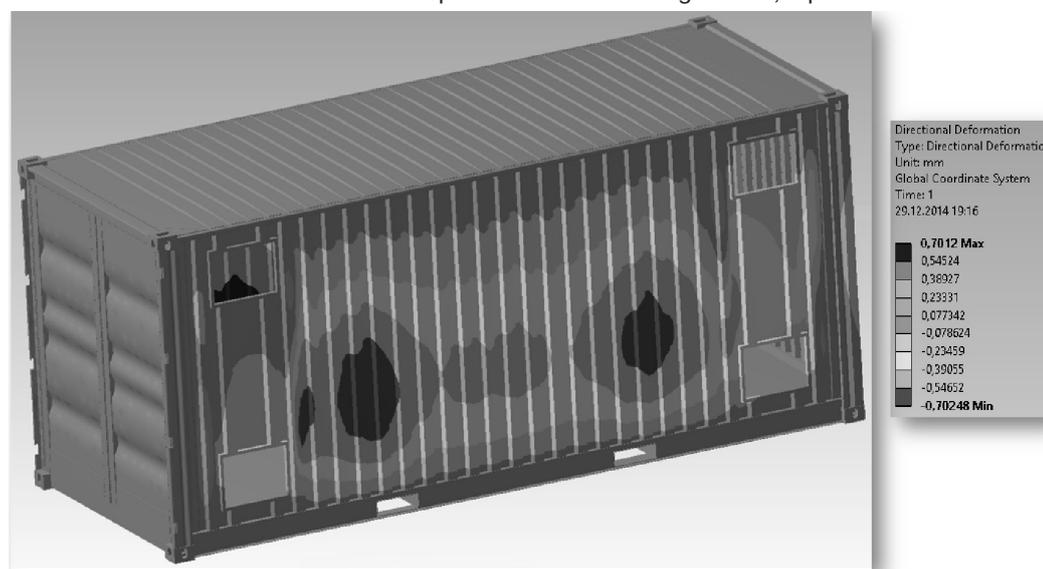


Fig. 5. Fields distribution equivalent displacements in the elements of the container for transportation fruits and vegetables, mm

Conclusion

On the strength of theoretical studies of the proposed container for transportation fruits and vegetables found that the calculated maximum stress in the structural elements of the container do not exceed the permitted ($123.3 \text{ MPa} < 295 \text{ MPa}$). Thus, the chosen

design of the container meets the requirements for strength for all combinations of operating loads.

On the basis of studies the technical solutions of a universal container for fruits and vegetables transportation were developed.

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Section 9. Physics

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Structural features of the spatial distribution of constant values

Abstract: The paper presents the problematic aspects of the construction of the balance of interaction between theoretical and practical researches coordinate the principles of spatial arrangement. The study is based on a stochastic physics experiment and higher environments. Revealed aspects of the understanding of the paradigmatic unit building energy cooperation in a vacuum environment. Directions of development of physics of the vacuum space and energy.

Keywords: energy balance, physics environment, paradigmatic value, vacuum, development.

Potential energy is the interaction energy, therefore potential energy cannot have any one form of matter without interacting with other forms of matter. Space and time are basic forms of existence of matter, in themselves, separately from each other, neither space nor time physically exist. Their existence is possible only in the form of a single conglomerate “space-time”. Space and time, interacting, inseparable penetrate each other and organically intertwine, creating a single system — the Universe. The result of the interaction of the two main forms of matter: space and time is the potential energy of interaction between the space-time continuum — the Universe.

The position of a material point in the space of the Universe is completely described by three spatial coordinates (x, y, z) . On this basis, we argue that the three-dimensional space of the Universe. But that's not entirely true, because all three spatial coordinates are expressed in the same units of length L and, therefore, from this point of view the Universe space is one-dimensional, since it has a single measure of L .

The space of the Universe can be represented as a set of points having the power of the continuum, all physical characteristics of which depend on the variable L , the value of which is the power of the spatial continuum, and not a measure of length L^1 , area L^2 , volume L^3 .

The cardinality of the set of points of any segment $[a, b]$ has the power to direct the continuum, as well as all direct, as well as power plane (i. e. 2-three-dimensional space), 3-dimensional space x and any N -dimensional space. Continuum in any degree stays continuum [5, 951].

Time is a one-dimensional continuum in which all physical characteristics depend on the “rough” variable t , related to the duration of an arbitrary length of time t , rather than individual pixels within it. Possible degree of magnitude of time $t^1, t^2, t^3 \dots$ do not change the essence of the continuum. Value t reflects temporary power continuum. The value of the length of time t , as the value of the interval length L — always positive. In the physical sense, the length of time t and cut lengths L mean the same thing-length or duration. In mathematical terms, this two are not different from each other, positive numeric row: 0, 1, 2, 3 ... Representing two infinite series of ordinal numbers. Ordinal numbers include ordinals are finite and infinite, i. e., ordinal numbers. Ordinals were introduced by Georg Cantor in 1883 as a way to describe infinite sequences, as well as with certain sets of ordered structure.

Based on the above, it can be assumed that the space-time continuum is a two-dimensional (L, t) , that has two dimensions. Interaction (relationship) of space and time is described by the expression: L/t — the speed of interaction. The numerical value of the space-time continuum can vary from zero to infinity, since the numerical value of both lines (L) and (t) may vary from zero to infinity, but separately, now and then, that individually and not together! Space-time continuum cannot be zero length, i. e. pulled at the point of origin, because in this case disappears, the interaction between the two forms of matter: space and time, therefore, disappear and the energy of interaction between space and time.

To the law of conservation of energy in space-time continuum was carried out, there are two choices:

1) there must be a minimum spatial L and temporary t lines that actually already exist in physics is the Planck length, which is equal to: $l_p = 1.616229(38) \cdot 10^{-35} m$. and the Planck time, which is equal to: $t_p = 5.39116(13) \cdot 10^{-44} c$. The way out of the situation is bad in that it does not understand the reason, mechanism of minimum data segments of time and space.

2) interaction (relationship) of space and time is described by the expression: L/t -speed interaction, but in the case of: $t = 0$, i. e. expressions of uncertainty arises in the absence of space and time the speed of their interactions can be either from zero to infinity.

To get rid of the uncertainty expression L/t at $t = 0$, you need to first get rid of discrimination figures 0 and assume that: $\frac{0}{0} = 1$, as well as: $\frac{1}{1} = 1; \frac{2}{2} = 1; \frac{3}{3} = 1 \dots$. Then the energy of interaction between space and time is not able to disappear under any circumstances. Cantor first built many power continuum, but measure zero! Zero being the least infinitely large ordinal of is identified with the cardinal number Aleph-zero!

When any large scale changes the universe speed interaction between the two main forms of matter-space and time is a constant, because: $\frac{L}{t} = \frac{0}{0} = \frac{1}{1} = \frac{2}{2} = \frac{3}{3} \dots = \text{const} = 1$.

The rate constant for interaction between the two main forms of matter equal to the unit or the speed of light in a vacuum.

Space-time continuum is a real mechanical system of an infinite number of material points, connection between which are not completely hard, hence, the space-time continuum as a real mechanical system has an infinite number of internal degrees of freedom.

Space-time continuum as a mechanical system with infinite number of internal degrees of freedom, velocity vector field describes interaction between space and time in its entirety applies to moving objects, or objects, the main characteristic which is the speed, and therefore is not mathematical and physical continuum.

If the speed of interaction of the basic forms of matter, space and time is the first major physical characteristic of the space-time continuum, the density of their interaction, the second main physical characteristic of the space-time continuum.

The density of interactions (ρ_{bs}) space-time continuum is a scalar value that does not have a direction vector. The density of interaction between space and time at the point of origin, is equal to: $\rho_{bs} = \lim_{V \rightarrow 0} \frac{m_0}{V} \cdot \text{Mass} (m_0)$ equals density times the volume, then mass (m_0) zero, if the volume (V) is equal to zero. On the assumption that: $\frac{0}{0} = 1$, get: the density of interactions (ρ_{bs}) at the point of origin is equal to 1: $\rho_{bs} = 1$.

Space-time continuum as a mechanical system with infinite number of internal degrees of freedom, describes the velocity vector field of interaction between a scalar field and a density of interaction between space and time and therefore may be considered as a solid Wednesday.

Solid Wednesday-mechanical system, movement which, unlike other mechanical systems, describes not coordinates and velocities of individual particles and density scalar field and vector field. Solid mass Wednesday is not its main physical characteristic. The main physical characteristics of space-time continuum are the speed of interaction (v_{bs}) and the density of interactions (ρ_{bs}) space and time.

Both types of interaction in the space-time continuum already exist inseparably together into a coherent whole, they create energy interaction between space-time continuum.

Energy (action, work, force, power) is a scalar physical quantity that is a single measure of various forms of movement and interaction of matter transition movement of matter from one form to another.

The energy of interaction of the space-time continuum is a complete mechanical energy system and forms the scalar potential field interaction energies, which combines the energy situation and energy of the elastic deformation.

For the space-time continuum on a par with its main physical characteristics-speed and density are important interactions and physical characteristics such as the intensity of the interaction between space and time is power, acceleration and momentum.

Force is a vector physical quantity, which is a measure of the intensity of interaction between space and time. The strength of the interaction is the cause of deformations and stresses in the space-time continuum-continuum Wednesday. Power (F_{bs}) the intensity of the interaction between space and time is equal to:

$F_{bs} = \rho_{bs} \cdot L^3 \cdot \frac{L}{t^2} = \frac{\rho_{bs} \cdot L^4}{t^2}$. Therefore, the intensity of the interaction between space and time with the growth of the volume of the universe expands in a quadratic sequence ($\rho_{bs} = 1$):

$$F_{bs} = \frac{1 \cdot L^4}{t^2} = \frac{0^4}{0^2} = 1; \frac{1^4}{1^2} = 1; \frac{2^4}{2^2} = 4; \frac{3^4}{3^2} = 9; \frac{4^4}{4^2} = 16; \frac{5^4}{5^2} = 25 \dots$$

In other words, the intensity of the expansion of the universe goes up, in this case the word acceleration means the process steps: accelerating, accelerating.

Acceleration is a vector physical quantity characterizing the change in velocity of its numerical value, and direction. Acceleration for solid Wednesday at the origin is equal to: $\vec{a} = \frac{L}{t^2} = \frac{0}{0^2} = 1$. In the

range from ($\frac{0}{0^2} = 1$) before ($\frac{1}{1^2} = 1$) acceleration \vec{a} reaches maximum value (for example: $\frac{0.3}{0.3^2} = 3.33$). With the increased scale of sizes of space-time continuum for continuous acceleration decreases Wednesday:

$$\vec{a} = \frac{L}{t^2} = \frac{0}{0^2} = 1; \frac{1}{1^2} = 1; \frac{2}{2^2} = 0.5; \frac{3}{3^2} = 0.3 \dots$$

Once the volume of the space-time continuum becomes non-zero weight appears in the universe: $m = \rho_{bs} \cdot L^3$ as an equivalent intensity of interaction between space and time: $m = \frac{F_{bs}}{\vec{a}}$.

Mass is a local deformation density ρ_{bs} the potential energy of the scalar field (solid Wednesday) resulting from serving it forces (F_{bs}). Weight is a scalar physical quantity that characterizes the "amount of substance" in the space-time continuum. As mass (m) is inversely proportional to acceleration (\vec{a}), It can be thought of as the equivalent energy of rest (the less acceleration (\vec{a}), the greater the mass of a substance (m)). With the increase in the volume of the universe acceleration (\vec{a}) decreases, and the mass value (m) increases in proportion to the force (F_{bs}) the intensity of the interaction between space and time. There is a duality of the physical character of the mass ($m = \frac{F_{bs}}{\vec{a}}$).

On the one hand weight-equivalent intensity of interaction between space and time, i. e. is equivalent to the kinetic energy of the interaction, on the other hand, mass-equivalent rest energy, i. e. the equivalent of the potential energy of the interaction. Therefore, mass "must escape from all the legs, just to stay in place". Structural elements of the universe, possessing weight, must constantly be on the move to stay alone.

Impulse (momentum) is a vector physical quantity, which is a measure of the mechanical movement of the body. The momentum of the body (\vec{p}) is equal to the product of mass (m) body at its speed (v). For the space-time continuum is a solid boost Wednesday at the origin is equal to:

$$\vec{p} = \rho_{bs} \cdot L^3 \cdot \frac{L}{t} = \frac{1 \cdot L^4}{t} = \frac{0^4}{0} = 1.$$

Unlike the magnitude of acceleration (\vec{a}) the magnitude of the momentum (\vec{p}) in the range from zero ($\frac{0^4}{0} = 1$) till unit ($\frac{1^4}{1} = 1$)

takes minimum values (example: $\frac{0.3^4}{0.3} = 0.027$). With the enlargement of the scale of the Universe impulse value (amount of traffic) increases in proportion to the increase of the mass of matter in the universe.

Physico-mathematical properties of space-time continuum in scale range from ($\frac{0}{0} = 1$) to ($\frac{1}{1} = 1$) cardinally differ from the physico-mathematical properties ranging from ($\frac{1}{1} = 1$) before ($\frac{\infty}{\infty} = 1$).

Vulnerable in set theory is the primary as an infinite number which is the set of natural numbers $N = 0, 1, 2, 3, \dots, n, \dots$. It is also called a countable set. It is being studied as an actual set, having the power of ω . ω is the smallest Infinite infinity, since all numbers less than this infinity, come in a myriad of N , which includes only the end number. Famous contradiction is the fact that many N contains only finite number is it still called a multitude of all target numbers and, despite this, postulated that it contains an infinite number of finite numbers ω . From the point of view of classical logic that cannot be because the number of numbers in the set (N) must match the maximum number of this set, i. e. the number ω , or at least the number $\omega - 1$ must be in many N . But that is not the case-the

number ω is not included in the number N , it is called the limit sought by a number of natural numbers. Having no predecessor (the number $\omega - 1$ in set theory), the number ω is magical, and mystical and fantastic. As a consequence, between ω and all finite number N is «hole», which may be a «black hole» in which can fly a myriad of infinite sets of N , and «white hole», the opposite of «black hole», from which you can draw, myriads of infinite sets. When the set of natural numbers has remained unchanged for its power, that is the number of elements!

The number ω is the limit sought by a number of natural numbers: $\omega = \lim_{n \rightarrow \infty} n$. In this and many other such records is a place of clarity in understanding the infinity symbol. So, write $n \rightarrow \infty$ should be understood simply as the phrase « n tends to infinity». Equality same limit $\lim n$ transfinitu ω quite specifically, although obviously that $\omega \neq \infty$. But, on the other hand, the number ω has no predecessor, this leads to the fact that the number ω is the limit ($n - 1$) and end ($n + 1$) an infinite set of natural numbers $N = \omega, 1, 2, 3, \dots, n, \dots, \omega$.

Transfinitoe number of ω has to say about himself: «I am the alpha and the Omega, the beginning and the end, the first and the last» – $A\omega$.

Scale range from beginning ($\frac{\omega}{\omega} = 1$) to ($\frac{1}{1} = 1$) — This area (level) microcosm space-time continuum. Microcosm is a world of elementary particles, nuclei of atoms, atoms. In microcosm-acceleration (\bar{a}) and the density of interactions (ρ_{bs}) space and time to reach its maximum value. Impulse (momentum) and the power intensity of interaction (F_{bs}) space and time in microcosm, conversely, reach their minimum values.

«Part can be equal to a» – this principle underlies the physical properties of the microcosm. The cardinality of the set of points of the interval $[1, \omega]$ to direct has a power continuum, as well as all direct, as well as power's 2 dimensional space, 3-dimensional space x and any N -dimensional space. Space-time continuum in scale-out range from the beginning of the ($\frac{\omega}{\omega} = 1$) before ($\frac{1}{1} = 1$) is a white hole in which endlessly is born an infinite variety of elementary particles which in turn builds an infinite Universe!

Massive range of space-time continuum from ($\frac{1}{1} = 1$) to end ($\frac{\omega}{\omega} = 1$) — This macro-mega world is a black hole which absorbs an infinite variety of elementary particles, which are endlessly born in microcosm. The macro-World Association of atoms into resistant forms, peace commensurate with man values; organisms, communities of organisms; World makroob'ektov, which sootnosa with the magnitude of the human experience. Mega world is a planet, star systems, galaxies, and the metagalactics-the world of vast cosmic proportions. In macro-mega world interaction density ρ -vz. space and time decreases inversely proportional to the increase in the volume of the universe, and also decreases the magnitude of acceleration (\bar{a}). The volume of the universe grows in proportion to the luminous intensity of interaction (F_{bs}) time and space, simultaneously with a growing mass of substances of the universe as the equivalent force intensity of interaction (F_{bs}).

Each of these worlds is characterized by the originality of the structure of matter, space-time and causal relationships, patterns of movement, and although at different scale levels, the space-time continuum has its own specific patterns, micro, macro and mega worlds are closely interrelated and form a single, infinite in time and space, System-universe.

Because the universe is moving mechanical system, the main characteristic which is the speed that the universe as a whole or any

part of it may not be alone. There are three variants of motion of the universe as a mechanical system:

- 1) the constant increase of its volume;
- 2) rotation around axis;
- 3) system oscillating about the point of equilibrium (zero).

All three movements are performed simultaneously. The universe is constantly expanding and thereat revolves, making one complete revolution per $6 \cdot 10^{13}$ years, also rotate all its constituent parts—the elementary particles (spin), nucleus, atoms, planets, stars, star systems, galaxies, clusters of galaxies. The permanent momentum of structural elements of the universe is their movement relative to each other. Oscillating motion systems will be discussed below.

The energy of moving space-time continuum consists of potential W_n and kinetic W_k interaction energies. Kinetic energy W_k — It is the sum of the progressive W_{noct} and Rotary W_{bp} movement. The law of conservation of mechanical energy States that in a closed mechanical system the amount of mechanical energy remains constant: $W_n + W_{noct} + W_{bp} = W_{noth} = \text{const}$.

Space-time continuum as the essence of the law of struggle and unity of opposites, combines the interaction of two opposites—rest (W_n) and movement (W_k). Therefore, the total mechanical energy of interaction of the space-time continuum is equal to the sum not mechanical types of energies, and their relation, because initially compared the power of two Continua: space (L) — rest and time (t) — movement.

The mass of a substance is growing simultaneously with the rise in the volume of the universe. The mass of a substance is growing and as an equivalent intensity of interaction between space and time, and how potential energy equivalent (with the scale of the universe decreases the acceleration ($\bar{a} = \frac{L}{t^2}$), i.e. simultaneously grows kinetic (W_k) and potential (W_n) energy of the substance of the universe, with the total energy of the universe remains constant:

$$W_{noth} = \frac{W_n}{W_{noct} + W_{bp}} = \frac{0}{0} = \frac{1}{1} = \frac{2}{2} \dots = 1 = \text{const}.$$

Potential energy interaction, unlike kinetic energy, which is always positive, can be in three phases of physical condition: good ($+U\phi$), negative ($-U\phi$) and neutral phase potential energy ($U\phi_0$). Potential energy is the energy situation, which is always relative to a certain level, which is zero, hence the scalar field of potential energy of interaction between space and time can be represented in the form of bilateral plane, one side of which is a positive phase ($+U\phi$), the other side—the negative phase ($-U\phi$) potential energy-State interaction. Zero or neutral phase potential energy ($U\phi_0$) is the surface phase section States the potential energy of the scalar field space-time continuum. The world of the universe is bilateral.

Inaccessible to our direct observation aside bilateral peace we can study on a number of indirect signs of the behaviour of astrophysical objects and created their gravitational effects. Not available for the us side bilateral world—a world of dark matter of about 30% a single two-way world. About thirty percent because we almost completely observe two phases (2/3) of the State of bilateral interaction potential energy scalar field: ($U\phi_0$) — neutral phase, ($+U\phi$) — a positive phase and partially negative phase ($-U\phi$) — antiparticle.

Space-time continuum universe is a solid Wednesday, at each point which in all its extent generally occur zero phase fluctuations and density of bilateral interaction potential energy scalar field. Zero oscillations arise from uncertainty phase State potential energy field in any solid volume Wednesday. The possibility of zero hesitation bilateral potential energy scalar field interaction is provided by the fact that energy field interaction combines the energy situation

and energy of the elastic deformation. Vibrational properties of solid Wednesday, double the potential energy of the scalar field, determined by the availability of positional strength.

Positional strength is such a force, which identifies deviations from equilibrium system. Of particular importance are the restoring forces that arise when the system from equilibrium position. Energizing the opposite direction deviation, these forces determine the ability of the system to make free oscillations. The main type of restoring forces are forces of elasticity. In the simplest case of a linearly deformable system healing power of elasticity is proportional to the deviation of the system. Elastic properties of links with this defined coefficient of elasticity, which is a generalized force can cause generalized a single move.

