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Section 1. Architecture

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Historical and cultural landscape of the Ancient Villages of Northern Syria

Abstract: The article presents a view of the issue of interactions between space and landscape architecture, judging from the position that these interactions are determined by cultural peculiarities as well as specific features of nature and landscape in the region. Taking into consideration the above-mentioned, it can be stated that a principal distinction between proper architecture and landscape architecture as its component simply does not exist. The phenomenon of a historically created cultural landscape has been discussed, where there are no borders between landscape and architecture, i. e. architecture has blended with the landscape and should be seen as a comprehensive whole.

Keywords: architectural environment, natural surroundings, cultural landscape, Ancient villages of Northern Syria.

Architecture as the art of space formation for human activity is tightly connected with environment, and the latter has its origin in natural surroundings. To prove the above, a statement by Le Corbusier can be cited: "An area that consists of a space and unevenness of the ground, water surface, rocks and sky, dressed in grass and forests, with various perspectives or an open even horizon is food for mind which is provided by our eyes to our sensual and emotional perception as well as our intellect. An area is the initial base for any architectural composition" [1, 213–276]. At the same time Le Corbusier argues that an architectural structure must absorb the landscape and make it its integral part [1, 213–276].

A historically created cultural landscape is a phenomenon in which the boundaries between the landscape and architecture are erased, i. e. architecture has blended with the landscape and formed a single unity with it. These relict landscape areas outside megalopolises play an important role in displaying harmonious relation between the human and environment. In view of the pressing need to preserve the national heritage of Arab countries the notion of the historical and cultural landscape as a specific category of cultural heritage objects becomes crucial.

Cultural landscape is a historically balanced system in which natural and cultural components form a harmonious unity. They cannot be seen only as the background or an influencing factor from one element of the system towards the other [2]. There are different approaches to treating a cultural landscape. A cultural landscape is often defined as an anthropogenic one, i. e. a landscape changed by the man but at the same time preserving certain aesthetic and functional properties. The second approach is characterized by the definition of a cultural landscape as an area which for a long time was inhabited by a certain group of people who were the carriers of some specific cultural values [2].

One more approach is based on the "concept of an active role of intellectual and spiritual activity in establishing a cultural landscape" [2]. In this case it is emphasized that the "cultural, spiritual and intellectual values that are kept and transferred from one generation to the other in the form of information not only determine the formation and development of the cultural landscape but are also its part, being at the same time influenced by other, material components of the landscape" [2]. This approach seems to characterize the phenomenon of cultural landscape in the most comprehensive way.

Preservation of cultural heritage is the most important role of cultural landscape. The development of the concept of cultural landscape in research practice is often connected with the UNESCO activity.

Cultural landscape as a heritage object was officially acknowledged by the world community in 1972 and this notion was included in the text of the main governing document on the use of the World Heritage Convention: "Operational Guidelines for the Implementation of the World Heritage Convention". In May 2009 this document was revised at the conference by experts of the countries that are UNESCO members (the author of the article is a member of the expert team).

In 2011 approximately **40 Ancient villages of Northern Syria** were included into the UNESCO World Heritage List. This event was preceded by preparation works (Nomination File) that had lasted for almost 3 years, from 2007 to 2009 and had been carried out by a group of experts from Syria together with qualified specialists from the UNESCO (the author of the article was a technical director of the works). To solve the problem of project development with view of including the Ancient Villages to the World Heritage List an international conference was held in April 2008 under the guidance of a Syrian Ministry of Culture,

DGA&M Syria with participation of the provinces of Aleppo and Idlib, as well as more than 20 UNESCO experts that had been working in those parts for more than 40 years, and the locals. The conference was essential for the completion of the project. The paramount aim of the project was to preserve the architectural and archeological objects together with the landscape in order not to lose their initial appearance. At the same time a territory for new construction works was defined in each park, where it was possible to build something without destroying the historical and cultural landscape.