Oscillating motion is the simplest type of movement inherent in solid Wednesday (spatial-temporary continuum).

Any, even infinitesimal deformation occurred in only one solid point Wednesday, were immediately shifted to the entire solid Wednesday as a whole and on each point separately. This is due to the fact that the position and movement of each element solid Wednesday ΔV determined by adjacent items. These items cannot move independently and chaotically because otherwise solid Wednesday would have formed tears. Thus, if an item Wednesday performs some movement, the neighbouring elements must also perform similar movements, i. e. the movement of all the elements of a solid Wednesday should be consistent!

View the prevailing collective movement of elements solid Wednesday for each scale level of the universe. At the level of physical vacuum is zero oscillations of density fluctuations and phase — bilateral interaction potential energy scalar field on the boundary (surface) of the phases (U_{ϕ_0}) potential energy.

Zero oscillations of small amplitude fluctuations with maximum neutral phase (U_{ϕ_0}) the potential energy of the scalar field create permanent positive shift ($+U_{\phi}$) and negative ($-U_{\phi}$) the potential energy of the scalar field phase relative to each other in the space-time continuum. This leads to a polarization of the scalar field, to the emergence of bilateral interaction potential energy scalar field. Minimum phase angle (φ), When that occurs the polarization potential energy scalar field interaction, is equal to:

$$\min \varphi = 0.4181112128162947 \text{ degrees.}$$

Phase shift is a shift in space moments achieve equal zero, positive or negative values of sine values.

Sine of phase angle minimum scalar field of potential energy interaction is largest fine-structure constant α :

$$\sin \min \varphi = 0.007297352535948453176.$$

Permanent zero phase fluctuations and density scalar field of potential energy, with the amplitude of the oscillations of the fine-structure constant equal (α), create in the space-time continuum of localized scalar potentials-elementary electrical charge-positive ($+q$) and negative ($-q$). Neutral phase State of bilateral potential energy scalar field (U_{ϕ_0}) retaining, separating the elementary electric charge from each other. Thus bilateral interaction potential energy scalar field is converted to an electrical field of the universe. The electric field is a vector field, one of the two components of the electromagnetic field.

Potential energy field interaction combining the energy situation and energy of the elastic deformation is a field of conservative forces. In the space-time continuum (continuous Wednesday), there are four types of conservative forces, four types of fundamental interactions: gravitational, electromagnetic, strong and weak. All these seemingly different conservative forces are a manifestation of the different scale levels of the universe the same generalized force-coefficient of elasticity.

At the heart of conservative forces lies solid elasticity property Wednesday (space-time continuum). Elasticity is the ability continuum experience significant elastic deformation without fracture. The elasticity of a solid Wednesday ensured power elasticity (elastic force). The power of elasticity is the strength that occurs when deformation solid Wednesday and opposing this deformation. In this case, solid deformation Wednesday is the continuous expansion of the universe, increasing its volume under the influence of work force (F_{res}) — force intensity of interaction between space and time, gravitational force expansion. Force expansion (F_{res}) resists elastic potential force-gravitational force (F_G). Thereby avoiding breaks in solid Wednesday. Expansion force (F_{res}) depends on the scale of the universe level: $F_{\text{res}} = \frac{1 \cdot L^4}{t^2} = \frac{0^4}{0^2} = 1; \frac{1^4}{1^2} = 1; \frac{2^4}{2^2} = 4 \dots$ The smaller the volume of the space-time continuum, in which it operates, the less its value and, therefore, the less it against gravitational force (F_G).

At various levels of scale of the universe, the main strength of the generalized space-time continuum elasticity factor manifests itself in the form of weak, strong, electromagnetic, gravitational force. All these forces prevent solid breaks Wednesday at various scale levels of the universe.

Everything in the world has a surface of. Despite this diversity, many surfaces are characterized by one common property: they have an excess of surface energy. Surface phase section (U_{ϕ_0}) bilateral interaction potential energy scalar field is no exception. On the boundary of phases go processes that cause spontaneous reduction of surface energy. Spontaneous reduction of surface energy can cause a variety of physical processes associated with the reduction of surface energy: mechanical phenomena, physico-chemical phenomena, electrical phenomenon, thermal phenomena, consolidation, particle formation of spherical and smooth liquid surfaces. Almost all of these processes are formative, in the space-time continuum of substance arises and related structures.

The internal pressure is a typical manifestation of mechanical processes, caused by the desire for spontaneous reduction of the surface energy. On the curved surface of the liquid (I) raised the internal pressure as the resultant of the surface tension at point a. It is directed perpendicularly to the surface of the liquid inside and reduces surface phase partition to the minimum size. Such a reduction causes a decrease in surface energy. The internal pressure is defined as follows: $\Delta P = 2\sigma/r$, where σ — surface tension on the boundary of phases; r is the radius of the droplet. The smaller dimensions of the drops and higher surface tension, the more intense the internal pressure. Surface tension force is tangential to the surface of the liquid and the perpendicular to the section of the path on which it operates. The force of surface tension is an elastic force replacing the large-scale level of elementary particles, nuclei and atoms, i. e. near the boundary (surface) of the bilateral phase of the scalar field potential energy gravitational force (F_G), which on this scale level is very weak.

On the boundary of phases of bilateral interaction potential energy scalar field along with the force of surface tension plays a fundamental role and the electric vector field. Interaction of electric charges (fields) leads to the distortion of the surface phase section (U_{ϕ_0}). On a curved surface section phases occurs as the resultant of the internal pressure of the surface tensions. It is directed perpendicularly to the surface of the inside section of phases and seek to reduce surface phase partition to the minimum size. Such a reduction causes a decrease in surface energy. Surface tension force is tangential to the surface of the section of phases and perpendicular to the section of the path on which it operates. This explains why

programs with electric charges repel each other, and raznoimënyye are attracted. Surface tension force, aimed at a tangent, with electric charges repel each other, and the resultant-attracts raznoimënyye charges to each other.

As a result, the zero oscillations of the surface phase section (U_{φ_0}) surface tension force, aimed at a tangent, creates a solid Wednesday density waves (ρ_{bs}), order yourself a solid Wednesday.

Interaction of surface tension force and electric field creates in the space-time continuum, a new force field-electromagnetic caused by zero phase fluctuations and density of bilateral interaction potential energy scalar field.

When zero resonance oscillations of the bilateral phase of the scalar field of potential energy surface of the neutral section phases along with the electric field is deformed in such a way that the inside of the deformation in one case turns out to be positively charged side bilateral scalar field and the other negatively charged. This is due to the fact that the opposite phase of bilateral scalar field shifted in space relative to one another when the polarization field. The force of surface tension directed tangential to the surface deformation of zavihreniû leads to a local field potential energy at the point of deformation and deformation of the detachment at the time neutral surface section of phases (U_{φ_0}) force expansion (F_{bs}), gives spin deformation (rotation). Thus the universe is born stuff, a couple of elementary particle-particle and antiparticle. The main role in the time of elementary particles, its separation from the neutral section surface phases plays acceleration (\bar{a}) whose value on this scale level is maximum.

If there are physical vacuum level zero phase fluctuations of the potential energy of the scalar field, then on the large-scale particle-level in addition to oscillating movement rotating movement occurs substances (spin) at higher levels of the scale rotational movement already prevails: the rotation of planets, stars, star systems, galaxies, cluster of galaxies and the rotation of the universe as a whole.

Based on the foregoing, it is possible to calculate what the internal pressure (ΔP) will have a structural element of space-time continuum, as well as calculate its surface and inner energy, if the radius of its volume is: $R = 10^{-35}$ m. Period zero phase fluctuations in this volume of bilateral interaction potential energy scalar field is: $T = 10^{-43}$ sec [2, 21].

Structural volume element is: $V_{(x,y,z)} = [4\pi(10^{-35})^3/3] \text{ m}^3$.

$E_0 = \frac{h\nu}{2}$, where $\nu = 1/T$, then: $E_0 = 3.313 \cdot 10^9 \text{ Dg}$.

Density fields of potential energy of this structural element is:

$$\rho_w = \frac{E_0}{V} = 7.9 \cdot 10^{112} \text{ Dg/m}^3, P = 7.9 \cdot 10^{112} \text{ Dg/m}^3.$$

Knowing the pressure, you can find out the amount of surface tension on the boundary of phases of bilateral interaction potential energy scalar field: $\sigma = \frac{\Delta P \cdot R}{2} = 3.95 \cdot 10^{77} \text{ Dg/m}^2$. Knowing the value of surface tension, you can find out the amount of free energy \mathcal{F} . Free energy is defined as that part of the energy system that can be turned into work: $\mathcal{F} = \sigma \cdot S$, where S — the surface area of the spatial scope of V c radius R , hence: $\mathcal{F} = 4.96 \cdot 10^8 \text{ Dg}$.

If we assume that the coefficient of surface tension (σ) on the boundary of phases of bilateral interaction potential energy scalar field is constant, then with increasing duration of period (T) zero hesitation bilateral interaction potential energy scalar field and the increase in volume (V) of a solid structural element Wednesday free energy on the surface section of the phases grows, while the internal energy density ρ_e decrease. Reducing density scalar field of potential energy interaction leads to the decrease of potential energy in the system of continuous Wednesday. The expansion of the universe leads to

an increase in free energy on the surface section of the phases (U_{φ_0}), in proportion to the surface area grows, the part of the energy of the universe that can be turned into a job. Reducing density scalar field of potential energy with the growth of the volume of the universe is accompanied by an increase in the mass of substances as equivalent potential energy, free energy takes the potential energy of matter from one type to another. The expansion of the universe is accompanied by a conversion of potential energy scalar field in the potential energy of a substance is its mass, the total interaction energy density remains constant. With the growth of the volume of the universe is increasing its free energy (\mathcal{F}), growing power (F_{bs}), ensuring the expansion of the universe. It grows in proportion to the gravity force (F_g). Growing number of substances (m) in the universe—the equivalent of the potential energy (W_n), growing the kinetic energy of a substance (W_k). The total energy of the interaction between space and time in doing so remains the same:

$$W_{\text{full}} = \frac{W_n}{W_k} = \frac{0}{0} = \frac{1}{1} = \frac{2}{2} = \frac{3}{3} \dots = 1 = \text{const.}$$

Zero potential energy scalar field fluctuations create solid Wednesday diverging from the source of disturbance wave density energy field interaction. In solid Wednesday there are two fundamentally different mechanism for the orderly transfer of energy through a surface. First of all, it is the energy density of the form:

$$\rho_e(x,t) = \frac{\rho_0}{2} \left(\frac{\partial u_x}{\partial t} \right)^2 + \frac{Y}{2} \left(\frac{\partial u_x}{\partial x} \right)^2 = \rho_{\text{kin}} + \rho_{\text{bs}},$$

with the speed bias element Wednesday $v_x \approx \frac{\partial u_x}{\partial t}$, described by

contribution to the energy flux density $\rho_e V_x$. The proportion of energy, strictly associated with each element Wednesday as “particle”, was postponed when driving “particles” in exactly the same way as mass and transferred its other characteristics. However, this is not the only possible and not even the main process for the orderly transfer of energy through a surface S_0 , the surrounding element Wednesday volume ΔV .

In traveling elastic mechanical energy flow density of wave j_{mex} can always be expressed in the form of pieces of internal energy density ρ_e the phase speed of the wave v_ϕ . The direction of the vector j_{mex} coincides with the direction of wave propagation:

$$j_{\text{mex}} \approx \Delta \rho_e V_x = (-\rho_0 v_\phi^2) \left(-\frac{1}{v_\phi} \frac{\partial u_x}{\partial t} \right) \frac{\partial u_x}{\partial t} e_x = \rho_e v_\phi e_x.$$

In the expression only of internal energy density ρ_e , not associated with a specific interaction mechanism of elements solid Wednesday. Included in the expression phase velocity of a wave v_ϕ — This is a feature of the migration process ρ_e at any distance, do not depend on x and t .

As a result of running elastic wave becomes meaningful independent type solid movement Wednesday in General, qualitatively different from the motion of particles and already is in no way associated with the movement of solid element Wednesday ΔV . Moreover, the end result is the magnitude of the interaction energies disappears. This indicates that the interaction in solid Wednesday when distributing traveling elastic waves plays a supporting role, providing transfer of internal energy ρ_e with speed v_ϕ . As far as the mass density ρ_0 in equilibrium and related energy density of rest $\rho_0 c^2$, She traveling elastic wave is not migrated.

Creeping elastic wave energy density ρ_e the resulting zero potential energy scalar field fluctuations, order yourself a solid Wednesday—the space-time continuum are gravitational waves [1, 387].

Gravitational waves is a type of “collective movement” solid Wednesday and, thus, this method of distribution of energy in space

and time, which speeds v_ϕ internal energy ρ_ϵ can be moved to any distance without migrating masses. Thus, it is assumed that the “particles” or items Wednesday remain near their equilibrium positions. This “collective” type movement solid Wednesday differs from the transfer of energy by driving a single particle, when simultaneously transferred as mass particles and all related energy.

Gravitational wave-running elastic wave can be represented and how running wave in solid Wednesday, and as the movement of an item Wednesday (particles) are relatively solid Wednesday. On the boundary of the volume ΔV There are surface forces. Deformation element Wednesday they produce work by reducing or increasing the internal energy, concluded Wednesday in this element. From the point of view of an observer to measure the change in internal energy in the volume ΔV , This energy varies regardless of whether it moves whether its density along with the item Wednesday over this element or produce work surface force potential nature.

As a result of zero density fluctuations bilateral potential energy scalar field in the space-time continuum raises periodic changes in curvature (flat in good condition) bilateral surface section of phases ($U\phi_0$) potential energy field interaction. At the point of surface curvature changes section phases will be local increased surface energy due to the increased surface area of the section. The local increase in surface energy activates the spontaneous work of restoring forces, attempting to reduce the surface energy in the place of the local deformation of the surface phase section (Uc_0). Depending on the size of the radius of curvature will either have the force of surface tension of small radius of curvature or gravitational force compression for large radius of curvature. The radius of curvature of the surface phase section ($U\phi_0$) bilateral scalar field interaction may vary from zero to infinity. If the curvature is zero, then the osculating circle degenerates into a straight, i. e. in this case the curvature of the surface phase section ($U\phi_0$) is equal to zero. If the radius of curvature is infinite, then the curvature of the surface phase section ($U\phi_0$) also zero, because a straight line radius of curvature equal to infinity [4, 89].

Between zero and infinity of the curvature of the surface phase section ($U\phi_0$) has a different meaning. Maximum curvature surface section phases will occur when the radius of curvature equal to the fine-structure constant (α). The magnitude of the curvature of the surface phase section ($U\phi_0$) from zero to maximum changes abruptly, this is due to the fact that the zero amplitude fluctuations on the scale of the fine structure constant level has no intermediate values. In the next moment, the curvature of the surface phase section ($U\phi_0$), as a result, zero fluctuations, changes from maximum to zero, then the process is repeated again and again. In tact changing values of surface curvature section phases ($U\phi_0$) changes and the value of the surface energy of the surface section. Therefore, the dumping of excess surface energy (free energy) is not constant, and portions, i. e. the quanta. Any process takes time (per $\Delta t = 0$ nothing happens), therefore it can be assumed that the surface curvature change phases section ($U\phi_0$) at the level of the fine-structure constant is going behind the Planck time, equal: $t_p = 5.39116(13) \cdot 10^{-44}$ sec.

The greatest curvature of the universe scale corresponds to the level of α — the fine structure constant to unity. With the increase in the radius of curvature of surface curvature value indefinitely section phases ($U\phi_0$) will decrease. Surface phase section ($U\phi_0$), and with it together, and the Universe will become increasingly flat.

Large-scale particle level corresponds to the radius of curvature of space from zero to one. On this large-scale density level of interaction ρ_{bs} reaches maximum speed of interaction is equal to: $v_{bs} = 1$, acceleration ($\bar{\alpha}$) between zero and unit-reaches its maximum.

With a radius of curvature of space of more units, acceleration ($\bar{\alpha}$) decreases and becomes less than one. Power F_{bs} — the intensity of the interaction (extension) of space and time, is proportional to the volume of space in which it operates. Volume space from zero to units operating in this volume power expansion F_{bs} — minimal, minimal rejects it accordingly the strength of gravitational contraction F_c . The large-scale particle level plays a fundamental role the force of surface tension.

Consider the physical characteristics of elementary particles with zero volume. Rest mass m_0 such elementary particles is zero, the velocity of a particle is equal to the speed of interaction: $v_{bs} = 1$, the momentum is equal to: $\bar{p} = 1$, acceleration $\bar{\alpha} = 1$. Due to the fact that the amount of elementary particles is zero, then the particle can be seen as moving the local deformation of the surface density phase section ($U\phi_0$) the potential energy of the scalar field is like creeping elastic wave or as a neutral particle.

The intensity (energy) neutral elementary particles with zero volume (traveling elastic waves) is equal to: $\bar{I} = \frac{1}{2} \cdot \rho_{bs} \cdot A_0^2 \cdot \omega_0^2$,

where ρ_{bs} — density scalar field potential energy A_0 — amplitude equal to the fine-structure constant α , ω_0 — the zero frequency fluctuations in the surface section of the phases ($U\phi_0$) bilateral potential energy scalar field. In the equation includes the area (A_0^2) surface neutral elementary particles, rather than its volume, it is said that all the energy neutral elementary particles is focused on its surface and the amount of this energy is directly proportional to the square of the frequency of oscillation of the surface phase section ($U\phi_0$). Energy neutral elementary particles is a free energy can be transformed into a work: $\mathcal{F} = \bar{I} = \frac{(\rho_{bs} \cdot S) \cdot \omega^2}{2}$, where ρ_{bs} — the po-

tential energy of the scalar field density, $S = A_0^2 = \alpha^2$ — the surface area of the elementary particles, ω — the zero frequency fluctuations in the surface section of the phases ($U\phi_0$), $(\rho_{bs} \cdot S)$ — equivalent mass of elementary particles.

Neutral elementary particles (photon, neutron, Neutrino and other neutral elementary particles), whose volume lies between zero to one are gravitational waves with different energy and wavelength.

Gravitational waves with small wavelength reduces surface energy section of phases ($U\phi_0$) solid Wednesday. As a result of the interaction of these waves are formed the elementary particles of the substance of the universe.

Gravitational waves with large wavelength expands the volume of the universe as a whole, thereby reducing the potential energy density fields. Due to the continuous increase in the volume of the universe increases length of gravitational waves, which leads to red offset, the shift of spectral lines of chemical elements in the long wavelength side.

Gravitational waves are the simplest characteristic solid traffic view Wednesday, providing a steady increase in the volume and mass of the universe. While the overall increase in the volume of the universe increased volumes of elementary particles, nuclei and atoms does not occur because the force expansion (F_{bs}) — force intensity of interaction between space and time at this scale level is minimal. Substance increases its volume as a result of the merger of elementary particles in nuclei, atoms, molecules, planets, stars ..., this decreases the surface energy on the boundary of phases.

With the increase in the radius of curvature of the surface phase section ($U\phi_0$) from one to infinity, you change the physical characteristics of the solid Wednesday-the space-time continuum. With increased curvature of the radius of curvature of space of the universe decreases, the volume of space the universe increases, decreases the

acceleration ($\vec{\alpha}$), increases the mass of the substance of the universe. With the increase of the universe grows power (F_{bs}), the larger the volume, the more the force expansion. Proportional to the force (F_{bs}) growing gravitational force (F_G). With the increase in the radius of curvature of space force of surface tension gives way to its work of the gravitational force (gravity).

As a result, the resonance of the gravitational wave with high amplitude of the surface phase is the partition ($U\varphi_0$) and the gap formed black hole. Around the black hole gravitational and surface activity of compression forces trying to prevent this gap is maximal. Surface tension force, the resultant F_G which is aimed at the center of a black hole forms around her gravitational field of attraction (compression). Inside the black hole initial conditions restored ($\frac{\omega}{\omega} = 1$), i. e. a new Universe, which limited the volume of a black hole. In the new Universe, the potential energy of the scalar field is converted to potential energy substances, i. e. born elementary particles, nuclei and atoms, gravitational force expansion F_{bs} makes the generated inside black hole stuff out. As a result, combat two forces, gravitational force expansion F_{bs} and gravitational forces compress F_G , a substance formed within a black hole is concentrated on its surface. As a result, around the black hole is very dense shell of substance, the density of which is many times greater than the density of the substance inside it. The process of the birth of the substance inside a black hole is accompanied by heat radiation under the influence which the real shell black hole heats up. The surface of a black hole is the surface potential energy state phases section, its outer shell has surrounded by solid Wednesday-potential energy scalar field. Therefore, the surface of the black hole possesses a surfeit of surface energy, spontaneous reduction of surface energy leads to a smooth liquid spherical surface of a black hole, as well as to thermal effects: the surface of the black hole (shell) warmed up, resets the surplus energy into the surrounding surface Wednesday in the form of heat, light and other types of radiation. So the star is born. As a result, zero phase fluctuations and density scalar field of potential energy of interaction inside the star is born-elementary particles, nuclei and atoms. This substance is gravitational force expansion (F_{bs}) is imposed from the Center outward, into its shell, increasing its density and volume-star grow inside.

The black hole at the time of birth is shrouded in a large number of substances, in the form of clouds of elementary particles, nuclei and atoms, born simultaneously with it. Under the influence of gravitational forces compress F_G This substance is concentrated around the black hole. The force of surface tension, directed tangential to the surface of the black hole spins concentrating substance around it. Thus, in the universe are born stars, stellar systems and star clusters-Galaxy.

On the basis of the above, with a high degree of confidence we can assume that star in «hollow», their mass and energy are concentrated in the surface layer.

Gravitational radiation (F_{bs}) black holes and gravitational force (F_G) can counterbalance each other making a star relatively stable dynamical system. When the balance of gravitational force stars to consider effect of surface tension on the boundary of phases, centrifugal and centripetal forces, as well as the amplitude of incoming gravitational waves in the area of a black hole (Star) from other parts of the universe. If the balance is broken, one of the gravitational force exceeds another, the star will be destroyed. If gravitational force weakens compression (F_G), gravitational force expansion (F_{bs}) blow off a star from the inside if the gravitational force weakens expansion, gravity compression will bring the star inside.

The assumption that stars of «hollow» inside, finds confirmation in the work of Professor Alexander Mikhailovich Il'ánok "characteristics of hollow Sun (Institute of modern knowledge, Minsk): ... Imagine the Sun in the form of a slowly rotating globe composed of compressible fluids, and carry out an analysis of the classical methods of Newtonian physics. In doing so, let's compressibility of fluids in the form of two components: the Sun shell consists of a fluid with density ρ_1 , and the core of fluid with density ρ_2 . For slowly rotating body that is in hydrostatic equilibrium, symmetric about an axis of rotation in the equatorial plane of the gravitational potential φ can be decomposed into a series. In this case, the compression figures balance Sun is determined only by the even number of members, ranging from $n \geq 4$.

Evaluating only the first member of the series, we use the known findings. Compression σ shape balance claim was made Dr. Stukeley Lyapunov method on the task defines the equality: $\frac{\sigma}{4\pi M} - \frac{\sigma}{5R^2} \int_{r_1}^R \rho(r)r^4 dr = \frac{\omega^2 R^3}{8\pi G}$, where R — the radius of the unperturbed star; r_1 — the radius of the cavity, ω is the angular frequency of rotation of the star. Integrating this expression producing under uniform density distribution $\rho(r) = \text{const}$, get:

$$\sigma = \frac{\omega^2 R^3}{2MG} \left[1 - \frac{3}{5} \cdot \frac{1 - (r_1/R)^5}{1 - (r_1/R)^3} \right]^{-1}$$

If $r_1 = 0$, that is, the mass is uniformly distributed on the volume of the Sun: $\sigma = \frac{5/4(\omega^2 R^3)}{MG} = 2.6 \cdot 10^{-5}$, which corresponds to the classical solution of Newton. If the mass is concentrated in the center of the Sun, then:

$$\sigma = \frac{\omega^2 R^3}{2MG} = 1.04 \cdot 10^{-5}$$

Both of these models do not correspond to experimentally measured value of the compressibility of the Sun equal to: $5.21 \cdot 10^{-5}$.

Substituting in the expression obtained experimental compression value Sun, find: $r_1/R = 0.763$.

This result shows that already in the first approximation, the only solution to compress the Sun is redistributing its bulk on his shell. Refine these results by using makrokvantovuú model hollow Sun. Introduce the terms of immutability of the volume of the Sun

as a hollow object: $V = \frac{4\pi}{3a^2} R_0^3 \left(1 - \frac{r_1^3}{R_0^3} \right) = \text{const}$, where R_0 , r_1 —

Accordingly, the outer and inner shell radius of the Sun; $\alpha = 1/137.036$ — the fine structure constant. It follows:

$r_1/R_0 = (1 - \alpha^2)^{\frac{1}{3}}$, the thickness of the shell of the Sun is equal to:

$$\Delta R_0 = \alpha^{\frac{2}{3}} R_0 = (1/26.5802) R_0$$

Under these conditions the average density of Shell Solar will reach 12.97 g/cm^3 , which at times exceeds the calculated 9.21 the average density of the Sun throughout the volume. A direct experimental proof of the solar shell such density is the density of her match with an external Earth's core. The Sun like the Earth's core is shown in the figure. On distribution of seismic waves found that Earth there are outer and inner core. Outer core starts at a distance of 1217.1 km . from the center of the Earth, and its density at reference data is 13.012 g/cm^3 . Error in the difference of the densities of the Sun shell and core of the Earth is 0.3 per cent. It is important that at these depths design temperature is $6200 \div 6300 \text{ K}$, that matches the temperature of the Sun shell 6282 K .

Any surface phases section there is an excess of surface energy. Free energy at the surface of the Sun is made up of two components:

the size of the surface tension and the surface area of the section, i. e., the surface area of the Sun: $F_{\odot} = \sigma \cdot \Delta S_{\odot}$. Surface phase section (surface of the Sun) has some thickness: ΔR_{\odot} . With constant magnitude of surface tension on the boundary of phases the magnitude of free energy will be more on the outside of the surface of the Sun, because the outer surface area of the Sun more. This is confirmed by practical observations. The outer layer of the Sun's atmosphere (Corona) has a temperature above 1 000 000 °C, while the visible surface of the Sun (the photosphere) has a temperature of only about 6 000 °C.

Acoustic Research inner core of the Earth shows that throughout the outer Earth core 1217.1–3485.7 km. are completely absent acoustic transverse waves and longitudinal only exist, which is typical only for liquid and gaseous Wednesday.

Based on the fact that the Earth is the Sun like the nucleus, it can be assumed that in the Centre of the planet to be a black hole. Substance resulting inside a black hole, under the influence of gravity waves of expansion is made from black holes to the outside, forming around a black hole, a shell of matter. The constant increase of the shell of a black hole is accompanied by her spontaneous heating, resulting in hot core of the planet with a black hole inside. Because the Earth is a dynamic system, balance the interaction of gravitational forces of compression and expansion changes periodically, resulting in periodic cooling and heating up the planet's core. During cooling the upper layer cools faster kernel internal layers, consequently formed hot core covered with cold crust. During a warm-up weight and volume growing planet, consequently the cold upper crust of the planet crack and moved apart, exposing inner layers of the planet. Gravitational waves extending outwards from the center of the Earth, are reflected from solid, cold the Earth's surface and changing its direction. As a result of the interaction between direct and reflected the gravitational wave resonance, i. e. increases the amplitude of oscillation of a gravitational wave, which leads to the volcanic activity and the formation of negladvogo relief of a surface of the ground.

Due to the constant growth of the mass and volume of risk become a star from the Earth grows, and grows exponentially. Modern research scientists confirm the above: for the past 2.5 billion years of warm and cold era alternated, with warm accounts for more than 80 % of the time [3, 36].

An overview of the results of the statistics on binary stars shows the frequency distribution. Among G-dwarfs it is $60 \pm 6\%$ among k-dwarfs — $45 \pm 4\%$, and among the more massive stars (Giants and blue main sequence stars) double frequency is close to 100 %. It has long been clear that double stars — not uncommon and regularity in Star world. The question arises whether there are generally solitary star? So far, it was thought that Yes, there are. As an example, led the Sun, knowing that its planetary system does not give rise to «enroll» in the category of double and multiple stars. But this is not the case. The solar system is no exception. The solar system is a system of two stars. One star — Sun, the second star — Land.

Proof that this is the case, is the work of Vitaly Filippovich Blinova: «Growing Earth: from planets in stars», 2007 y.

«... Our planet Earth is growing over time increases the radius of the Earth, the surface area, mass. And the more the land becomes, the faster it grows. Empirically, according to various estimates, exponential increase in law set the radius of the globe from time to time. At present, the growth rate is maximum, the Earth's RADIUS is increasing at least 2 centimeters per year. If all layers of the globe grew at the same rate, its growth will not soon be found. But the remarkable feature of the Earth's growth is that the deeper layers increases with greater speed than less deep. Solid Earth's crust is not a

raspuhaúšie creature inside and bursts. Shards of old crust sprawled around the globe in the form of the modern continents and between them appears and grows new, so-called oceanic, the young bark.

The bark Ocean differs from the crust of continents by age, composition, density, texture, thickness. Age of the most ancient breeds of continental crust is greater than 4 billion years old. Age of the most ancient rocks of the oceanic crust is only about 200 million years. Cora continents consists of granite and basalt layer, the bark of the oceans-only from basalt. The density of basalt is greater than the density of granite, and the underlying mantle crust density is even greater. For this reason, the Earth's crust is located on top of the mantle, and not vice versa. Continental crust thickness 35–70 km, the thickness of the oceanic crust 5–10 km. If you take a globe and cut all the oceans, the remaining continents almost seamlessly into a single easy to connect the Mainland to the balloon radius of almost one and a half times less than the current size of the Earth. Once, about 200 million. years ago, the Earth was this. The oceans were not. Were small sea, the bottom of which was the same continental type. So much water as it is now, 200 million. years ago, was not on the Earth. When the substance of the mantle rises to the surface of the Earth and converted into the Earth's crust, is degassing and dewatering. Gases are entering the atmosphere, and water fills the ocean. About 10 % of the weight of the substance of the mantle is water. When a certain area of oceanic crust of the stuff 10 km thick mantle stands out so much water that it covers this area of the layer thickness of about 3 km. Thus, simultaneously with the building area of oceanic crust occurs and the build-up of water column of the oceans. Continents and oceans, ancient, their bottoms and water, there were geologically recently. But the land grew until it oceans, albeit more slowly. In dookeaničeskij stage of growth of earth crust mainland type simply utončalas' without substance mantle to the surface of the Earth. Zone stretching the crust only led to a decrease in relief. This fall, surrounded by almost all parties quickly filled hills, sand and clay. Power of sedimentary layers reached tens of kilometers. At a depth of these sediments turned into firm, not loose, breed. These powerful kristallizovannye and cemented sedimentary rock strata built up area of the continental crust.

On all continents, there are the so-called kernel is very ancient rocks, which like rings on a tree trunk cut about rings and lenses of the continental crust of younger ages, pointing to a gradual increase in the area of the world in the dookeaničeskij period the growth of the Earth. For the first time, 200 million. years ago, the growth rate of the Earth reaches this size, that the rate of build-up area of continental crust has become less than the speed the build-up area of the globe. In the area of the present Pacific first rises to the surface of the substance of the Earth's mantle. From this moment begins the oceanic phase growth land. The global system is formed the so called mid-ocean ridges, where the old crust at odds in hand, and mantle substance goes directly to the surface of the Earth, vented, dehydrated and solidifies, forming a strip of new crust along this Ridge.

A remarkable property of frozen rocks is that they remember the direction of Earth's magnetic field at the time of solidification. A remarkable property of the Earth's magnetic field is that the North and South poles, quite often, a geological scale. This allows pretty exactly where and how many naroslo oceanic crust for a period of geological time, as well as determine the speed of her rise in a geologic time.

Currently, the mid-Atlantic Ridge during the year growing streak of new crust up to 1.5 cm., and in the Pacific mid-ocean ridge system speed 2 crust reaches 9 cm. per year. If we assume that while increasing the size of its Land mass is not increasing, with increasing radius

of the globe gravity on the Earth's surface should decrease. Change of gravity, thus, should be very noticeable. For example, 200 million years ago, when Earth's RADIUS was 1.5 times less gravity on the Earth's surface must be more than in 2 times more. But it was at this time on Earth was the heyday of huge dinosaurs, which at the present Earth would weigh tens of tons. Some instances — up to 80 tons, and when his weight for such a fragile skeleton could navigate the current Earth with great difficulty, if at all, could not move in water. And give them 2 times a large force of gravity! There was no more in ancient times the force of gravity on the Earth's surface. On the contrary, as

evidenced by: gigantizmom ancient gigantizmom ancient plants and animals. While plants with grassy trunk reached a height of several tens of meters, and steeper slope angles fossils of sand and a number of other facts suggest that the force of gravity on the surface of the ancient earth was considerably less, as it is smaller, for example, on the surface of the moon. In a number of planets in our solar system, we are seeing the same pattern-the bigger the planet, the more Earthlike gravity at its surface. It is expected that the growth of the Earth is not a unique phenomenon in the universe. In a number of other Earth-like planets, the Earth is nothing special does not stand out».

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Section 10. Philology

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Lexical Interference in English-Finnish bilingualism

Abstract: The aim of the article is to determine the specific features of cross-language interference functioning, fixed in the speech of the English-Finnish bilinguals. The object of the study is the process of lexical interference manifestation under the Finnish-English bilingualism. The main aim of the article provides the following tasks: determining the particularity of the concept of the term ‘interference’, the consideration of the implications that cause this phenomenon, and analysis of lexical interference existence in the context of the Finnish-English bilingualism.

Keywords: bilingualism, interference, language situation, sociolinguistics, sociophonetics, Finnish.

A number of fundamental works, in which linguists indicate the necessity of the in-depth and comprehensive study of the language functionality characteristics in a dynamic assimilation of cultures in terms of a multi-ethnic society, reveal topical issues of the language contact theory, borrowings and bilingualism (V.I. Belikov, Z. M. Bogoslovskaya, U. Weinreich, A. Wierzbitskaya, V. Vinogradov, T. G. Vinokur, J. Gumperz, M. Johnson, A. I. Domashnev, W. Labov, J. Lakoff, A. Schweitzer, G. V. Stepanov, E. Haugen, L. Schatzman, T. Shevchenko, R. O. Jacobson, V. N. Yartseva and others). The notion of language as a single holistic formation has changed since scientists came to understanding of the whole diversity of a language structure, due to linguistic and extralinguistic factors.

The main conditions, under which the language functionality undergoes internal and external changes, are indicated in the linguistic conception of Ferdinand de Saussure, who delineates the language system and the social nature of language, highlights the characteristic features of “language” and “speech” terms, presents the study of language in synchrony and diachrony.

It is noted that when the language operates in the natural and socio-cultural environments, different from the original ones, a natural process is the emergence of language variation in the communication process.

Thus, in the monograph of U. Weinreich “Languages in Contact: Findings and Problems”, published in New York in 1953, “cases of deviation from the norms of the language occurring in bilingual speech as a result of ownership of two or more languages, i. e. as a result of language contact” [4, 34] are described, which led to the emergence of a new concept within the scientific field of linguistics studies — cross-language interference.

It is known that in linguistic literature, the term itself was first introduced by the representatives of the Prague Linguistic Circle in 1948 and further the interference phenomenon aroused interest of many scientists. Interference analysis was reflected in the works of J. Baudouin de Courtenay, M. V. Vereshchagin, A. Diebold, A. E. Karlynsky, N. B. Mechkovskaya, V. V. Klimov, V. Y. Rosenzweig, E. Haugen and L. V. Scherba.

It is supposed that linguistic interference should be understood as interaction of contact languages, which might be either negative

or positive and is expressed by: a) deviations from the norm in one language under the influence of the other one (negative interference); b) acquisition, consolidation and strengthening of skills in one language under the influence of the other one (positive interference). In other words, linguistic interference is a kind of “intervention of elements of one language system to another, which might be both constructive and destructive” [10, 105].

Another definition of interference, is proposed by V. A. Vinogradov and accentuated in the “Linguistic Encyclopedic Dictionary” edited by V. N. Yartseva: “Interference (lat. *inter* — «each other», «mutually» and *ferio* — «to touch», «to hit») — is language systems interplay under bilingual environment, emerging either from contacts of two languages, or due to the individual assimilation of the non-native language; interference is expressed in deviations from the norm and the second language system under the influence of the mother language” [6, 325].

Investigations conducted suggest that the phenomenon of interference is represented at all levels of the language system. There are many approaches to the definition and classification of interference. V. V. Alimov in the manual “Interference in Translation” offers the following types of interference: — phonic (phonetic, phonological and sound-reproducible); — grammatical (morphology, syntax and punctuation); — lexical; — orthographical; — semantic; — stylistical; — intralinguistic [1, 66].

A. D. Petrenko in the work “Social Phonetic Aspects of Language Variation” gives “evidence of bilinguals usage of different phonetic systems with overlapping characteristics’ that further allows ‘to predict the phonetic form of interference” [11, 156].

According to U. Weinreich, under grammatical interference “the identification of the morpheme or grammatical category of the language A with the morpheme or category of language B” takes place [3, 36]. The speech of bilingual speakers undergoes changes due to the transfer of grammatical categories of one language to other significant parts of words of the other language.

Under lexical interference are primarily meant “all the changes, provoked by the cross-language links in the lexical inventory composition, as well as in functions and usage of the lexical-semantic units in their semantic structure” [7, 129].

In addition to the above-mentioned classification, depending on the “direction” of the situation of communication, interlingual interference might be – positive, negative, or two-way; according to the type of speech activity of a communicant — impressive (receptive) or expressive (productive); in the form of manifestation — the interference of the first or second language, overt or covert; intralinguistic (internal) or cross-language (external) — depending on the “origin”; according to the nature of a native language skills to a foreign language study — both direct and indirect; complicated, volatile or destructive — as a result of obtaining a certain result of speech activity; and extralinguistic: realities, body language, non-verbal behavior, ideology [8].

V. T. Klokov highlights cultural and lingvo-cultural interference. According to the author, in cultural interference “the transfer of some behavior stereotypes, certain norms, ideological concepts, as well as linguistic means of communication peculiar to the native (transmitting) culture is made” [9, 113]. In interference of lingvo-cultural character “the transfer of the part of the linguistic and paralinguistic elements of the native language, which in some way are connected with the extralinguistic elements of culture, is made” [9, 114].

Interference viewed as part of sociolinguistic areas of linguistics by J. Bagan in the work “Contact linguistics” is directly related to the functions of language and its social status in a multilingual society, which leads to the emergence of another type of interference — a sociolinguistic one [2].

Social dominance of one language over another is determined, as a rule, by the state language policy, and is considered to be a variation with respect to the norms of the linguistic situation in the country in which the language and form of the language are strictly selected and used only in certain localities, communities and under special circumstances (territorial and social stratification language and speech) that, in turn, confirms the existence of so-called situational (or contextual) interference [2].

It is noted that situational interference depends on the social position of not only the languages used at the time of speech contact, but also on the social status of speakers, as well as the situation of communication at the time of communication. For example, living in the city or in the village, belonging to a certain type of activity, profession, age, level of education and mentality may also lead to differences in the tendency to perpetuate the interference in the contact languages [5, 269].

Taking into account the theoretical principles and practical achievements in the field of interference, it is possible to analyze the most typical manifestation of lexical interference in the context of the English-Finnish bilingualism (contact language English).

Examples of **Nouns** interference (Eng-Fing-Rus): *an accident* — *accidentti*; *a battery* — *patteri* (батарея); *a billion* — *biljoona* (миллиард); *a book* — *ruuka* (книга); *butter* — *putter* (масло); *canine* — *kaniini* (клык); *etiquette* — *etiketti* (этикет); *a hamburger* — *hampurkki* (гамбургер); *a hotdog* — *hoddari* (хот-дог); *harmony* — *harmonikka* (гармония); *house* — *haussi* (дом); *liquor* — *likööri* (ликёр); *a motorist* — *motorist* (автомобилист); *a novel* — *novella* (роман); *a park* — *parkki* (парк); *petrol* — *petrol* (бензин); *public* — *puhlikki* (общественность, публика); *a telephone* — *telefooni* (телефон); *risk* — *riski* (риск); *a sweater* — *veteri* (свитер).

Examples of **Verbs** interference (Eng-Fing-Rus): *to boot* — *vuutata* (надевать ботинки); *to save* — *seivata* (сохранять); *to print* — *printata* (печатать); *to chat* — *tsätätä* (болтать); *to format* — *formatoida* (форматировать); *to edit* — *editoida* (редактировать); *to bach* — *pätsätä* (жить самостоятельно, вести холостяцкий образ жизни); *to run* — *runnata* (бежать); *to talk* — *tolokata* (говорить); *to go upstairs* — *upsteelle* (идти на верхний этаж); *to park* (нарковаться) — *parkata*; *to rollerskate* (кататься на роликах) — *rollerskataa*.