The Ancient Villages area adjoins the Turkish borders and is hundreds of kilometers (140 to 165 km) long and 60 to 80 km wide. They are a part of the Limestone Massif of Northern Syria that is situated in the valleys of Afrin and Oronte in the West and Aleppo and Chalcis in the East. The ensemble creates a series of unique cultural landscapes that have preserved their authenticity because of the lack of any human activity for a thousand of years and due to the absence of any restoration or reconstruction works in the 20th century.

Picture 1. An opening view from Qirqbize Site — S. Ricca, 2007

The Ancient Villages of Northern Syria, grouped in eight parks, are situated in the North-Western part of Syria. These villages existed in 1–7 centuries AD and the inhabitants left them in 8–10th centuries AD. A characteristic feature of this area is its well-preserved landscape with the architectural monuments, including the remains of houses, pagan temples, churches, cisterns, bathhouses, etc. Their cultural landscapes, including the landscape structures and village remains, illustrate the transition from the ancient pagan world of the Roman Empire to Byzantine Christianity. The preserved fragments of the Ancient Villages of Northern Syria show that their inhabitants were skilled in agriculture. There are some remains of olive oil and wine production as well as mills. The rural lifestyle is proven by markets, bazaars, sport facilities and dwellings.

Picture 2. Church colonnade in Kharab Shams — F. Cristofoli, 2003.

First of all, the Ancient Villages of Northern Syria and their relict landscapes provide exceptional testimony to the architecture of the rural house. The whole set of the constructions are peasant houses, they are more or less complicated and belong to one building type that includes three mandatory elements: two-layer rooms, a yard and a fence.

The yard provides the only access to the house, and the rest of the elements are situated around it, including an independent entrance, a gallery, a room with a press, an underground room (storehouse), the second yard, and a garden. The yard is usually surrounded by high dead walls.

This is the place for people to pass and work as well as keep animals, what is proven by the availability of feeding racks among the portal supports. Sometimes the yards are paved with slabs.

Starting with the second half of 4th century AD rural population began to build churches, proving their transition from heathenism to Christianity. In this time monasteries appear that are widely open from all sides. Usually they are situated far from dwelling areas but close to communication ways. The most interesting San Simeon Citadel and Site are distinguished both by the unique landscape and its architectural complex which is harmoniously included into the landscape.

Picture 3. San Simeon Citadel, view from the Western church — S. Ricca, 2006

Picture 4. Aerial view of San Simeon Citadel & Site — J.-L. Biscop, 2002

Picture 5. San Simeon Citadel, terrace of the Western church — S. Ricca, 2003

Qal'at Sem'an — Site de Saint-Siméon

"The great cruciform church is unique in the history of architecture and is not only the most beautiful and important existing monument of architecture between the buildings of the Roman period of the second century and the great church of Santa Sophia of Justinian's time, but also … is the most monumental Christian building earlier than the masterpieces of the eleventh and twelfth centuries in Northern Europe." [4, 98].

The monastery of Saint-Simeon was a pilgrimage place for Christians from all over the world up to 2010. Unfortunately, fierce fighting is currently underway there, leading to complete destruction of the historical and cultural heritage objects.

The most important role of the cultural landscape represented by the **Ancient Villages of Northern Syria** consists in the cultural heritage shown by the preserved objects that demonstrate the activity of the people who inhabited this area and defined the flow of all social processes taking place on their territory. The complex of historical and cultural as well as unique natural formations is a carrier of historical memory.

Unauthorized use of rocks in the region now endangers the preservation of the archeological traces. The construction of new communication ways threatens the preserving of the villages at the Massif. The former network of roads and paths which used to connect the villages of the Massif can disappear as a result of the new roads being constructed without prior approval from the authorities. Even the development of tourism in the region and the need to build new roads to connect them with the ancient places had a negative influence. The landscapes that have been ideally preserved till today demand regulation for landscape protection.

Consequently, a natural landscape environment is a necessary and inseparable component of the architectural ensemble composition. Always being unique and specific for a given region, it determines the nature of interaction between natural environment and architecture.

Cultural landscape is an environment that possesses the features of cosmic generalization, it helps the human feel an integral part of the Universe. The mountains of the Limestone Massif as the only example of ancient living landscapes in the Mediterranean basin have their own historical value and show how natural areas were conquered by people. They must be preserved but not turned into museums. The problem is to keep them alive, i. e. keep their kind and provide the local population with an opportunity to develop.