Examples of **Adjectives** interference (Eng-Fing-Rus): *smart* — *smartti* (умный); *isolated* — *eristetty* (отдельный, изолированный); *legal* — *laillinen* (правовой, юридический, легальный); *lazy* — *laiska* (ленивый); *rich* — *rikas* (богатый); *sore* — *sairas* (болезненный); *tragic* — *traaginen* (трагичный); *stylish* — *tyylikäs* (стильный); *weird* — *vieras* (странный); *exact* — *eksakti* (точный); *global* — *globaali* (глобальный).

Examples of **Interjections** interference (Eng-Fing-Rus): *hey* — *hei* (эй); *okay* — *okei* (хорошо); **Pronoun:** *he* — *he* (он); **Neologisms:** *phone + tablet = phablet* (смартфон с сенсорный экраном с широкой диагональю); *gay + boy = gayбу* (ребенок, воспитывающийся в однополых семьях); *blog* — *vlogi* (видеоблог); *grey + beige = greige* (серый и бежевый цвета); *fame* — *feimi* (известный, благодаря социальным сетям); *chick lit* — *timmikirjallisuus* (развлекательная литература для девушек).

The presented examples reflect the interference processes, that take place in the English and Finnish languages, resulting in the enrichment of modern contact “hybrid language” Finglish with new lexical units. There is a tendency to absorb by the recipient language lexical elements of the native language of the speaker and the emergence of neologisms in the live speech of communicants.

Interest of modern linguists in interference issues in the context of bilingualism is rather obvious, therefore, the implementation at the other levels of the language system (phonetic, grammatical, sociolinguistic) of represented in the article linguistic phenomenon needs to be further studied.

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Section 11. Philosophy

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To the problem of moral harmony

Abstract: The article devoted to understanding the processes of transformation of public morality. Author specially stopped on the morality of the middle class, as a naturally phenomenon, and shows how utilitarian morality of the middle class becomes a means of resolving a moral dilemma «success or virtue».

Keywords: moral dilemma, moral harmony, egodikeia, elite, utilitarian morality.

We notice that morality is transformed. It is quite natural processes. But how and where it is transforming? And by what measures themselves to measure? Torment moral choice is especially common among people who are forced to periodically make responsible decisions.

After all, whom much is given, much will be called to account. It is possible, therefore, to understand any person with active life position, hoping to build such a system of relations and ethical norms, in which he would be comfortable.

Where to find these rules, as the crisis in the spiritual sphere smote all mankind? Our time can be called the epoch of the collapse of metaideas. Several mass ideologies, more recently, quite acceptable to the majority of the world's population today is written off to the scrap, as the used equipment. These are already there, and new ones yet.

Spiritual entropy increases. For someone in this situation continues to be a need in development of solid and understandable picture of the world, and someone, and such, probably most, looking for answers to the question “how to live in good conscience?”. Moral harmony comes the end, when one of his actions pays discharged himself moral bills.

We are talking about the moral justification or Egodikeia. Egodikeia in this regard is a moral self-reflection, which aims search convincing performance consistency ethical background of specific actions and relevant to that person's moral precepts. This behavior is characteristic first of all, for those who are seriously concerned about finding ways to resolve internal moral conflicts.

Even Kant wrote about the paradox of happiness and virtue. Its essence is the following: people who are not burdened with moral duty, faster succeed. You want to be successful, forget about morals; I want to be moral, forget about success. Thus, cheats and cynics are triumph, and virtuous citizens are failing.

This is particularly evident during periods of social upheaval, powerful social transformations. The situation is exacerbated in the case of a sudden extra “democratic freedoms”. Gin, long suppressed brutal instincts, breaking out of the bottle begins to destroy everything. The transition from authoritarian regimes to liberal (or pseudo liberal) accompanied, as a rule, the fact that all want as quickly as possible to gain access to the benefits that previously relied only the elected.

Looking around, one notices that in this race for the benefits start winning those who managed to throw the chains of the moral

precepts and prohibitions. So it is easier to flee. Anyway, at first. However, after some time among the winners there are people, which begin to speak sincerely, having in mind not their wallet and their good name. They form the backbone of the new elite establishment. They believe, they want to emulate. Look at them with admiration. They were able to resolve the paradox of happiness and virtue. There is no need to ask them about their secret.

It is obvious: the resolution of this paradox, this main contradiction moral consciousness, is in the realm of so-called utilitarian morality. The basic principle utilitarian morality says: to be honest profitable. Good name, too, has a market value. They can be traded.

The lawyer, who for ten years he worked flawlessly from the ethical point of view, actually turned his name into the capital. Now he has no difficulty finding the customers. A businessman, who did not violate any agreements with partners, now has no problems with loans for any amount of money at low interest rates. Everyone wants to cooperate with him. And so on.

Utilitarian morality is, first of all, the moral of the middle class. These people are the most socialized. In the sense that included a greater number of social ties and relations. This class lives, mainly, at the expense of their labor. Morality need it as a means of survival. It is only at the very top or, on the contrary, on the lower level of the social hierarchy, people can afford to be morally, putting itself beyond good and evil.

The lumpen have nothing to lose (it now even chains no, and the high and mighties of this world depend only vital (in the end, and they are mortal and are guided solely by the internal beliefs).

Genetically utilitarian morality grows out of the total amorality, the state of “war of all against all”, where the main principle of life — homo homini lupus est (dog eats dog). We must assume that the following utilitarian morality stage — absolute morality, where the morality of a person becomes a goal in itself, i. e. it cannot be a means to something else. Accordingly, for each stage needs to have its own personality type. The basis for the classification is the focus on preferential satisfaction of a certain type of needs. Accordingly, total amorality assumes the identity of the biological type, utilitarian moral, social, and unconditional moral, spiritual.

Utilitarian morality is convenient that its orders, in contrast to absolute morality, flexible enough to maintaining internal moral harmony, to write your verdict on the resolution of moral dilemmas. Norms absolute morality are characterized by extreme rigidity. They cannot “push”. As said Lao Tzi, “noble man with honest

people do honestly, and with dishonest ... too honest". Three types of morality, despite the logic-genetic link between them, do not negate each other, and with the need to co-exist next. This segment

of one common ethical system that is subordinated to a certain global law. To understand this law is the task of the future socio-philosophical studies.

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The question of critical re-evaluation of theological interpretation of the anthropic cosmological principle: paradoxes of the "finalist anthropic principle" of F. J. Tipler and J. Barrow

Abstract: in the article, perhaps, the most paradoxical — in the context of scientific thinking — formulation of "the anthropic principle", meaning the "finalist" formulation, is critically analysed. However those paradoxes and contradictions to which F. J. Tipler and J. Barrow's concept led, show basic impossibility of use of scientific data as proofs of religious dogmas.

Keywords: anthropic principle, "finalist" formulation, science, theology (divinity), religion, "Omega point".

Within the covers of the "European science review" magazine we already made an attempt to make some contribution to philosophical re-evaluation of the anthropic (in other transcription — anthropological) cosmological principle. (Briefly we will remind its natural-science sense, giving its definitions from the "Astronomical Dictionary" and fundamental "Physical Encyclopedia". "The principle in cosmology, according to which the intelligent life in the Universe is a necessary consequence of its fundamental properties" [1]. "People distinguish the weak and the strong types of the anthropological principle ... The essence of the first one is that our place in the Universe ... is nevertheless exclusive in the sense that it has to be compatible to our existence as observers. ... According to ... (to the second one, i.e. «strong» — my note) the Universe, physical laws, which operate it, and its fundamental parameters have to be such that in it at some stage of evolution the existence of observers (mankind) was allowed" [2, 348]. That means — we gave grounds for the thesis that if not to distinguish (and rather "to mix") its scientific and religious interpretations, both scientific character and religiousness as such simply disappear located, turning into "pseudoscientific mysticism" [3]. We shall not repeat the facts, considered in the previous article, and will provide vivid words of F. Hoyle, which can be called the motto of the position that we criticize: "sensible interpretation of the facts gives the chance to assume that in physics, and also chemistry and biology the «superintelligence» experimented and that in the nature there are no blind forces deserving attention" (quote of [4, 141]). We realize that this tradition, which we criticize, traces its roots to many classics of the European natural sciences. For example, when the chaplain R. Bentley appealed to I. Newton to help to prepare the sermon on the subject "Atheism Denial" — relying on scientific knowledge of the "Universe structure"! — the great physicist sent him four detailed letters with explanations. In the first of them he wrote: the harmony,

surprising coherence of this "structure" "on my belief can hardly be explained with only one natural reasons and therefore I am compelled to attribute such transformations to the plan and pro-thinking of the certain agent being able to think" [5]. Therefore the following assessment of the Newton principle, that R. Cotes, a friend and a colleague of R. Bentley, gave in 1713, is not surprising: "Newton's works represent the most right protection against attacks of atheists, and not to find the best protection against impious gang" anywhere [6, 21]. Another example, we can provide, is the compatriot of I. Newton, R. Boyle. As the prominent modern Russian social thinker and the philosopher of science S. G. Kara-Murza writes, this great physicist and chemist "could not help thinking of the necessity to break evidentially the arguments of supporters of atheism" [7, 98], and, according to R. Boyle, "only the science based on supervision, experiment and mathematical calculation could rescue values of Christian religion" [7, 98]. If the reader compares these thoughts to the attempts of theological interpretations of the anthropic principle that we considered in the previous article [3], he will see that the similarity is great. We can bring more and more examples of great scientists, "standing in this row", but thoughts, which have already been considered, are enough in order that the reader had such question: "why then we criticize theological interpretations of modern discoveries, in particular, of the anthropic cosmological principle"!? Without repeating earlier provided arguments (see [3]), we will formulate a new one, related such kind of formulation of this principle as "finalist" (this option is alternative to "weak" and "strong" formulations which were briefly provided in the beginning of the article, and also to the "principle of partnership"). "The finalist anthropic principle" was introduced by the American cosmologist and mathematician F. J. Tipler and the English astrophysicist J. Barrow in their work of 1986 "The anthropic space principle" [8]. In the previous article we quoted the book by

F.J. Tipler written in 1994 — with the indicative name “Physics of immortality. The latest cosmology, God and revival from the dead”! — as an example of theological interpretation of the specified cosmological principle. For example, he calls theology “part of physics”, specifying that representatives of the latter “can prove the existence of God with their calculations” [9]. But the “finalist” (also called “final” or “eschatological”) formulation of the anthropic principle made by F.J. Tipler together with J. Barrow brings new, paradoxical sense in theological perspective. A. V. Nesteruk, as well as Yu. V. Balashov and S. V. Illarionov translate and formulate this “finalist principle” as follows: “the generation of information which began in the Universe in the form of reason will never terminate” [10, 194]; “in the Universe there has to be a reasonable information processing, and, once having arisen, it will never stop” [11]. Notably, as A. V. Nesteruk notices, “intelligent life” is not identified by F.J. Tipler with “human life”, it “is associated with the computer realizing some program” [10, 194]. In confirmation of this the Russian researcher of the anthropic principle provides the following words of the American cosmologist: “the living being is rather a submission of a certain program, than the program in itself” [10, 194]. Already at this point we see a divergence with modern science (which most challenging theories do not “extend” the qualities of “living” or “reasonable” to computers, etc.), as well as with traditional divinity (which can not estimate the idea of “living as a program” differently as “heresy”). Upon further consideration of the F.J. Tipler and J. Barrow’s concept, the well-known saying “the deeper into the wood you go, the more timber seems to grow” comes to mind: i. e. this divergence (both with provisions of science, and with divinity doctrines) cardinally amplifies. After all, on the one hand, the Universe is creation of God (therefore its fundamental indicators are so uniquely coordinated that promote existence of life). But, on the other hand, God doesn’t exist yet! (sic!). He will result from evolution of the Universe, and will create the world “in the past”, having destroyed it in the present. As in this regard Yu. V. Balashov and S. V. Illarionov write: F.J. Tipler and J. Barrow carried out “the prediction, unusual to physics based on a hypothesis of almost Teilhard plan of future destiny of our Universe” [11]. A. V. Nesteruk formulates idea of the future — according to the principle of finalism — as follows: The Universe contains “the «Omega point» as

final in which world lines of all events will merge and all horizons will disappear” [10, 194]. As we can see, all three quoted Russian authors draw a parallel between “the anthropic finalist principle” and P. Teilhard de Chardin’s concept (“Omega point” is the main concept he introduced). This “parallel” seems not quite reasonable to us and we will prove why. P. Teilhard de Chardin, the prominent philosopher, scientist-palaeontologist, and at the same time the priest and Jesuit, begins his main work — “Phenomenon of the person” — with such words: “to understand this work correctly, it should be considered not as metaphysical and all the more not as the theological tractate, and exclusively as a scientific work” [12, 136]. And acquaintance to this work confirms correctness of these words. This means it is possible to tell that Teilhard — unlike many of those authors that interpret the anthropic principle in line with theology — “doesn’t mix genres”: i. e. he doesn’t try to prove the existence of God by means of scientific arguments, and, in turn, doesn’t try to use religious doctrines as scientific arguments. He clung to it — as paradoxical as it seems! — even when he was developing the theory of a noosphere innovative at that time. According to Teilhard, formation of a noosphere is the result of impact of action of God conducting the world to association with itself — he called the moment of such association “the Omega point”. As the Russian researcher G. B. Gutner writes, after that “all tendencies to disintegration and isolation will be overcome, and the mankind will turn into the uniform reasonable organism which will be in absolute harmony with the world” [13, 24]. This idea — despite the seeming paradoxicality — doesn’t contradict traditional ideas of Christianity, as well as Teilhard’s thinking of the person doesn’t contradict scientific thinking. As for the sense, which is F.J. Tipler and J. Barrow put in the concept of the “Omega Point”, it contradicts both dogmas of religion, and scientific thinking. We will remind the reader that by this “Point” they meant the emergence — as a result of evolution of the Universe — of a certain Supersanity, “God” who somehow “will create” the Universe ... in the past (!), “having closed” thereby the “cycle”. In our opinion, F.J. Tipler and J. Barrow developed this difficult, sophisticated, paradoxical construction to try to overcome the “gap” between natural sciences and religion. However those paradoxes and contradictions, to which this attempt led, show basic impossibility of use of scientific data as proofs of religious dogmas.

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G. Shpet and hermeneutics

Abstract: Article purpose is to show the significance of the ideas of Shpet for the development of Russian philosophy and the Russian hermeneutics. Particular attention is given to the relationship of word and personality in the process of understanding. The emphasis is on the relevance of hermeneutic developments of the thinker for the present.

Keywords: philosophy, science, hermeneutics, postmodernism, the word.

The name of the philosopher Gustav Gustavovich Shpet became known to a wide range of readers interested in the problems of philosophy relatively recently — in the first years of perestroika. In 1989 in the Appendix to the magazine «Questions of philosophy» such important for the comprehension of the philosopher's creativity works as «Sketch of the development of Russian philosophy», «Aesthetic fragments» and «Introduction to ethnic psychology» were published. Despite the long oblivion of the name of Shpet, the presentation of the development of philosophy in Russia would not be complete without acquaintance with his works. Shpet made an indisputable contribution to Russian and world culture in general by his research in philosophy, psychology, aesthetics and linguistics.

Shpet believed that science could never and cannot exist without the support of philosophy. He wrote: «Scientific views and any ideology should rely on the philosophical foundation for there is no other knowledge about the principles» [1, 36]. According to Shpet, philosophy also cannot exist without the spiritual creativity, penetrating to different spheres of human existence. He believed that modern development of humanity has come to a new, significant stage in the development of science and philosophy. In this favorable situation, the philosopher said, «we can at least identify requirements that philosophy must meet as a “basic science”» [1, 37].

In his conception of philosophy Shpet explicitly relied on the ancient tradition. Philosophy for him is «free, pure, absolute philosophical knowledge» [1, 37]. In many respects the philosophy of A. Bergson was consonant for him. Shpet's ideas that only reasonable and only intellectual approach to understanding of the world is limited, resonate with the intuitivism of a French thinker. He believed that only peering into the variability of the sensory world we touch the essential, the eternal principles of life.

Nowadays of special interest are his works on the development of philosophy in Russia, as well as difficulties in understanding of a language, of a sign. Shpet made his original contribution to the formation of such a science as hermeneutics, which became especially topical since the second half of the XXth century in connection with the appearance of post-modernism. As it is known, one of the important features of «postmodern sensitivity» is increased attention to the cultures of different countries and peoples. Postmodernism is characterized by the absence of a unified style: eclecticism becomes the fundamental attribute of new culture. In this regard, the issues addressed to postmodernists, closely drawn together with the development of the hermeneutic interpretation of history and art. Purely postmodern forms of hermeneutics- hermeneutics of suspicion and hermeneutic of deconstructivism are even formed.

In this connection, Shpet's works written in 1917–18 («History as a matter of logic» and «Hermeneutics and its problems») are especially interesting. The importance of philosophy for understanding of history and problems of cognition are indisputable for Shpet. His words that the notion of science only according to the

model of mathematical of science is limited as actual till now. In philosophy as a special form of knowledge its dialectical nature, «joint thinking in the true and full meaning» [1, 191] are important. «Philosophy had one subject — specific; subject of concrete reality» [1, 192] — said the philosopher. The highest manifestation of specific things are social and historical things. A historical torrent appears in all its complexity, in all its diversity. Scientists try to solve the problem of skill attainment of the diverse torrent. Shpet believes that empiricism with its limited understanding of the experience cannot cope with this task. «Experiencing does not see «eye», «mind», — eye is its obedient tool» [1, 197] — said the philosopher. Considering the various manifestations of expert knowledge of history, Shpet emphasizes the importance of skill in observation, experience, and understanding. «Cognition begins with the moment of reading and understanding of this word. To be able to observe and be able to read means the same in empirical cognition: to be able to understand the meaning of the verbal sign that points to the corresponding part of the reality» [1, 229]. Thus, a word as a sign gains in the process of understanding the utmost importance. Hermeneutics becomes the theory of cognition of history.

Analyzing the history of the development of hermeneutics, Shpet identifies those features in the doctrines of the thinkers who, in his opinion, were the most fruitful and to the greatest extent contributed to the understanding and the development of hermeneutic problems. For example, the significance of the ideas of Aurelius Augustine in what he contributed to “the expansion of the content of hermeneutics, having added to the problem whether the word is monosemantic or polysemantic the problem of a sign in general and the problem of understanding as the transition from a sign to a value” [1, 263].

In Flacy's research Shpet emphasizes his concept on the need to understand each part from the context of the whole. Later this idea will find applications in the famous notion of a «hermeneutic circle».

For Shpet, hermeneutics is first of all understanding through a word. «A word is evidence of a message first of all. A word is not only a phenomenon of nature, but it is also the principle of culture. A word is the archetype of culture; culture — the cult of understanding, words are incarnation of the mind» [2, 380]. He also insists on the fact that the subject of hermeneutics should be understood rather widely. Along with the consideration of issues relating to the history, science and art, it focuses on the identity of the creator. «With every word of the author we now begin to hear his voice, to guess his thoughts, to suspect his behavior. Words retain all their value, but we are interested in some special intimate sense having its own intimate forms. The value of a word is accompanied by a co-value» [2, 470]. «In General, the personality of the author acts as the analogy of a word. The personality is the word and requires its understanding» [2, 471]. As it is known, hermeneutics is much

obliged to German philosopher F. Schleiermacher. Shpet notes the importance of Schleiermacher's recognition of the relationship of hermeneutics and thinking. But, as the philosopher suggests, Schleiermacher stops in front of the problem of «understanding as it is, and meaning as it is». What is interpreted is understood by Shpet in a more complicated manner than by Schleiermacher. «What is interpreted must not be quite alien to us, but it must not be quite ours» [1, 320] — Shpet said. Hermeneutics as the art of understanding, as Shpet considers, should not be only reduced to the external, positive interpretation. He insists on the fact that avoiding of purely philosophical perspective is unfavorable for any scientific research.

The disadvantage is the ambition to reduce the problem of understanding to psychologism. Shpet reveals this disadvantage in the works of many thinkers who studied the problems of hermeneutics. We must study not only the problems of grammar and psychology, but also try to understand the «surroundings and relationships of nature, and finally a historical event, institutions and morality, states and activities in the national spirit. It is this type of interpreting that seems especially important for us» [1, 360] — the philosopher thinks.

Great attention is paid by Shpet to the development of ideas about hermeneutics in the works of the German philosopher Dilthey and the German historian I. G. Droysen. Dilthey's merit, according to Shpet, is in the fact that he demonstrated the importance of hermeneutics for the consideration of history and all the sciences about spirit. «For modern justification of sciences of spirit it is hermeneutics that gives a starting-point of the highest value» [1, 382], noted Dilthey. But Shpet is not satisfied with Dilthey's bright psychological setting in the understanding of hermeneutics as a science of an inner experienced reality, although Dilthey in the development of problems of hermeneutics goes further than Schleiermacher, addressing the problem of intercommunion of the internal and the external (in this connection it is worth to recall the famous Dilthey's words that «the human spirit speaks from the stones of marble, from musical sounds, gestures, words and writings, deeds, economic organizations and institutions») [1, 384]. Thus, Dilthey turned to the problem of language and expanded the

art of understanding to the philosophical generalizations. But according to Shpet, Dilthey did not understand fully the importance of considering the problems of a sign. For Shpet a sign and a word are the main facts of the development of culture and the solution of the problems of hermeneutics and our «coming in» into culture depend on their understanding. And not accidentally the ideas of hermeneutics are closely associated with the development of semiotics and structuralism.

The depth and the compactness of a thought and manners of its exposition by Shpet admire us. In a few words or lines he could express both his attitude to all sorts of philosophical ideas and his own point of view. You can only imagine what heights the philosophical thought in Russia would have reached, if there had not been known tragic events.

Modern are Shpet's words about the necessity of comprehension of true vital essence, hidden behind the surface of sensual and rational experience. The Russian philosopher considered it necessary to be able to see and to understand the meaning of what is happening both in life and in science and philosophy. And now, to all who doubts the need to study and to know philosophy and believes that its role in our world is extremely low, it is worth recalling the words of one of the most brilliant Russian thinkers: «Philosophy is designed not to solve the tasks of a physicist or a historian but to show him his own roots, starts and to bring the universal base under huge modern knowledge» [1, 39].

And it's not just that Shpet was much ahead of his time, developing the ideas and principles extremely important for modern philosophical thought. His ideas are often much more productive than the modern philosophical concepts of postmodern and post-structuralistic persuasion. Not getting into philosophical relativism, so characteristic for the «postmodern sensitivity», he, at the same time, operates by very flexible techniques of philosophical analysis and philosophy design, gives brilliant samples of generalized philosophical analysis of the specific, complex phenomena.

The principles of modern hermeneutics developed by him are not out of date nowadays but they retain a great potential for further development.

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Rationality as an attribute of sociality

Abstract: It's asserted in the article that the idea of different “types of rationality” leads to the methodologically inappropriate increasing of the number of such types. In the opinion of the author the real differences in thoughts or ways of existence are embodiments of one and the same rationality as an attribute of the social mode of human existence.

Keywords: rationality, types of rationality, irrationality, attribute of sociality.

The idea of different “types of rationality” has been developed in the 20th century in a lot of philosophical and humanitarian contexts. It will not be exaggeration to say that by the early 21st century this idea has acquired the status of a methodological principle in researches not only of the history of culture as a whole, but of the essence of its separate phenomena, such as philosophy,

science, religion, art, policy, etc. Indication to the special “type of rationality” is treated today as an essential basis for understanding any other differences between the subjects of culture or the results of their activities [See: 1; 2; 3; 5; 6; 7].

The use of the term “rationality” in science has always been a part of the ideological self-assertion of science as the “higher”, the

“best”, the “most effective”, etc. type of knowledge. For scientists themselves as for positivists and neopositivists, who expressed just scientific self-consciousness, scientific knowledge is the only actual knowledge and scientific knowledge only can appropriate the status of “rational”. Unlike the use of such a direct estimates as “good” or “bad”, using of the terms “rational” or “irrational” gave an appearance of a special disinterestedness, objectivity and adherence to some universal criteria of reason that are embodied just in scientific knowledge. All the other forms of knowledge: mundane, philosophical, humanitarian, artistic, religious — were declared to be irrational simply because they are not scientific.

For all non-scientific forms of knowledge and for all critics of positivistic and neopositivistic philosophy and methodology of science the meaning of the “problem of rationality” was reduced, ultimately, to two issues: (1) are nonscientific forms of knowledge as rational, as science, and (2) what are the specific features of scientific rationality itself? To the extent that the research of non-scientific forms of knowledge required going beyond the logical and methodological problems of science, the context of discussions about “rationality” was becoming increasingly broad and the content of issues — more philosophical and culturelogical. Anthropological studies have shown that in the context of “ours/theirs” the term “rationality” are always marks (and at least partially — masks) simple value judgments: “It is good (because we like it), and so — it is rational”, “It is bad (because we don’t like it), and therefore — it is irrational”. And no matter how sophisticated the logical or methodological analysis of scientific cognition would be the opposition “rational/irrational” always retained deep cultural and historical meaning as an expression of “good/bad” estimation of a particular element or form of knowledge. Ultimately, representatives of all branches of philosophical and humanitarian knowledge came to the conclusion that alien and incomprehensible from our own criteria of reasonableness should be recognized just as related to some sort of “different type of rationality”.

It seems paradoxical, but in the debates about rationality in philosophy and methodology of science not only nonscientific forms of knowledge, but all the fundamental problems of development of science itself began to be considered under the sign of “rationality”. Moreover, it is just a hidden evaluative rather than purely logical or methodological meaning of the term “rationality” has become dominant in discussions about the specifics of scientific knowledge, the relations between empirical and theoretical levels of research, normal and revolutionary periods in the development of science, the ways of justification of theoretical knowledge and choosing between theories, etc. Each of the disputing parties assigned the status of “rational” to that only which was considered by them as acceptable, worthy of approval, support and further development in science. But since in accordance with the ethos of science, even recognizing the rationality of just one of the solutions of a scientific problem it is impossible to name as “irrational” actions of those scientists who have another point of view, incompatible theoretical systems was awarded the status of “different types of rationality”. Thus, the supporters of the idea of rationality as the exclusive feature of scientific mind have contributed to the spread and adoption of the idea of “types of rationality” in science.

It appears that a general epistemological premise of the idea of different “types of rationality” in all contexts was an intention to refute the assertion that thinking is strictly connected with norms and rules inherent in any chosen kind of cognitive activity, which receives the status of “rational” (in contrast to all the other kinds of knowledge), or in any chosen subject of culture, which is considered

to be acting “rationally” (in contrast to all or some of the other subjects), or in any chosen method of solving a scientific problem, which is perceived by his supporters as the only “rational”.

The validity of this critical intention is beyond any doubts as the desire to develop a system of concepts for describing meaningful differences in the ways of existence of various subjects of culture or in the ways of knowing. However, the use of the concept “types of rationality” as the means for expression these differences has not become, in my opinion, more convincing, even after it had entered in the usual scientific discourse. From the perspective of a researcher, who does not use the term “types of rationality” for describing meaningful differences in the results of human cognition, such terms as “local rationality” or “special rationality” [See: 4; 8] look as absurdly, as definitions “regional honesty” or “local truthfulness”.

There is an impression that none of the proponents of the typology of rationality never even tried to answer the question: «Is it really possible for such abstract qualities, as “rationality”, “truthfulness”, “sociality”, “spirituality”, “decency”, etc., to have any “types”?». What is meant, for example, by “rationality” as such, if, on the one hand, it is believed that chemistry and alchemy, philosophy and science are equally rational, but, on the other hand — that their rationality is “typologically” distinct? Or: Why it is denied that primitive man had some kind of rationality, but at the same time any violation of the laws of formal logic is considered as a manifestation of just “local rationality”? And finally, why, in principle, the differences between mythology, religion, philosophy, science, or arts are described as different “types of rationality”? Is it because, speaking about “types of rationality”, researchers actually equate rationality as a conscious way of life inseparable from human existence with the diverse content of the results of rational activity?

In any case, when as the answer to the question: “What is rationality?” — we get a discussion of “types” of rationality, it becomes obvious that in accordance with the overall style of postmodern research the idea of “types of rationality” exists besides any analysis of the essence of the rationality and is not derived from any more or less distinct theoretical model of the considered phenomena.

From the assertion that human mind can and actually acts in accordance with different systems of norms and rules, it does not follow that there are different “types of rationality”, i. e. literally: different types of mind. No one talks about the different “types of activity” considering principal differences between conceptual systems of classical and non-classical science, tonal and atonal music, rhymed and unrhymed poetry, etc. It is obvious that the “type of activity” is not the same as the “result of activity”. A musician remains a musician no matter what kind of music he/she writes or performs. A scientist remains a scientist whatever conceptual system she/he might hold.

No any specifics of a particular field of human activity and cognition do follow from typological differences in conscious activity of subjects who successfully can carry out a variety of activities. The various different results of human activity and knowledge demonstrate, in my opinion, not many “types of rationality”, but many ways of realization of the rationality itself. One and the same rationality/intelligence/mental activity begets as mythology and religion, as philosophy and science. One and the same reason dictates people different approaches to the investigation of concrete or universal laws of the development of nature and to justification of our life goals. But speaking “one and the same”, I do not deny the development of reason itself, but emphasize only the fundamental difference between rationality and the lack of it, on the one hand, and between rationality and rational results of any human activities — on the other. It means that essentially

universal human mind merely uses different means to implement its own, by definition — reasonable, rational, activity.

The types of something can be allocated only on a background of continuously lasting unity, which is the essence of this something. The essence of rationality is such that it can be realized in an infinite variety of products, results, works of human activity, but cannot exist as a set of separate “types”. Rationality, embodied in one or many separately existing “types”, would cease to be rationality at all and would have turned into its opposite — irrationality. The strength and effectiveness of thinking is expressed in its flexibility, ability to move quickly from one system of norms and rules for solving problems of cognition or for achievement of a practical result to another. That is why rationality is not directly correlated with strict logical consistency and, especially, with formalization of the process of thought, but one-sidedness of mind or lack of

thinking should not be considered as a “specific type of rationality” as well.

Thus, when we talk about rationality, we mean universal, attributive characteristic of human social activity and its results. There are no special or local “types of rationality”, but there is a single human mind, historically developing and deciding practical and cognitive problems by methods and means consistent with the nature of these problems. Despite the undoubted importance of many scientific problems that had been included in the scope of interests of international scientific community in the course of discussions of “types of rationality”, the history of this idea resembles the history of the theory of epicycles and deferents in astronomy. The endless proliferation of the number of “rationalities” is the same dead end in development of cognition as theoretically unjustified increase in the number of epicycles for describing inequalities observed in the motion of the planets.

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Section 12. Chemistry

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Liquid-phase aerobic oxidation of petroleum hydrocarbons in the presence of Cr- and Co-complexes

Abstract: The liquid-phase aerobic oxidation of the hydrocarbons of naphthenic-paraffinic concentrate with boiling temperature 217–349 °C of diesel fraction of Azerbaijan oil in the presence of Cr salt of natural petroleum acids and their mixtures with penta- nuclear complexes of Cr and Co was carried out. The increased yields of synthetic petroleum acids in the case of mixed Cr and Co complexes are observed. The yield of petroleum acids and activity of catalysts as a function of the composition of the catalyst are discussed.

Keywords: Cr complexes, catalytic oxidation, petroleum hydrocarbons.

Introduction

The oxidative conversion of petroleum hydrocarbons (PH) into the oxygenated products is one of the effective ways of rational processing of natural hydrocarbons. Among products of the oxidative conversion of the oil hydrocarbons the synthetic petroleum acids (including carbon oxy-acids) have a special place [1; 2]. Synthetic petroleum acids (SPA) instead of natural petroleum acids (NPA) are widely used in the preparation of corrosion inhibitors, desiccants, catalysts, surface — active detergents, softeners, emulsifiers, bactericides, additives for fuels and many other beneficial products [3; 4]. Thus, the growing demand to oil acid and at the same time the limited of its natural resources, as well as the fact that they exist in

the form of complex mixtures, makes the production of SPA relevant and important.

In the present paper Cr salt of NPA (CrNPA) and pentanuclear Cr, Co-complexes are tested as catalyst in the aerobic oxidation of PA into SPA.

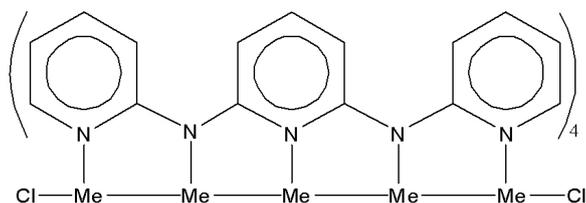
Experimental/methodology

The used petroleum hydrocarbons are represented the dearomatized fraction of Azerbaijan oils boiled in the range 217–349 °C. The diesel fraction is dearomatized by extraction method. As an extractant n-methyl pyrrolidone (NMP) is used. Some physical-chemical parameters of the diesel fraction before and after the extraction are determined and presented in Table 1.

Table 1. – The values of physical-chemical parameters of the diesel fraction before and after the extraction

Parameters	Diesel fraction	
	Before extraction	After extraction
Molecular weight, M_w	225	200
Density, ρ_4^{20} , kg/m ³	842	835.9
Refraction coefficient, n_D^{20}	1.4677	1.4638
Kinematic viscosity, at 20 °C, mm ² /s	5.71	5.52
Freezing temperature, °C	minus 41.4	minus 51
Boiling temperature, °C	217–349	220–340
Acid number (A. n.), mgKOH/g	1.73	–
Iodine number, at 100 g fuel, gJ ₂	2.25	–
Amount of sulfur, % wt.	0.0936	0.03
Amount of the aromatic hydrocarbons, % wt	~17–18	1

As a catalyst for oxidation of petroleum hydrocarbons in liquid phase Cr salt of NPA (CrNPA), pentanuclear $[\text{Cr}_5(\text{tpda})_4\text{Cl}_2]$ and $[\text{Co}_5(\text{tpda})_4\text{Cl}_2]$ (tpda = tripiridildiamin) complexes are studied. The Cr salt of NPA is obtained from sodium salt of NPA by exchange reaction [5]. Cr and Co-complexes of tpda are synthesized in the Tayvan National University and presented courtesy to investigate their catalytic properties [6]:



where Me is Cr or Co.

Table 2. – The yield and composition of reaction products

№	Liquid phase without and in the presence of catalysts	Conversion, %	Yield of the carbon acids, %	Reaction products, %		Acid number, mgKOH/g	
				SPA	SPOA	SPA	SPOA
1.	Without catalyst	14.6	4.2	3.2	0.5	84.4	62.1
2.	$[\text{Cr}_5(\text{tpda})_4\text{Cl}_2]$ (0.1 mas. %)	67.2	24.7	15.0	7.1	130	122.5
3.	$[\text{Cr}_5(\text{tpda})_4\text{Cl}_2]$ (0.1 mas. %)	70.8	35.8	21.5	6.4	140.5	125.5
4.	CrNPA (0.1 mas. %)	67.7	30.2	17.1	4.1	132	115.8
5.	CoNPA (0.1 mas. %)	68.2	29.8	19.2	7.3	128.8	116.4
6.	CrNPA + Co-comp. (0.15 mas. % = 0.1+0.05)	72.2	42.5	23.4	6.9	142.4	125
7.	CrNPA + Cr-comp. (0.15 mas. % = 0.1 + 0.05)	68.4	31.5	22.8	6.8	134.8	122.6

As can be seen from the table 2 in the presence of catalyst the conversion of hydrocarbons and the yield of the petroleum acids are essentially increased. A marked difference in the yield of acids is due to, of course, the nature of the catalyst. In these systems, the oxidation of hydrocarbons takes place, with the activation of molecular oxygen in the first stage of the reaction is most likely into the ion-radical state, which is the necessary in the formation of the hydroperoxides as the intermediates in the further oxidation of the hydrocarbon into the acid. The formation of hydroperoxides as the intermediates is the necessary for transformation of the hydrocarbons into acids. The cobalt complexes more easily than Cr complexes activate molecular oxygen into the ion-radical form O_2^- .

The oxidation process is carried out in the bubble type installation and the air flow rate was 300 l/kg-hour during the 6 hours at 135–140 °C. The content of Cr, Co pentanuclear complexes in ratio to liquid phase were 0.1 mas. % and CrNPA — 0.2 mas. %. After the reaction the liquid products of oxidation process was separated and characterized by chromatography and infrared-spectroscopy. The atomic absorption spectrometer iCE 3000, Thermo Scientific, USA is used to determine the amount of the Cr and Co in the catalytic systems before and after the reaction. The particle size analyzer LB 550, Horiba is used to determine the size of the particles in catalytic systems before and after catalysis. Infrared spectra were obtained using the Bruker ALFA FTIR spectrometer.

Results and Discussion

The results of catalytic oxidation of the used petroleum hydrocarbons are given in the table 2.

This fact can be the main in the primary higher activity of the cobalt complexes in comparison with the complexes of chromium in the oxidative conversion of hydrocarbons to acids.

The state of the catalyst in the liquid phase before and after oxidation process is characterized by dynamic light scattering method. For the all studied systems the values of “hydrodynamic diameter” and diffusion coefficient of particles are estimated and it was shown that the estimated values of particle size in PA dispersions are in the range 1 ÷ 2 nm. and after the reaction the complex picture in DLS spectra is observed. DLS spectra and the values of DLS parameters for the catalytic system with Cr complex before and after the oxidation process are presented in the fig. 1, 2 (a, b) and table 3, accordingly.

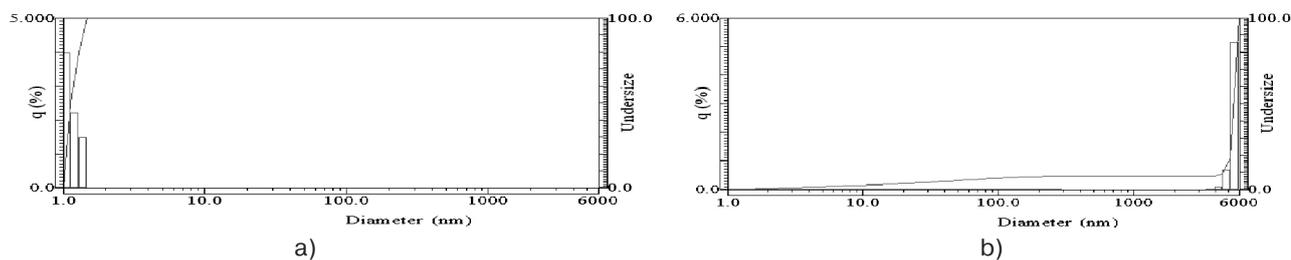


Fig. 1. DLS spectra for catalyst powder before (a) and after (b) the reaction in PH dispersion

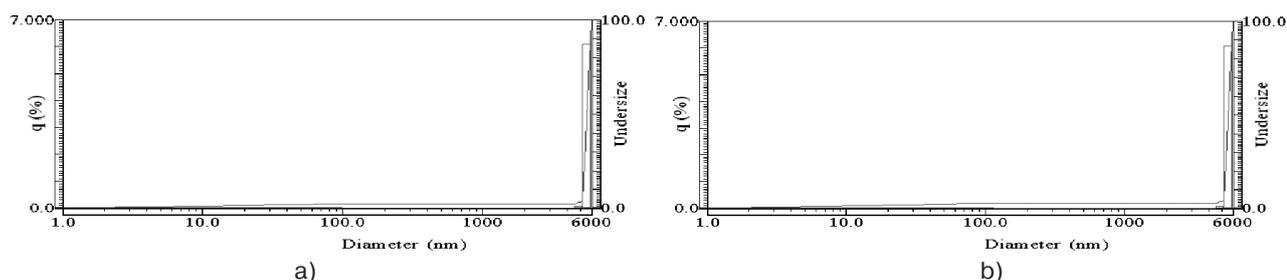


Fig. 2. a, b — sample with fig. 1, b — diluted 2 and 8 times, respectively

Table 3. – The values of DLS parameters for PH dispersions with the isolated powder from catalytic system based on $[\text{Cr}_5(\text{tpda})_4\text{Cl}_2]$ complex after reaction

Samples*	Parameters of Dynamic Light Scattering (DLS)							Diffusion coefficient, m^2/sec
	Diameter of particles in liquid, nm						Span	
	% of particles with diameter			Median	Mean	Mode		
10	50	90						
1	1.0	1.1	1.4	1.1	1.2	1.1	0.3217	3.8123E^{-7}
2	4864.3	5482.4	5892.7	5482.4	5180.9	5513.1	0.1876	7.8452E^{-11}
2, a	4524.9	5445.5	5884.8	5445.5	5021.8	5494.3	0.2497	7.9003E^{-11}
2, b	4818.7	5475.6	5891.2	5475.6	5212.9	5504.0	0.1959	7.8838E^{-11}
2, c	5143.2	5507.7	5898.1	5507.7	5284.9	5528.4	0.1371	7.8478E^{-11}
2, d	5129.2	5499.4	5894.4	5499.4	5217.9	5526.2	0.1395	7.8500E^{-11}
2, e	5177.0	5527.8	5902.4	5527.8	5405.5	5538.5	0.1312	7.8153E^{-11}
2, f	5173.8	5525.9	5902.0	5525.9	5379.1	5538.8	0.1318	7.8216E^{-11}

Note: * — Dispersions of catalyst powder before (1) and after reaction (2); 2, a, b- the next 2nd and the 3rd measurements of the sample 2; 2, c, d, e, f –initial dispersion 2 after dilution 2,4,8,16 times, respectively, with the same PA.