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Section 2. Biology

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Effect of 15-hydroxyazomethine atisine, a diterpenoid alkaloid atisine derivative, on Na$^+$/Ca^{2+} exchanger mediated contraction of rat papillary muscle

Abstract: We investigated the effects of 15-hydroxyazomethine atisine (15-HAA), a derivative of atisine, a diterpenoid alkaloid, on the force of contraction of rat papillary muscle induced by low Na$^+$ (35 mmol/l) solution and ouabaine (20 µmol/l). The force of contraction induced by these two different procedures in the presence of nifedipine (10 µmol/l) and ryanodine (4 µmol/l) dose-dependently inhibited by 15-HAA. At 25 µmol/l 15-HAA almost complete inhibited the force of contraction induced by low Na$^+$ solution and ouabaine, with IC$_{50}$ values of 16.9±3.9 and 15.8±4.7 µmol/l, respectively. Since under used experimental conditions Ca^{2+} influx through slow Ca^{2+}-channels and Ca^{2+} release from sarcoplasmic reticulum were blocked by nifedipine and ryanodine, the results suggest that 15-HAA inhibits the force of contraction mediated by Ca^{2+} influx via the Na$^+$/Ca^{2+}. This suggestion was further confirmed when we used KB-R7943, a specific blocker of the reverse mode of Na$^+$/Ca^{2+} exchanger, which significantly attenuated the inhibitory effects of alkaloid on the force of contraction increased by two different procedures. In conclusion, we found that 15-HAA possess a potent inhibitory action on Ca^{2+} influx via Na$^+$/Ca^{2+} exchanger suggesting that this action may also be involved in its negative inotropic effect. The significant potency of 15-HAA to block reverse mode of Na$^+$/Ca^{2+} exchanger suggests that it can be useful in development of novel approaches to protect heart against severe cardiac pathologies associated with Ca^{2+} overload induced by exchanger.

Keywords: Alkaloids, negative inotropic effect, Na$^+$/Ca^{2+} exchanger.

Introduction

The 15-hydroxyazomethine atisine (15-HAA), a derivative of atisine, a diterpenoid alkaloid, isolated from Aconitum plant species, has a pronounced antiarrhythmic effect [1]. The mechanism of antiarrhythmic action of 15-HAA is similar to that of class 1 antiarrhythmic drugs which mainly is due to blockage of voltage-gated Na$^+$-channels in cardiac cells [2]. The blockage of Na$^+$-channels with these antiarrhythmic drugs causes a decrease in the depolarization rate of the action potential, slows conduction velocity and reduces the excitability of the heart tissue [3, 4]. At the same time, all class 1 antiarrhythmic drugs exert significant negative inotropic effect related to Na$^+$-channels blockage and the subsequent decreases in the intracellular Ca^{2+} concentration [5; 6]. It is assumed that the blockade of the Na$^+$-channels by these drugs may alter Ca^{2+} transport through Na$^+$/Ca^{2+} exchanger so that a decrease in intracellular Na$^+$ promotes Ca^{2+} extrusion at a polarized state and inhibits Ca^{2+} influx through the exchanger at a depolarized state [7]. These changes in Ca^{2+} transports would secondarily reduce Ca^{2+} content in the sarcoplasmic reticulum (SR), limit SR Ca^{2+} release and, thus, decrease contractile force [8]. Recently we found that alkaloid 15-HAA also produced a strong negative inotropic effect which was attenuated by lidocaine and after inactivation of Na$^+$-channels [9]. In addition, we observed that this alkaloid significantly decreased the post-rest potentiation of contraction, which mainly reflects the amount of Ca^{2+} in SR. Since Ca^{2+} content in SR is directly associated with functional state of Na$^+$/Ca^{2+} exchanger [10], these data suggest that the inhibition of the exchanger may also be involved in

the negative inotropic effect of 15-HAA. Therefore, to test this hypothesis we examined the effects of 15-HAA on the contractions of rat papillary muscle induced by low Na^+ solution and ouabaine, which are mainly due to the Ca^{2+} entry via Na^+/Ca^{2+}-exchanger.