The synthesized catalysts before and isolated solid products of catalytic reactions after oxidation of petroleum hydrocarbons were characterized by atomic absorption spectroscopy and infrared spectroscopy. The content of chromium is determined by AAS (0.022 and 0.019 mas. %, respectively). The difference in content of

chromium between the samples before and after reaction connected with the increase of the organic part of the sample after the reaction due to reaction products chemically bonded with the catalysts crystals. Infrared spectra of Cr-complex before and after oxidation of petroleum hydrocarbons are given in fig. 3.

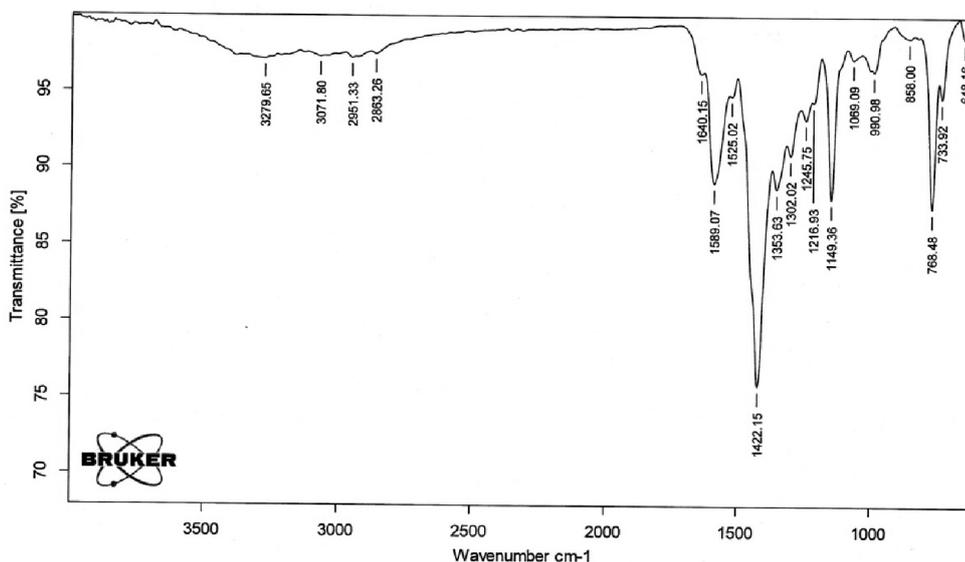


Fig. 3. a) IR spectra of catalytic system with Cr-complex before oxidation

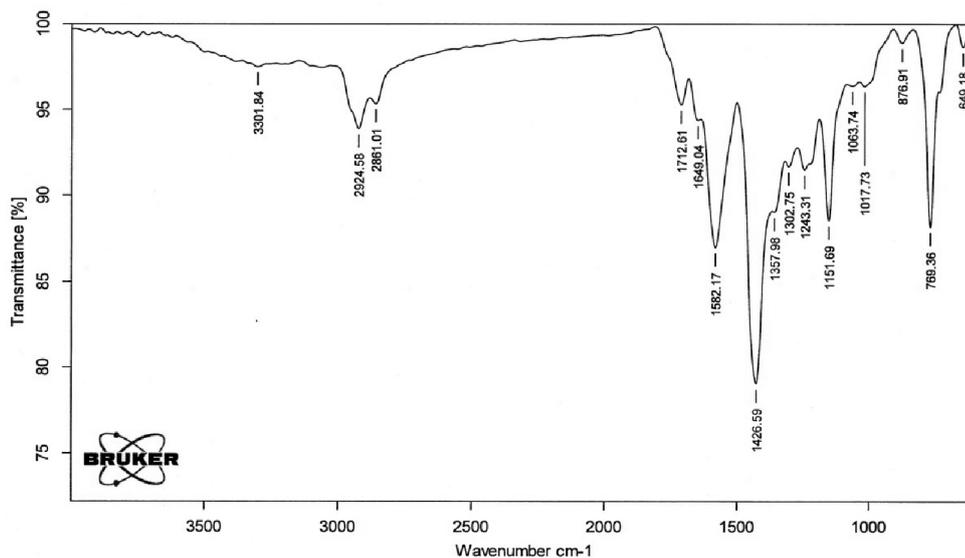


Fig. 3. b) IR spectra of catalytic system with Cr-complex after oxidation

The observed changes in FTIR spectra from isolated samples of catalyst after oxidation process also can be due to reaction products which chemically bonded to the surface of the catalyst.

Conclusion. Cr, Co complexes with different composition and structure was used as catalyst in the oxidation process of petroleum hydrocarbons into the petroleum acids. It was shown that in all cases the catalytic systems are the liquid systems with nano- and

micro-sized catalyst particles and it can be supposed that the oxidative conversion of petroleum hydrocarbons into the petroleum acids are catalyzed by these nano- and micro-sized particles based on Cr-, Co complexes. The formation of the oxygen ion-radical O_2^- more easily in the case of cobalt complexes than chromium complexes can be accepted as the main factor of higher activity of cobalt complexes than complexes of chromium.

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Section 13. Economics and management

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Improved territorial policy, as the direction of increase of efficiency of sphere of services

Abstract: In the article the urgency of formation of effective spatial economic policy. It is determined that one of the priorities of this policy is the development of services. It is proved that the main objective of this policy is the optimal combination of actions, methods and means that ensure the interaction of manufacturing and services to meet current and future needs of the territory.

Keywords: regional policy, services, directions of development, efficiency, tourist centers.

Functioning of the territorial economy can guarantee the competitiveness of the service sector only on condition of effective territorial policy associated with the general strategy of the territory and also with the basic tools of management. Absence of the unified general strategy leads to uncertainty in relations with intermediaries (agents) and consumers of the customers.

Under the modern conditions, the development of tourism is on the way to creation of tourist centers, in which hotels, restaurants, travel agencies and other facilities that cater for tourists, are covered by the unified territorial policy. Services provided in recreation complexes of the tourist centers are the result of taking relevant territorial measures and synthesis of such indicators, as the quality of means and other material objects used for the service production, as well as the level of customer service.

The relevance of the study lies in the fact that the process of service provision in a tourist center is either directly or indirectly linked to the territorial processes. Logically, they are one of the main tools of ensuring tourist center's integrity and functioning.

Foreign authors, such as: A. Zorin [1], H. Montaner Montehano [2], O. Beidik [3], concentrate on the problems in the functioning of a tourist center. Ukrainian scientists, in particular, V. Danilchuk [4], N. Sviridova [7] reviewed various activities of tourist centers.

It follows from these works, that the structure of the tourist attraction involves many different objects, and the static typology of tourist centers offers four basic classification types: axiological, natural, recreational and multi-factor/mixed-type.

Despite the lack of legal definitions for the "tourist center" and the "tourist zone", V. Danylchuk, referring to the Spanish experience, defines a tourist center as a destination, in which the "minimum number of non-temporary accommodation reaches at least 500", while the territory it occupies is approximately 10 hectares. Tourist area is then defined as a destination "that sites two or three centers for receiving tourists, with the total of at least 5000 places to stay" and, assumingly, the appropriate area of no less than 100 hectares [4, 33].

Economic development of the territory is defined by the process of interaction and synthesis between factors that require coordination of available resources. Such a process starts with reconciliation in the parameters of effective functioning and use of performance indicators native to the services sector. An emphasis

here is on the tourist center and its transformational influence on the economic performance of the territory and related areas.

The problem of tourist center activity is especially acute in Donetsk region — a richly populated and a heavily industrialized area. Many a samples of natural reserve fund of the region are traditionally used by the population for recreation and tourism (mostly temporary and unorganized). However, in order to shift their usage to stationary and organized recreation and tourism, the question of establishing tourist centers must be raised.

Activities in national parks and other reserves that are united into tourist zones and are protected by clear legislation can be the source for self-funding and help preserve nature even further. Also, there are possibilities for parks and territories development through country's internal budget or via international investment.

Tourism and recreation planning deserve special attention as uncontrolled expansion of touristic activities leads to disruption of the natural and cultural environment and deterioration of the area's preservation conditions. Activities in the protected areas should be planned and carried out in strictly controlled amounts and types.

The most important stage in developing a theme parks is to determine the thematic direction of the area in question. World experience shows that theme parks and other family leisure centers are much more popular with visitors when given distinguishable vibe as opposed to sites that have no unique inimitable style [3].

Primary activities in these areas are scientific and cognitive tourism, hiking, aqua sports, fitness and other types.

Judging by the results of previous researches, it is advisable to acknowledge the following: a tourist center is an area that has a certain tourist resource and adequate infrastructure on the territory.

Once again, tourist center typology can be taken as a basic principle for outlining recreational activity. Full range of services can be provided by the center, accounting for behavioral possibilities to realize specific recreational goals, evident from of guests' enquiries [5, 127].

Full spectrum of desirable services can only be realized under the condition of adequate functioning of all main factors in the system of quality assurance: aims and objectives on the directions of enhancement, support and improvement of the product quality should be at the center of economic policy of the tourist center; achievement of the required quality of services with minimal costs; the main criterion of achieving product quality is meeting the needs of consumers;

the use of systematic approach while ensuring product quality control; continuous and systematic training of workers and employees; respectful attitude towards consumers; constant, conscientious and creative work of all employees to improve and enhance the quality of tourist products on the territory of the tourist center.

Consequently, modern quality service management at the tourist center should be directly focused on customer needs, their structure and dynamics; market capacity and market environment; incentives conditioned by economic and technical competition.

At the same time, regardless of the form of ownership and volume of tourist center services, its main task is ensuring an optimal blend of actions, methods and tools to provide manufacturing and provision of services to meet customers' needs and wants, as well as the development of new services, able to meet the future needs and requirements of the market.

Creation of tourist centers and theme parks requires investments in relevant projects. Investment choice of recreational areas and projects accounts for the following characteristics: natural attractiveness; accessibility; possibility to organize tourist flow; ability to create the appropriate infrastructure.

There are several directions in the choice of areas and facilities for tourist centers and theme parks [7, 106]: — defining priorities for restoring recreational areas and facilities via continuation of the research into the methodology of estimating recreational resources; — developing characteristics of recreational territories and objects to the fullest; — managing process of investment projects.

Actions sequence for selecting recreational areas, facilities and theme parks:

- evaluation of the potential use of territories and objects for recreational purposes;
- satisfaction with the recreational areas and objects of social values;
- satisfaction with the recreational areas and facilities, meeting the requirements of the standard services;
- satisfaction with the projects of development of the recreational areas and projects that require investment.

Study the current state of functioning of a tourist center creates basis for creating a mechanism of evaluating feasibility of investment attractiveness of the relevant recreational territory and adjacent projects of tourist attraction and theme parks [6, 25].

The complexity in validation of a tourist center structure lies in the following:

- Tourist center is a formation that requires a variety of industrial capacities and production activities, each of which carries out independent functions. These same functions they can perform in other economic systems of the region, which causes difficulties in allocating them to the components of the tourist center and complicates the detection of the limits of the complex;
- Further on, successful development and operation of the tourist center is possible on the condition of availability of the multiple linkages between sectors of the economy, which are involved in the process of holiday makers servicing, but hardly all of them can be included in its composition;
- Next, formation of specific tourist center takes place under specific conditions that define the structure of the development.

For example, formation of a tourist center can be a combination of production sectors and non-production areas that promote or limit recreation. Similarly, natural conditions determine the specialization of the tourist center. Finally, the development level of a transport network defines logistical boundaries of all projects.

Tourist Center as a recreational and tourist complex is a component part of the general territorial complex that combines a sophisticated system of recreational and tourist establishments, servicing enterprises, infrastructure and other sectors, which have close trade and economic ties by sharing the resources in order to meet a variety of recreational, educational, cultural and other needs of the population.

Therefore, the internal structure of the tourist center cannot be clearly standardized. Each particular site will have its own specifics. Composition and the structure of a tourist center can vary due to the emergence of new kinds of tourism and recreational activities as well as improvements in the customer service industry.

Territorial structure of the tourist center is formed by:

- the area and facilities that directly serve recreational and tourist purposes (tourist zones, cultural and historical recreation parks, sightseeing centers);
- the area and facilities that indirectly serve recreational and tourist purposes (natural reserves, national parks, monuments of nature).

The smallest taxonomic unit of a tourist center is, as researchers state, the “enterprise”, i. e. a separate institution, similar to other territorial production complexes. As any commercial complex, tourist center performs all the necessary functions. Its primary function is the maximum satisfaction of the population's recreational needs, spiritual and physical development.

Researchers N. Sviridova, M. Pristjuk, S. Liskova, A. Dvagal [7, 115] suggest dividing social functions of a tourist center into three main groups: medical and biological; social and cultural; economic and political ones. Addition thematic purposes such as ecological, military, international, integrational, and city-forming functions can easily be added to the mix.

Establishing criteria and indicators for attractiveness of recreational territories is also of great importance. Substantiation of accepted critical loads on the environment, analysis of conformity of the new services with the requirements of the market and competition, and their concordance with the specialization of the tourist center are all factors to consider.

Designing a tourist center necessitates considering the balance between creativity, memorability of features and design value of the project. It is than advisable to collect, summarize and analyze the latest data on the quantitative and qualitative composition of natural recreational resources, to identify environmentally safe recreational capacity of its individual areas.

Combined differences in the natural, economic, and social conditions of the region, as well as recreational and tourist establishments placed there, influence the size, specialization, industry structure, intensity and stages of the service sector development. These are essential factors for the rational use of natural, medical, touristic and other resources in the region for the purpose of forming an efficient regional economy.

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Sustainable low-carbon development: turning point in global economy

Abstract: The threatening increase of human impact on the climate took place during the period of the global economy industrial development. It has been already proved that the warming by over 2 °C can lead to catastrophic climate changes. To avoid this it is necessary to reduce greenhouse gas emissions (equivalent to carbon emissions (Hereinafter)) by 50 % during the next 20 years and by 85 % — within the next 50 years. To do this, the society must urgently move to a model of sustainable development, which stipulates the economy growth provided the reduction of carbon emissions. An important condition for solving this problem is the introduction of an effective system to promote sustainable low-carbon development. This is possible by creating an incentive system that would combine stimulating and forcing measures in influencing businesses and encouraging their ecologically friendly behaviour. The overall system of such incentives covers at least four cooperating institutions: international environmental organisations; national state governments; transnational corporations (TNCs), and consumers. Harmonisation of economic and environmental interests of such businesses and consolidation of their efforts is capable of ensuring the facilitation of sustainable low-carbon development.

Keywords: sustainable development; low-carbon development; globalisation; anti-carbon tools.

The most complete and comprehensive research of the problems related to the threatening human impact on climate has been provided in the Report of the World Commission on Environment and Development: Our Common Future [1]. This issue has been also studied to this or that extent in the works of many scientists, in particular: N. Andreieva [2]; B. Burkynskiy [3]; O. Veklych [4]; A. Prokopenko [5]; T. Tunytsia [6]; Yu. Tunytsia [7]; S. Kharichkov [8]; M. Khvesyk [9]. However, these studies were mostly of segment and sector character. We lack comprehensive research and theoretical and methodological development of proposals regarding the solving of the problem of creating a global incentive system for sustainable low-carbon development thus proving the rationale of this article.

The anthropogenic impact on the environment is estimated at the level of 95 % of the climate change risks. This is primarily due to the rapid growth of carbon emissions, which significantly outpaced the growth of population and economy. To the greatest extent this was due to the rapid development of carbon-rich energy, which accounts for 80 % of the volume of all carbon emissions. In turn, the growth of carbon energy was due to its increased funding by the state. Carbon energy funding is in fact the funding of carbon emissions that create global catastrophic threat to the climate. Moreover, studies have shown that carbon energy funding is opportunistic and

does not contribute to any improvement in the energy availability or energy security, stability, or environmental sustainability. State funding of carbon energy is a terrible manifestation of the contradictions of national economic and global environmental objectives.

The transition to sustainable low-carbon development can be a success through the implementation of the global economy energy conversion. However, energy conversion requires effective financial support. In many countries where such support is provided (mostly in the EU) there is good progress in economy energy conversion. Moreover, such countries are characterised by significantly better energy availability, security, stability, and environmental sustainability. However, in many countries such funding is very low, thus resulting in high intensity of carbon emissions. But the most paradoxical is the fact that many countries have dualistic policy: funding the carbon energy and the carbon-free one simultaneously. This once again demonstrates the inability to address this issue at the national level and the need to implement a global incentive doctrine for sustainable low-carbon development.

A tax mechanism is a generally accepted effective way to mobilize the financial resources. The advantages of such a mechanism are the double effects, which are greatly acceptable to motivate low-carbon development. However, environmental taxes, which have been widely applied in the countries since the end of the twentieth

century, are still far from fulfilling this task. The share of such taxes in GDP and tax payments is very low and inadequate to the economy load on the environment. The proceeds from such taxes are used to finance only a part of environmental measures. At the same time, the environmental costs are not even close to being covered by the revenues from environmental taxes. The tax base is not linked to the volume of environmental damage caused by the economy. Therefore, the existing environmental taxes do not affect the intensity of carbon emissions. We need a new paradigm of building such a tax mechanism that would become an effective tool for the global incentive system for sustainable low-carbon development.

The introduction of the Kyoto Protocol was the first international incentive mechanism for low-carbon development. However, Kyoto mechanisms had no overall positive impact on the situation with the world's carbon emissions. The global carbon emissions rose by 38.3% over 20 years. Moreover, if in 1990–1997 the average annual growth of carbon emissions was 1%, in 1997–2012 it was already 3%. Developing countries were exempted from emission reduction commitments, thus they significantly increased carbon emissions. This represented the global contradictory character of the anti-carbon policy of Kyoto period. The experience in the implementation of the Kyoto mechanisms showed that:

- 1) differentiation of approaches led to the opportunistic behaviour of the countries;
- 2) the opportunistic character of the anti-carbon policy has caused injustice in the investment: countries that received most investments under the Kyoto mechanisms (where China received the major share) had the greatest increase in carbon emissions;
- 3) the anti-carbon policy should be unified, global and mandatory: exemption from emission reduction commitments for some countries results in global growth of emissions and nullifies the achievements of the countries that have committed themselves to emission reduction.

Successful implementation of such tasks requires large volumes of investment. However, the forming of such an investment potential is complicated by the contradictions in the global anti-carbon policy, where negative environmental impacts are global and positive economic benefits are only national. Therefore, the national economic benefits aggrive the investment incentives for low-carbon development. Thus, the global benefits from the anti-carbon economy modernization determine the need for growing foreign investments into this sector. In today's world there are many different funds, TNCs, banks, insurance companies, and other institutions with large capital. However, their share in the low-carbon development investment is very small. This is due to the lack of an effective incentive system to motivate the investments of their capital in this area. So we need a global incentive system for sustainable low-carbon development.

In a global environment of a sustainable low-carbon development Ukraine also finds itself in a paradoxical position. On the one

hand, it refers to a group of countries, which have very high energy and carbon capacity economy, high consumption of carbon supplies, and depends much on their import. On the other hand, Ukraine is positioned among the world countries with very low energy conversion of the economy and low development of renewable (carbon-free) energy if provided with enough opportunities to do so. Ukraine has a great potential to reduce carbon capacity of its economy primarily due to: 1.5–2 times energy conservation; modernization of production capacities (1.5–2 times); due to energy innovations Ukraine can achieve the replacement of the one third of carbon energy sources with carbon-free ones by 2030 and reduce the carbon capacity of the country's GDP by one third. Therefore, Ukraine urgently needs the incentive system for low-carbon development with double influence effect and aimed at both ensuring (forcing) a significant reduction in carbon emissions and encouraging of investments into energy conversion.

The investment process in the field of low-carbon development in Ukraine is rather opportunistic. The dynamics of domestic budgetary investment in this area is very unstable, and the amounts are far from sufficient. The participation of private capital in investments into this sector is very low. On the one hand, this is due to the low investment image of the sector, and on the other hand, due to low motivation for investors. The signing of the Kyoto Protocol by Ukraine, which had a large surplus of emission quotas, gave the country a big chance to attract significant amounts of foreign funds. However, this opportunity has not been taken, first because of the delay in the ratification of the Kyoto Protocol and then due to the delay in attracting investors to the Kyoto mechanisms. As a result, Ukraine has lost time and the potential to sell the surplus savings of carbon credits, having used just 20% of such an opportunity. This showed the conservatism of the Ukrainian anti-carbon policy, which led to the loss of large foreign investment opportunities within the great potential of investment capacity and attractiveness of the Ukrainian economy.

The duality in state support of carbon and carbon-free energy creates a serious problem for the forming of incentives for low-carbon development in Ukraine. According to the IMF, the state support for carbon and carbon-free energy in all industries in Ukraine is about 17% of GDP. With this figure, Ukraine ranked 17th in the anti-rating among 134 countries surveyed. At the same time, the level of state support for renewable energy (also in all industries) reaches less than 0.08% of GDP (one of the lowest places among the countries surveyed). The ratio of the amount of state support for renewable (carbon-free) energy to the carbon one is 0.5%. This is the lowest figure among European countries. Therefore, it is fundamentally important for Ukraine to eliminate contradictions and duality in the system of state energy funding. In view of these shortcomings of the state support system for the energy sector in Ukraine, the conceptual provisions of the proposed global incentive system for sustainable low-carbon development can be quite acceptable.

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Improving management of risks related to international operations in bank engineering

Abstract: This article describes main risks associated with international operations in banking engineering practice. There is a review of the situation on the international market in this area. It is concluded to use the concept of VaR method for the objective estimation of the risks of commercial banks.

Keywords: banking engineering, banking risks, credit risk, liquidity risk, legal risk, strategic risk, reputation loss risk.

While the economy is globalizing all over the world, the activity of banks is also expanding. Expansion of the banks' activities is connected with the fact that, first of all, banks offer services for foreign economic activities of the clients and, banks start their performance in the world financial markets. Therefore, international activity of the bank can comprise of different aspects such as foreign exchange operations, lending, accounting, fund and guarantee operations. Clients of the bank can be both residents and non-residents of the country and it, in turn, raises probability of risks.

The difference of bank's internal operations from its international operations is that more sources of risks can occur in the international performance. The participants of these operations can include a client, a bank itself and a foreign representative office. All

above-mentioned statements prove the urgency to study not only national participants of international operations, but also foreign participants with the account of factors of risks which can occur.

The global factor of raising the risks in international activity of banks is reduction of the volume of operations on the best assets and liabilities from the liquidity point of view and increase of the operations related to capital mitigation, in particular, increase of the volume of virtual operations with securities. Rapidly increasing number of virtual agreements in the world financial markets can result in financial fluctuations and it, in its turn, in conditions of interconnection of economic liberalization and national economy is extending weaknesses of international bank operations like chain reaction.

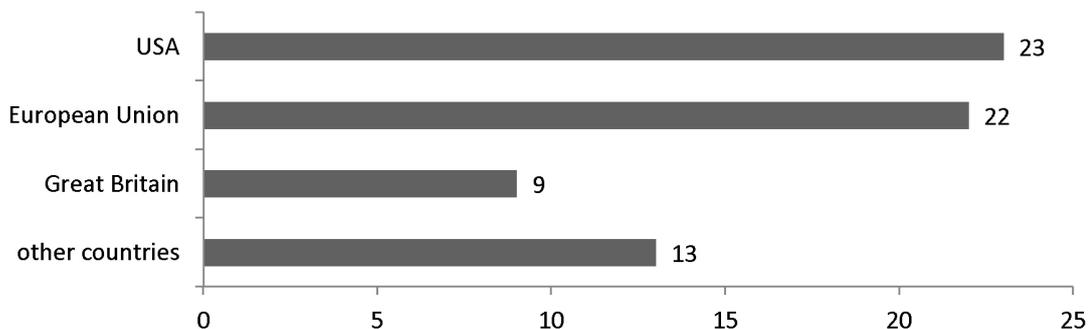


Fig. 1. Illegal (hidden) operations in some countries (for 2012, in trillion USD) [10]

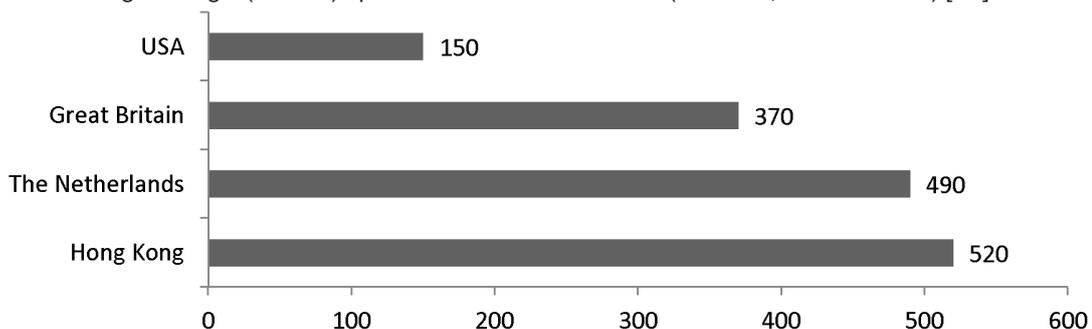


Fig. 2. Illegal (hidden) financial and bank operations performed via offshore zones (2012, in relations to GDP, %) [10]

From the analysis we can see that all over the world in 2012 the indicator of performing illegal operations sharply rocketed. In particular we can see that if in 2002 this indicator accounted for 26 trillion USD, in 2007 it was 62 trillion USD and in 2012 this indicator amounted to trillion USD.

Significant increase of the volume of operations performed via banks offshore zones can be considered to be the issue of concern. In Hong Kong the relation of illegal operations to GDP accounts for 520 %, in the Netherlands this relation amounts to 490 %. During

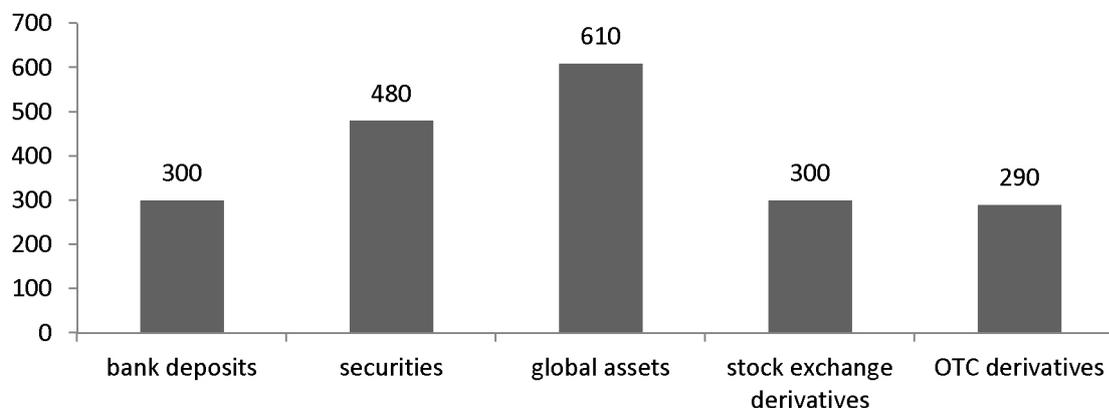


Fig. 3. Value of total assets in 2012 in trillion USD [11]

Growing number of these indicators results in increase of risks inherent to international operations. A comprehensive approach to the risks occurred in international banking operations enables to systematize these types. Among these risks a foreign exchange risk (currency risk) is considered to be the most important because since signing foreign trade or credit agreement and over the duration of the contract there is a possibility of the risk of foreign exchange loss because of the change of the exchange rate price in relation to the payment exchange rate. There are the following types of foreign exchange risk: the risk related to operations — the risk of bearing a loss or receiving a profit not in a full amount; the risk related to the balance (translation) — non-compliance of assets and liabilities stated in foreign exchange. The basis of foreign exchange risk consists of changes of the value of money obligations in the fixed period of time. The bank and its exporting customer can bear some loss because of the reduction of the exchange rate of the agreement, and, as a result, they receive the real value which is less than the value expected in the contract. Like the situation stated above, the bank — lender can bear the risk of non-getting back the equivalent of the loan temporarily given to the borrower. On the contrary, the increase of the loan exchange rate in relation to the national currency can raise the possibility of the foreign exchange risk for the bank. In both cases the national currency equivalent of the borrower at the same time can seem a rather small amount for counterparties signing the agreement. In case of operations between banks and customers, fluctuations of the exchange rates can bring profit to the one counterparty, but another one can bear loss at the same time. Foreign exchange risks can be dangerous for all participants of international bank operations. Foreign exchange risks of banks can occur in case of open exchange positions. Changes of the exchange rates make an impact on the result of the performance of banks engaged in implementing investments on different currencies and different countries. When the foreign exchange faces devaluation while implementing real settlements in national currency, an amount of capital placements can be lower than at the moment of placing investments, and, in turn, can lead to the loss.

6-month period of 2012 we can observe a sharp rise of the number of companies registered in offshore zones. This situation illustrates lack of the appropriate measures undertaken to reduce a negative impact of the world financial economic crisis.

Moreover, a sharp increase of derivatives makes a huge impact on the practice of performing international operations. In 2012 the total value of over-the-counter derivatives accounted for 290 trl. USD, stock exchange derivatives amounted to 300 trl. USD and global assets made 610 trl. USD.

Sharp short-term and significant long-term fluctuations of exchange rates lead to the over-estimation or under-estimation of the foreign exchange in the national and global markets. This creates favourable opportunities for wide-spread speculation of foreign exchange.

If the bank possesses an open foreign exchange position, if liabilities and obligations on sold foreign exchange exceed assets and requirements, short-type risks can occur. On the contrary, if assets and requirements on sold foreign exchange exceed liabilities and obligations, long-type foreign exchange risks always happen.

At the time of counter-agreement execution as well as at the moment of buying foreign exchange previously sold and selling foreign exchange previously bought, and if the changes aren't favourable and beneficial for the bank, this bank can be subject to the risk. The bank buys foreign exchange in the amount which is less than the amount sold and pays the equivalent sum which amount is more than previously bought foreign exchange. Profit and loss are connected with the direction of forex change or with the currency position of the bank.

At the time of performing international credit operations banks can be subject to risk as a lender and a borrower. The bank getting a loan from abroad can face the following risks [9]:

- Foreign exchange (currency) risk;
- Low efficiency of international credit operations.

This risk can occur if the average term of the use of the total amount of the loan received in foreign exchange is much bigger than its total term. It depends on the term fixed in the agreement, use of the principal and its maturity and a grace period of servicing external debt.

- In case if the value of international credit is determined by the contract increases or if it grows as a result of being hidden, it can lead to profitability. This is connected with the possibility of reduction of the interest rates of the loan capital in the world market in relation to the rates determined in the contract and can occur due to the implementation of different commissions by lending foreign bank (negotiations, participation, management and accepting an amount of the loan as a reserve). This risk is connected with open elements of the

loan value: 1st degree security of the borrower, in particular, liquid assets, insuring unfavourable conditions by some insurance companies, demand for introducing reserve requirements to the volume of the loan. Some elements of the value of the international loan cannot be assessed by money, they can be very important in establishing supervision under the bank-borrower. External preference conditions of some international lenders are connected with hidden expenses and cannot make risks more expensive.

Credit risk is considered to be the most typical risk for the bank as an international lender. It can occur in case if a borrower doesn't accomplish his financial obligations in compliance with the contract completely and in time [6]. The bank which has extended an international loan can be subject to the risk of non-payment of the principal and interest by the borrower. Peculiarities of these obligations depend on the type of the international loan. These types can be the following: export-import loans, *tratta* (transfer bill), consortium/syndicated loan, financing the project, leasing, factoring, forfeiting, etc. [4].

Non-remittance of the international settlement resources implemented by banks, risk of non-payment (especially with applying incashment through open account without additional guarantees), foreign exchange risk, submitting false or fraudulent documents to banks, various export-import contracts on different sums of agreement are widely spread in the world practice [5].

Peculiarities of the *market risk* connected with international agreements of the banks include financing issues, for example, negative changes in the financial market, leading to possible losses. Market risks include interest rate risks, foreign exchange risks and stock risks [3]. *Stock risks* can occur when banks perform operations with securities and at that time their market quotations become unfavourable for the bank [3].

Liquidity risk happen if performing international operations the bank cannot execute its financial obligations for domestic and foreign customers and counterparties. Liquidity risks can lead to difficult consequences like bankruptcy and possibility to charge the amount of financial obligation by the court house [8].

Legal risk can occur when the procedure of the international bank operation isn't in compliance with national legal regulators, requirements of international regulations and traditions and doesn't suit the terms of the contract between a domestic and a foreign customer or counterparty. This risk can also happen due to the mistakes made by bank employees while preparing documents for international operations of the bank. Losses can be also resulted because of existing law non-perfection [1].

Strategic risk can happen if to rely on non-accurate strategy while performing international operations without taking into account overall risks faced by the bank, non-correct determination of the perspectives of the bank's international activity and its foreign counterparties [8].

In international bank's activity the risk of *reputation loss* deserve a particular attention. This risk is considered to be the risk of losing reputation and trust and can appear in the form when the operations performed by the bank don't meet expectations of resident and non-resident counterparties. It can also occur when the general public has a negative opinion about financial stability of the bank as well as professional skills and qualifications of the bank management and its employees. The risk of the reputation loss can negatively impact attraction of external debts and developing cooperation between foreign customers and counterparties.

In conditions of global expansion of operations with hidden capital, legalization of criminal income and terrorism financing

we cannot deny a possibility of entering these negative processes in international bank's operations and such kind of risk is dramatically rising.

Outflow of the capital from Russia in 2000–2008 accounted for 427 bln. USD. During 1990–2008 years 21–32 trl. USD were hidden from taxation in offshore zones. If in 2008 capital outflow accounted for 4–8 % to the GDP, in 2011 this indicator amounted to 12 %. According to the results of 2011 outflow from Russia kept 30–40 % of private assets in offshore countries. In the USA this indicator is equal to 2–3 %, in the European Union it amounts to 10 % [2]. In order to be aware of the risk of the liquidity loss as well as withdrawing a license from the bank by supervising authorities it is required to detect suspicious bank operations and inform them the agency for financial monitoring.

Nowadays one of the most widely-used methods of assessing these risks is the method of comparing open trade position with expected changes of the cost of assets formulating this position. No doubt, the accuracy and reliability of this method of risk assessment depends on how accurately and correctly price changes are forecasted. An experienced specialist who perfectly knows market laws and methods of technical analysis can make a reasonable conclusion about market rates and quotations. However, there are more factors which should be taken into consideration. The more factors influencing fluctuations of financial markets and leading to unexpected situations we take into account, the more important problem is raised. In turn, it is leading to the necessity of using the approach which enables to provide a more exact forecast of a big volume of operations and inherent market fluctuations. The sample of such kind of approach is the VaR method which enables to assess the value of the risk.

The concept of determining risk value cannot change the essence of methods assessing market risks. Therefore it is recommended to introduce additional restrictions to calculate the volume of probable loss. The restrictions can be the following:

- Maximal value of probable losses which can be faced by investors in the market;
- Probability of non-exceeding the maximal value of losses expected by the investor through confidence;
- Exceeding maximal losses expected by the investor which have been entirely unexpected during the period of time.

So we can make a conclusion that value at risk (VaR) denotes the maximal degree of the risk expected within an exact term on the portfolio placements during a certain period of time. According to the rule, while calculating VaR, the period of time can vary from 1 day to 10 days, and a reliable limits of this value fluctuates between 95–99 %.

The VaR can be calculated according to the following formula:

$$K_i = \frac{\beta_i}{\sqrt{\alpha}} \cdot R^2 \cdot 100\%$$

where:

- q — quants' denoting a reliable limit, q for a reliable limit of 95 % is equal to 1.65, of 99 % is equal to 2.33;
- d_i — denotes standard deviation for i asset;
- OTP — open trade position (for i asset).

Moreover, in compliance with the recommendations of the Basel Committee on Bank supervision while calculating the VaR the following points should be taken into account:

- it is necessary to take into account at least 1 year retrospective data at calculating changes of the value of market prices;
- the period of maintaining this position consists of 10 days because keeping this position for 1 day has rather optimistic

peculiarities so closing this position even in the market of the high liquidity requires time. In case if the period of maintaining this position consists of 10 days in order to take into account raising degree of risks it is necessary to multiply daily standard deviation into the square root of 10 or 3.16;

- to provide additional protection for financially unstable cases occurred during the past time it is advisable to use a coordination multiplier which is equal to 3 (so-called "Basel" multiplier).

In conclusion we can say that the VaR method widely used in assessing risks connected with international operations of banks has

the following advantages: its results are obviously seen, this method is scientifically-grounded and can be used at assessing different kinds of risks.

Nowadays the VaR method is considered to be the most common method used for assessing risks for participants of the banking system in western countries. European agencies are gradually paying more attention to the VaR method as the method used to supervise ban activity. Therefore in conditions of integration of the banking system of developing countries with the western countries' banking systems the importance of using VaR method in practice and market of Uzbekistan is significantly increasing.

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Potential of the Internet network in formation of the assortment of the trade organizations

Abstract: Provision of availability to population of goods is the important social task of organizations of trade. But than population density is lower, the narrower is the offered assortment of goods to the consumers, and the higher are costs for organization of physical distribution with it. Use of e-commerce mechanisms serves to the solution of this task.

Keywords: trade, retail trade, electronic commerce, electronic trading, range of trade, digital goods.

Retail is one of the industries with which the consumers directly interact. The organizations of retail carry out direct contact with population, mostly, determining quality of its life. It defines high social responsibility of trade organizations in modern economy. However, striving of trade organizations to optimize costs for goods movement leads to reduction of the proposed assortment, reducing possibilities of a consumer choice.

Now the lower is the population density, the narrower is the offered assortment of goods to the consumers, and the higher are costs for organization of physical distribution with it. It is being explained by the fact that, on one hand, cost of delivery of goods to the regions is higher and on another side probability of a purchase of goods by buyers is lower. Reduction of the level of prices on goods being sold is the important task of regional goods movement. Unfortunately, lower density of population of regions leads to the fact

that value of goods is dividing into a smaller number of people, which leads to increase of value of goods and hence to reduction of a breadth of assortment. Organization of a large quantity of regional decentralized goods connections is the more complex problem than use of hub system of goods supply. Efficiency of investment in creation of such a system is sufficiently high.

Requirements of buyers are the major factor determining a realized assortment of products. Use of e-commerce mechanisms serves to the solution of this task.

Provision of availability to population of goods is the important social task of organizations of trade [1]. But in traditional trade, as was said above, high costs for goods movement are hampering resolution of the mentioned task.

Electronic trade is a modern direction of trade development. Development of electronic trading was in the first place determined

by development of information technology, but in the development such a kind of trading activity has a number of advantages. One of them is a potentially lower price level in electronic trading in comparison to traditional one. Potential of reduction of prices of electronic trading is being formed on basis of lower costs for organization of a trade-technological process, as well as is determined based on the market mechanisms by higher level of competition. The low prices, the discount systems allow to sell goods to socially-open groups of population [2].

The electronic trading technologies allow to optimize backing of a trade organization with goods resources. The mechanisms of electronic trading allow the trade organizations to form stock-in-trades on basis of a consumer choice, using information about behavior of a consumer in the internet network, Formation of stock-in-trades on basis of a consumer choice possesses a number of advantages for a buyer, as well as for a seller — the buyer receives a possibility to acquire precisely those goods that he needs choosing from a sufficiently wide assortment of a proposal in goods, but the seller does not incur costs for procurement of the products on which there's no consumer demand. Originally the product sales were presupposed in academic works with use of a service of delivery of goods to the buyer, but the practice showed great popularity of a service of self-exportation of goods [3]. Sale of goods with use of a service of self-exportation of goods allows to implement the process of buying of goods to a buyer maximally similar to a traditional form while trade organizations have an opportunity to form an optimal range of products.

E-commerce makes a vast difference for persons with disabilities. It is electronic trading that in this case allows to make a purchase of goods on his own without leaving the house.

Sale of digital goods is one of the directions of development of electronic trading. The internet network is the ideal main one for their sale. Legally sale of digital goods in a number of countries has dual legislative regulation — on one hand, the process of purchase and sale of goods, on the other hand, is occurring — copyright legislation is being applied.

Sale of digital goods allows to implement the process of well-made e-commerce — goods do not have material basis — and, accordingly, necessity of delivery of these goods is absent. All the process of a purchase of sale can occur in several minutes. Volume of supply of digital goods in the market is increasing, accordingly, is increasing and there is the number of purchase and sale transactions.