Material and methods

Adult male Wistar rats (200–250 g) were used according to a protocol of the Institute of Bioorganic Chemistry Animal care and Use Committee. After brief anesthesia with sodium pentobarbital hearts were rapidly removed, and papillary muscles (1–3 mm in length and 0,5–0,8 mm in diameter) were dissected from the left ventricles. Preparation was mounted in a tissue bath (STEIRT, HSE, Germany) by one end to a force-displacement transducer (Type F30, HSE), and the other end to the bottom of the tissue bath. The tissue bath (3 ml volume) was perfused at a rate of 20 ml min⁻¹ with Krebs solution containing (in mmol/l): NaCl, 118; KCl, 4.7; $CaCl_2$, 2.5; $MgSO_4$ 1.2; KH_2PO_4, 1.2; $NaHCO_3$, 24; glucose 10 (pH 7.4). The solution was bubbled with 95% O_2 and 5% CO_2 and maintained at 37 °C. The preparation was stretched to a length at which maximum developed force was evoked and allowed to equilibrate for at least 1 h with changes in Krebs solution every 15 min. The preparation was field-stimulated at a rate of 0.1–5 Hz by two platinum electrodes with rectangular wave pulses of 10 ms duration at twice the threshold voltage delivered from the electronic stimulator (ESL-2, Russia). The amplitudes of elicited maximal isometric contraction were used as the control (taken as 100%), and changes in the contraction after drugs action were expressed as a percentage of the maximal response. Contractions recorded on the chart recorder (TZ 4620, Czech Rep.) and simultaneously stored on computer for analysis. To examine the effect of alkaloid on contraction mediated by Ca^{2+} influx through Na^+/Ca^{2+}-exchanger, both low Na^+ Krebs solution and ouabain, a cardiac glycoside, (20 µmol/l) were used. In a low Na^+ Krebs solution, the Na^+ concentration was reduced to 35 mmol/l by replacing the NaCl with equimolar choline chloride and atropine (10 µmol/l) was added to avoid any parasympathetic effects. To block Ca^{2+} influx through L-type slow Ca^{2+} channels and Ca^{2+} release from SR in these experiments nifedipine (10 µmol/l) and ryanodine (4 µmol/l) were used. Chemicals such as atropine, nifedipine, ouabaine, ryanodine and KB-R-7943 were purchased from Sigma-Aldrich (Sigma, St. Louis, MO, U.S.A.). Data are expressed as mean ± SEM with n for number of experiments. Student's *t*-test or one way ANOVA used for analysis, P<0.05 was considered statistically significant.

Results

To examine the role of Na^+/Ca^{2+} exchanger in the negative inotropic effect of 15-HAA its action on the contractions of rat papillary muscle induced by low Na^+ solution and ouabaine were evaluated. In control experiments the basal force of contraction of rat papillary muscle perfused with normal Krebs solution and driven at 0.1 Hz, was about 3.6±0.2 mN, taken as 100%. When to this perfusion solution nifedipine (10 µmol/l) and ryanodine (4 µmol/l) were added simulta-

neously the force of contraction decreased to 16.1±5.3% of control (n=6). After replacement of the normal Krebs solution with modified low Na^+ solution, containing nifedipine and ryanodine, the force of contraction increased to 72.6±4.8% of control (n=6). Similarly, addition of ouabaine (20 µmol/l) to the normal Krebs solution containing nifedipine and ryanodine increased the force of contraction to 68.6±3.6% of control (n=6). Since in these experiments Ca^{2+} influx through slow Ca^{2+}-channels and Ca^{2+} release from SR were blocked by nifedipine and ryanodine, the results indicate that increases in the force of contraction induced by low Na^+ solution and ouabaine were mediated by the same mechanism involving Ca^{2+} influx via the Na^+/Ca^{2+} exchanger. The experiments with KB-R7943, a specific blocker of Ca^{2+} influx via Na^+/Ca^{2+} exchanger [11], confirmed the involvement of Ca^{2+} influx via Na^+/Ca^{2+} exchanger in contractions induced by these two different procedures. As shown in (Fig.1), KB-R7943 almost completely inhibited the force of contraction induced by these two different procedures. These results provide clear evidence for the involvement of Ca^{2+} influx via Na^+/Ca^{2+} exchanger in contractions induced by these two different procedures.

Figure 1: Effects of KB-R7943 on the force of contractions of rat papillary muscle induced by low Na+ solution (solid circles) and ouabaine (open circles)

The experiments were performed in preparations preincubated with nifedipine (10 µmol/l) and ryanodine (4 µmol/l) for 30 min before low Na^+ solution and ouabaine were added. Data are shown as mean (±SD) and expressed as a percentage of the force of control contraction, obtained in normal Krebs solution at 0.1 Hz before the addition of drugs, which was taken as 100%. (n=6). *p<0.05, when compared with control value.

Therefore, to test the effect of 15-HAA on contraction mediated by Na^+/Ca^2 exchanger we first studied its action on the force of contraction induced by low Na^+ solution. In these experiments was observed that 15-HAA dose-dependently inhibited the force of contraction increased by low Na^+ solu-

tion and at 25 µmol/l maximally reduced it from 72.6±4.8% to 11.6±3.1% (Fig.2). The IC_{50} value of 15-HAA, a concentration producing 50% of maximal inhibition, determined graphically, was 16.9±3.9 µmol/l. Similar inhibitory effect of 15-HAA was observed in papillary muscles contracted by ouabaine in the presence of nifedipine and ryanodine. Under these conditions 15-HAA in similar dose-dependent manner inhibited the force of contraction increased by ouabaine and at 25 µmol/l maximally reduced it from 68.6±3.6% to 6.9±3.1% (Fig.2).
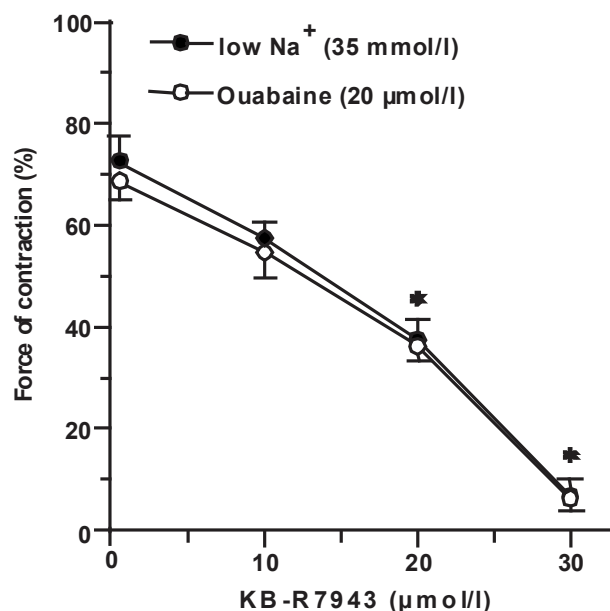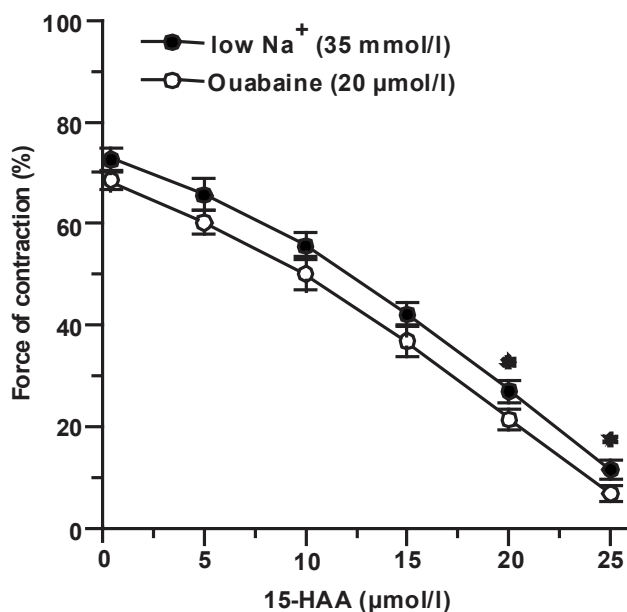