Creation of its unauthorized copies is the major problem on sale of digital goods. If a consumer is unable to copy goods having material basis or costs for such copy usually exceed value of goods, digital goods are copied without problems. Thus the unconscientious consumer strives to acquire one minimum consumer, a copy of goods more often — and, in addition, to create the necessary number of copies. A large quantity of cases of an abuse of their rights by buyers is addressed in judicial practice of a number of countries and sale of digital goods gives the additional occasion for consumer extremism if the consumer has made a copy, he does not need directly purchased goods any more.

For the purpose of protection against such risks commercial means of protection are applying — some components making creation of copies of such goods more difficult or impossible are brought into digital goods. But application of technical preservatives creates of itself problems for legal users — they need to post additional actions on entry of additional codes, storage of documentation. The cases when officially purchased disks led to bigger wear or a breakdown of equipment are known. Since the other side,

application of protective means compromises a concept of digital goods itself. The buyer can acquire a music piece for the purpose of listening a certain device such as a portable player. But recording a musical composition to memory of such a device is per se a copy that it will be incredible in case of protections. For this purpose, DRM technology is applying, but the vast majority of users do not know what it is like. At the same time the delinquents who made illegal copies will not experience such problems.

Sale of digital goods is contributing to development of regions. Often tourists are buyers of digital goods. At the same time the tourist acquires digital goods directly for use on the device he has which requires certain material basis of sale of goods. The situation becomes more complicated if the tourist does not have the equipment which will allow him/her to load information to memory of his/her device. Music players are the example, the one using the private memory for storage. In that regard introduction in trade organizations of a service of load of information to memory of a matching device seems optimal.

In the modern world role of mobile commerce is vast. An ever larger user population constantly uses in everyday life mobile computer devices such as tablets, mobile phones, etc. And the manufacturers of these devices embed a function of a purchase of digital goods in the own Web shops in them. It leads to additional revenues of producers of mobile devices, convenience of users because purchased goods with high probability will be easily used on a mobile device, legalization of market of digital goods.

But such an approach leads to strong reduction of competition. The buyer is locked into a particular Web shop, moreover, some manufacturers put severe artificial technical restrictions on use of digital goods purchased on the side. As a result, the producers receive vast advantages — a large part of revenues remains in their Internet — stores — and the buyer remains attached to a competitive mobile device — at the replacement of a mobile device the buyer will be able to continue the use of favorite digital goods (at worst, they will have to reacquire them in the same Internet store, but often transfer is executed free). During a purchase of a device by another manufacturer digital goods can be absent in an assortment of his Web shop and the buyer will not be able to acquire goods for whatever money.

To the present time practice is very much spread when goods are sold together with some electronic device. Impossibility to buy an electronic device without digital goods conflicts with legislation and is a subject of proceedings.

The digital goods which are free according to the decision of their manufacturers, including for commercial use, are the following problem. For an ordinary consumer the fact of right of free usage is coming with advantage and lead to an economy of monetary funds, as well as to absence of complexities in copy protections, then for commercial organizations there arise complications with determination of value of such property. In essence free digital good is presented by a manufacturer to a consumer and in accordance with legislation its value must be determined at cost of goods (an analogue). But the digital goods are per se unique and the task of a definition of an analogue is solved in extremely complicated manner. Audio– books which received the wide circulation in a segment of consumers of retirement age — appear as implementation of social role on sale of such goods.

Notwithstanding remote trade is characterized by the fact that the buyer does not have direct contact with acquired goods and the buyer has a possibility to get acquainted with the goods only from a description on the website.

The possibilities of telecommunication networks allow the goods producers to cover broader markets. Many producers do not have possibilities for organization of the own sale network or the organization of such a network does not give potential profit for a goods producer. Use of tools of remote trading allows, however, to organize sale of goods without forming his own branching trading network in different world points.

The respective trend on introduction of forms of trade in distance is observed in traditional stores as well. The organization of proprietary Web shops, as well as additional services being provided through a network are assigned to such trends. Reservation of goods is the example of such services for particular buyers, at

the same time the goods which are really unavailable at a particular point of sale may be reserved. In this case the buyer is informed of the time in which he has an opportunity to acquire goods. The job by such a scheme is similar to a customer pickup service is morally perceived as goods' being bought at the same time by a buyer, as made in a certain point of sale.

Role of the internet network during stimulation of purchases of a proposed range of products is also high.

In conclusion, high role of a subsequent internet- of technologies during initial formation of an assortment of trade organizations, as well as during stimulation of its further implementation should be noted.

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Strategy of enhancing competitive advantages of a commercial bank based on an innovative approach

Abstract: The article considers the interrelation of competitive advantages and innovation activities of a commercial bank. The following four strategies are proposed and grounded to enhance the competitive advantages of the bank: strategy of qualitative renewal of banking products and services based on innovation, strategy of active expansion of sales of banking products, strategy of the gaining the great trust of customers and strategy of aggressive policy against target segments.

Keywords: commercial bank, bank system, competition, competitive advantages.

The present stage of development of commercial banks in Uzbekistan is characterized by the growth of non-cash turnover and public demand for services associated with the use of plastic cards, serving non-cash payments, as well as by new means of communication in the management of the bank account. Under these conditions, complementary factor, which is meant to provide the competitiveness of commercial banks becomes their strategic development program based on the development and effective use of innovation potential, including the development of new banking technologies, products and services. This is reflected in the development of systems such as “Bank-Client”, “Internet Banking”, “Mobile Banking”, “the SMS-Banking” and other.

Nevertheless, further sustainable development of commercial banks depends importantly on designing and implementing of new and innovative banking products and services based on information technologies. This will allow banks to improve and enhance the quality of banking services, thus creating a competitive advantage not only for the number of individual banks, but also for the entire banking system as a whole. Meanwhile, we can say that the expanded use of financial innovation leads to a strengthening of the position of credit institutions in the financial market, which is especially important in the conditions of competition for customers between the various commercial banks.

Innovative activity of commercial bank should be subordinated to its main objective, i. e. for maximum satisfaction of customer

requirements for the quantity and quality of services at the lowest possible cost for their development, implementation, delivery and profit making on this basis. Under conditions of tightening of competition, well-organized innovative activity will enable Bank to reach competitive advantages. Besides, competitive advantage is not some abstract concept, but a very real condition of the bank, which distinguishes it from other banks. The bank with competitive advantage, is attractive in the eyes of customers, has a high profit, is characterized by stable performance, and provides an example to be followed.

The efficiency and competitive advantages of a modern bank are impossible without strategic management of all aspects of its activities, including innovative. Monitoring of the development and innovation in the financial sector, the creation of this flexible process control system, and the availability of creative climate in the team could be key to a successful bank's implementation in the fiercely competitive, saturated with participants and products financial market. However, in the modern context, a Bank can reach specific competitive advantages only if its innovative activity is based on feasible strategies that set it apart from other credit institutions.

In our view, innovative activity of commercial bank, aimed at achieving competitive advantage should be based on the following strategies: a qualitative renewal of products and services based on innovation, the active expansion of sales of banking products, gaining the great trust of customers, an aggressive policy towards target segments (Fig. 1).

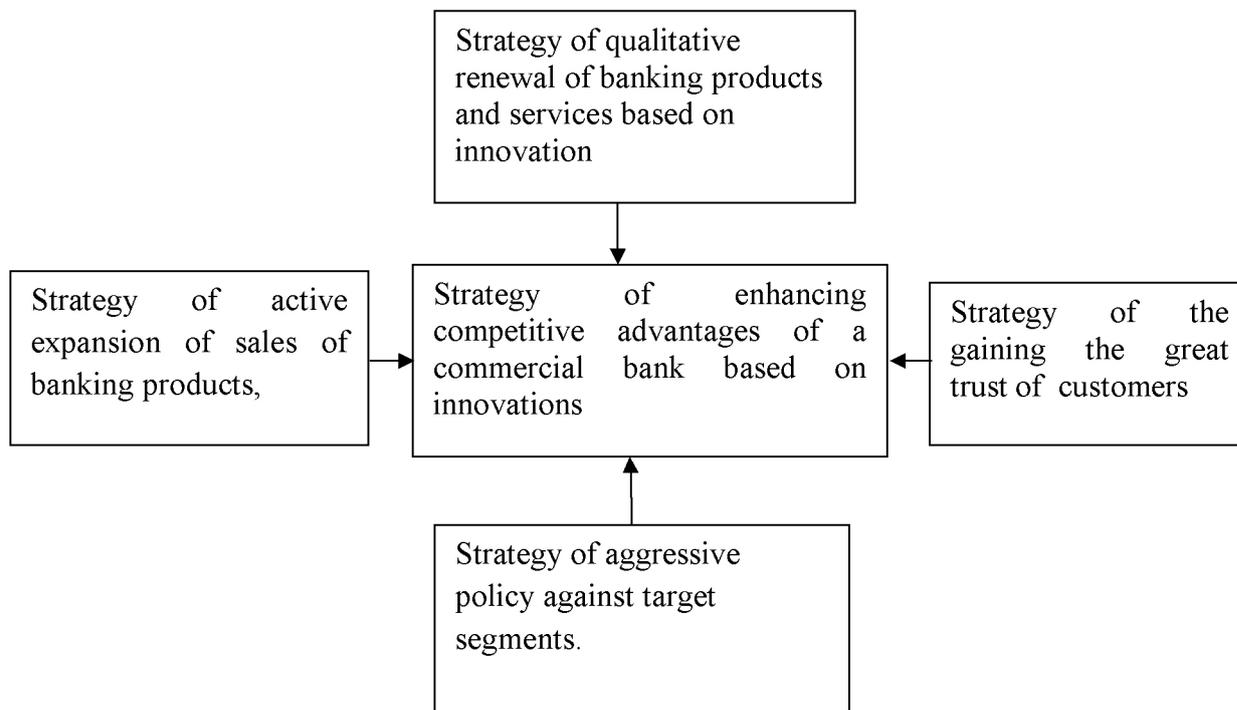


Fig. 1. Strategy of enhancing competitive advantages of a commercial bank based on innovations

Strategy of qualitative renewal of banking products and services based on innovation. This strategy is aimed at promoting the maximum renewal of banking products by offering a qualitatively new services based on innovation. Here is a matter of qualitative upgrading of the offered products in order to better meet the needs of consumer. The updating of banking services should be based on the wide application of innovations. This strategy is developed and implemented to increase sales and it directly impacts on the bank's profits. The strategy favors the establishment of mutually beneficial relationships with customers and allows expanding its market share, thus will enhance the competitive advantages of the bank.

Strategy of active expansion of sales of banking products. This strategy is directly derived from previous strategy. The strategy of active expansion of sales represents the activity of offering customers new products or replacement of products, which had already been consumed in due time. This strategy provides a good profit and allows reaching advantages above its competitors. One of the main conditions for the success of this strategy is a logical sequence of new innovative services offered to the customer in the sales process. The products should be interesting and attractive for the customer and should be included in the package of services that can be proposed to sell at any moment. By means of analysis of the existing set of services, new products that haven't been enjoyed by the clientele served yet, but in which are to be necessarily interested potential customers, could be included in the proposed package for potential customers.

Strategy of the gaining the great trust of customers. It is obvious that customer trust depends not only on established close relations with the bank, but also on the number of products purchased by customer. Reliable and trusted customer purchases more products, costs less, and usually brings a large income, because he wills to pay a high price for high quality service and a trusting relationship with the sales point. For the development and implementation of the strategy of the gaining the great trust of customers, it is required to have adequate marketing tools and information systems, based on innovative technologies.

This requires that bank employee, who directly contacts the client, has full information about client. This suggests that the bank staff should have full information about the client's relationship with the bank. In this case, it is about creating a trusting relationship with the client by offering him the bank product, the need for which arises from the fact that every client is different from the other and, therefore, expects that its service will be individual, acceptable only for him. As a first step in the implementation of this strategy the nominal list of clients should be made with the help of Client's profile card.

Strategy of aggressive policy against target segments. Customers, who are satisfied with the bank services, become active agents of sales promotion policy of banking products. Customers themselves advertise the bank on the positive side to their family, friends and colleagues. This helps to simplify the banking activities for customer engagement. First of all, strategy of the gaining the great trust of customers should be implemented towards existing ones, with a focus on those customers, who are included in the target segments. The Strategy highlights aggressive policy, which should be conducted to potential clients by winning their confidence to tout bank products. Finally, it will lead to forming of new target segments, which will enhance the competitive advantages of the commercial bank.

The successful use of aforementioned strategies directs the bank to achieve competitive advantage through the implementation of organizational, informational and technological innovation. Such strategies are designed for banks participating in the implementation of promising but risky innovative projects. Examples of such banks are credit and financial institutions that implement information and network technology, as well as implementing processing systems and other innovative products that provides quick transition to a qualitatively new provision of banking services demanded by customers.

Conclusions: In order to form and achieve competitive advantages, a commercial bank should develop and implement the abovementioned strategies as well as to create certain conditions. First of all, based on the analysis of customer needs and the latest achievements of the competitors, innovation activity should be

continuously innovated in the bank, as well as new banking products should be introduced and developed. These features of the bank relate to the specifics of the bank, which is an innovative structure of the economy with highly qualified, initiative and professional employees. In addition, the bank differs in dynamic abilities in rapid implementation of customers' need and in adapting to business environment changes. This distinguishes the bank from other

entities of the economy, because of the appeal of its brand, image and efficiency of business processes, and other intangible assets, including the knowledge and professionalism of the staff. To increase the effectiveness of the proposed policies, it is necessary not only to develop and apply the correct strategy, but also take into account the interrelation of the strategy, organizational structure, culture and management practices.

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Section 14. Science of law

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Contents of the legal status of the deputy of the representative body of state power

Abstract: The article is dedicated to research of the structure of the legal status of the deputy of the representative power body. Based on the analysis of various approaches to the notion of the status of the deputy, determination and characteristics of its basic structural elements, the authors provide a new look at the problems of contents of the category “legal status of the deputy”.

Keywords: legal status, deputy, elector, powers, guarantees, responsibility.

Problems of the legal status of the deputies of representative bodies of state power have special meaning, as they permit determining the extent of dependence of the deputies on the will of the electors and responsibility to the electors for their activity.

In the legal science the category “legal status” is widely used, though up to this moment not just the generally definition of the legal status is not worked out, but also approaches to its research differ. At the opinion of professor L. P. Rasskazov the legal status may be defined as the accumulation of recognized and state guaranteed freedoms and rights, and obligations established by the state [6, 167]. As S. I. Arkhipov states, by means of notion of the legal status the general social and legal position of law subject is defined, as well as the level of its legal opportunities, and attitude towards it of the state and other persons is indirectly expressed. In this regard the legal status may be considered as the indicator of the regulatory possibilities of the subject of law, its place and role in the legal system [5, 166]. Professor V. V. Dolinskaya points out three basic approaches to research of the notion «legal status»:

- 1) the legal status as the rights, freedoms and obligations;
- 2) the legal status includes all legal facilities, which legally define and formalize the position of the person in the society;
- 3) The structure of the legal status includes certain legal facilities, formalizing the position of the person in the society [2].

This way, the basic discussion concentrates around the contents and the elements of the legal status. Some authors interpret the notion under consideration too widely, the other — too narrowly. The analysis of various points of view as to the definition of the term «legal status» allows to make a conclusion that this category is considered as an independent legal institution, which constituent elements are rights, obligations, guarantees of their performance, conditions of possessing the rights.

On the basis of the basic construction of the legal status let us consider a derivative institution of the legal status of a deputy. A deputy is an elective person, who represents the electors, carries out their interests in the representative government body, as well as

carries out powers, corresponding with his legal status. Assuming an office, the deputy receives a mandate, i. e. the right and the obligations at the same time to represent the interests of the electors, to participate in the work of representative power bodies.

It is worth mentioning, that reasoning of the structure of the legal status of the subject are fair also in the course of defining the contents of the legal status of the deputy. In the law science there is no single understanding of the structure of the legal status of the deputy, presence or absence of one or another element. The central element of the legal status of the deputy is accumulation of his rights, as the facility of possible behavior, guaranteed by the state, and obligations as the means of due behavior, established by the state. The rights of the deputy are aimed at providing due performance of his duties, therefore the key element of the legal status of the deputy shall be his obligations. He is endowed with powers and authorities, which are delegated to him by the electors to represent their interests in the representative public power body, therefore in the statutory regulation of the activity of the deputy the method of obligation prevails [1]. Therewith, in order the deputy was recognized as the subject of law and acquired certain rights and duties, he should have basis to acquire and terminate the status of the deputy, which form the prerequisite for his subjective rights and obligations.

The element of the legal status is the responsibility of the deputies, presenting special interest, as taking into account the specificity of the activity carried out by them, the deputies bear social responsibility to the society for the decisions and regulatory acts made by them. We agree with the opinion of A. V. Malko and R. S. Markunin, which consider the responsibility of the deputy as the social necessity of initiative performance of the duty understood and perceived by the deputy, as well as all political, moral and legal duties assumed by him [3]. Establishment of responsibility of the deputy is preconditioned by a social function of the people’s representative, involving providing a feedback of the deputy with the electors, embodiment of the will of the electors in decisions of representative bodies. A specific result of the legal responsibility is the means of legal disapproval,

expressing itself in unfavorable consequences for the deputy in the form of certain deprivations.

Besides the named elements, the structure of the legal status of the deputy includes legal guarantees of the deputy's activity, representing the system of legal conditions and facilities, providing realization by the deputy of his rights and duties, as well as protection from the side of the state. Guarantees of the deputy's activity may be subdivided into three groups: 1) guarantees, contributing to the direct performance of the deputy's obligations; 2) guarantees, providing social and economic benefits to the deputies; 3) guarantees, providing legal protection to the deputies against illegal actions in connection with performance of their duties by them. It seems logic to include restriction on performance of the deputy's activity and occupation of positions into the notion of the legal status.

Proceeding from the abovementioned, the legal status of the deputy may be defined as the accumulation of regulatory norms, governing public relations, connected with arising, termination and contents of the deputies' powers, guarantees of performance of the powers, as well as subordination and responsibility of the deputies. It follows that the importance elements of the legal status of the deputy are not just the rights and obligations, but also the powers, the guarantees of their performance and the responsibility.

This way, the legal status of the deputies of representative bodies of state power is characterized by three elements: the nature of the deputy's mandate; the rights and the duties of the deputy; the guarantees of the deputy's activity. It is possible to join the opinion of those authors, who consider that the contents of the legal status of the deputies, except for those named above, also includes the following elements: the term of the powers, the relations with the electors, the control powers. Consequently, the specific feature of the legal status of the deputy is granting rights to them, provided with real guarantees of their exercising [4, 31]. Meaning of no small importance for detecting the nature of the deputy's status belongs to obtaining the mandate and its term. The source of the deputy's powers is expression of the will of his electors, to which voluntariness of getting by the electors of the deputy's mandate corresponds.

A lot of factors have an impact on the legal status of the deputies. The critical meaning belongs to the model of relation of the deputy with the electors — a free or an imperative mandate. The imperative mandate represents the powers, received by the deputy from the electors on condition that the deputy is to carry out their orders and

bear responsibility to the electors. The definitive meaning for the imperative nature of the deputy's mandate belongs to the institutions of withdrawal, as the orders to the deputies and their reports without the right of withdrawal may not make the mandate imperative. Such mandate stipulates permanent control by the electors over the deputies' activity. With such system of relations the deputy is not free in selection of his position in the course of solution to a questions in the representative body, he shall express his interests and the will of the people not on the whole, but his electors only. The imperative nature of the deputy's mandate is in its representative nature.

As B. N. Chicherin states, the representation is not a simple instruction: «When a certain person charges his affairs to another one, he means performance of his personal will, which he delegates to the attorney for his own benefit or convenience, who takes his place. The latter here is the instrument or the means in the hands of the other. He shall act exclusively in the interests of the principal, under his orders, in the limits established by him. If he deviates from the aim, if he acts not in accordance with the will of the principal, the latter may always request a report from him, destroy the power and even bring him to responsibility. All this is impossible in peoples' representation...» [7, 3]. Consequently, the essence of the deputy's mandate is not in performance of the will of those, who had issued the mandate, but in performance of functions, established by the legislation for the representative body. The free deputy's mandate is based on such relations, adopted in the modern democratic states.

The free mandate stipulates that the deputy is not connected by any orders from the electors, and the powers are realized by him proceeding from his own persuasions in the interests of the whole peoples. In case the interests of the electors of a certain district do not coincide with the general interests of the peoples, the general interests shall prevail with such mandate. With the free mandate there cannot be withdrawal of the deputies, and the responsibility for his activity shall be incurred by him not to his electors, but to the peoples on the whole.

This way, the legal status of the deputy of the representative body of state power may be interpreted as a complex legal institution, representing an accumulation of the norms, governing the basis for acquisition and termination of the deputy's status, his rights, duties and responsibility, guarantees and limitation in the course of performing the deputy's activity.

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