Figure 2: Effects of 15-HAA on the force of contraction of rat papillary muscle induced by low Na⁺ solution (solid circles) and ouabaine (open circles)

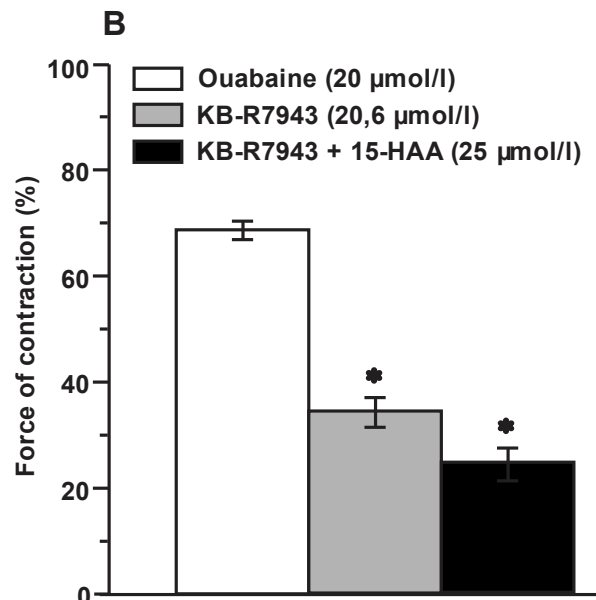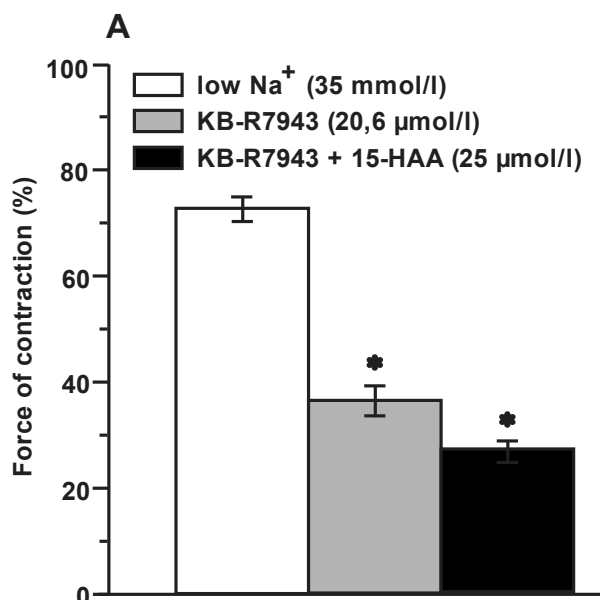The effects of 15-HAA were examined in preparations precontracted with low Na⁺ solution and ouabaine in the presence of nifedipine (10 µmol/l) and ryanodine (4 µmol/l). Data are shown as mean (±SD) and expressed as a percentage of the force of control contraction, obtained in normal Krebs solution at 0.1 Hz before the addition of drugs, which was taken as 100%. (n=6). *p<0.05, when compared with control value.

The IC_{50} value of 15-HAA obtained in these experiments was 15.8±4.7 µmol/l, which is nearly equal to those obtained from experiments with low Na⁺ solution. The data indicate that 15-HAA with the almost identical potency inhibits the force of contraction induced by low Na⁺ solution and ouabaine, suggesting that this inhibitory effect of alkaloid is due to the blockage of Ca^{2+} influx via Na^+/Ca^{2+} exchanger. This suggestion was further confirmed in the experiments with KB-R7943, which significantly attenuated the inhibitory effect of 15-HAA on the force of contraction increased by these two different procedures. In these experiments the preparations were pretreated with KB-R7943 at concentration of 20.6 µmol/l, at which the force of contraction increased by low Na⁺ solution or ouabaine was reduced by about a half. In these experimental conditions administration of 15-HAA (25 µmol/l) on top of KB-R7943 further reduced the force of contraction induced by low Na⁺ solution, but to a much lesser extent, than that obtained in the absence of KB-R7943 (Fig.3A).

The experiments were performed in preparations preincubated with nifedipine (10 µmol/l) and ryanodine (4 µmol/l). KB-R7943 was used at 20.6 µmol/l, concentration corresponding to its IC_{50} value. Data are shown as mean (±SD). *p<0.05, when compared with control value.

A

B

Figure 3: KB-R7943 attenuates the inhibitory effects of 15-HAA on the force of contraction induced by low Na⁺ solution (A) and ouabaine (B) in rat papillary muscle

Similarly, KB-R7943 attenuates the inhibitory effect of 15-HAA on the force of contraction induced by ouabaine. As shown in Fig.3B, after administration of 15-HAA (25 µmol/l) on top of KB-R-7943 the force of contraction induced by oua-

baine further reduced, but also to a much lesser extent, than that observed in the absence of KB-R7943. These data again support the suggestion that the inhibitory effect of 15-HAA is due to the blockade of Ca^{2+} influx via Na^+/Ca^{2+} exchanger.

Discussion

In this study we have examined the effects of 15-HAA on the force of contraction of rat papillary muscle induced by low Na^+ solution and ouabaine. The present results demonstrated that 15-HAA markedly and dose-dependently inhibited the force of contraction induced by these two different procedures. The increase in the force of contraction induced by low Na^+ solution is mainly due to changes in the thermodynamic driving force of the Na^+/Ca^{2+} exchanger which promotes Ca^{2+} influx via the reverse mode of the exchanger [12; 13]. Since under the present experimental conditions Ca^{2+} influx through slow Ca^{2+}-channels and Ca^{2+} release from SR were blocked by nifedipine and ryanodine, inhibition by 15-HAA of the force of contraction induced by low Na^+ solution suggests that this effect of alkaloid is due to the blockage of Ca^{2+} influx via the Na^+/Ca^{2+}. This suggestion was confirmed by observation that 15-HAA also potently inhibited the force of contraction induced by ouabaine, which also is mediated by Ca^{2+} influx via the Na^+/Ca^{2+} exchanger. Ouabaine inhibits Na^+, K^+-ATPase, and increases intracellular Na^+ concentration which in turn reverses the operating mode of Na^+/Ca^{2+} exchanger, thus promoting Ca^{2+} influx [14, 15]. Since in the experiments with ouabaine, nifedipine and ryanodine also were present, the results indicate that inhibitory effect of 15-HAA on the force of contraction induced by ouabaine is a result of blockage of Ca^{2+} influx via the Na^+/Ca^{2+}. Furthermore, from these results it is evident that 15-HAA inhibited the force of contraction induced by ouabaine almost to the same extent and with nearly equal IC_{50} value as those observed in the experiments with low Na^+ solution. Thus, a similar inhibitory action of 15-HAA on the force of contractions induced by two different procedures which activates Ca^{2+} influx via Na^+/Ca^{2+} exchanger provides the clear evidence that these effects of alkaloid are a result of direct blockage of Ca^{2+} influx through this exchange mechanism. The potency of 15-HAA to block of Ca^{2+} influx via $Na+/Ca^{2+}$ exchanger was further confirmed in the experiments with KB-R7943, which significantly attenuated the inhibitory effects of 15-HAA on the force of contraction increased by two different procedures.

Conclusion

The present results demonstrate that 15-HAA markedly inhibited the force of contraction induced by low Na^+ solution and ouabaine indicating that this inhibitory effect of alkaloid is due to the blockage of Ca^{2+} influx via Na^+/Ca^{2+} exchanger. These results suggest that the blockage of Ca^{2+} influx via Na^+/Ca^{2+} exchanger may also be involved in the negative inotropic effect of 15-HAA. It seems likely that the negative inotropic effect of 15-HAA is provided with a complex mechanism and, apparently, represents the sum of their Na^+ channel and Na^+/Ca^{2+} exchanger blocking activities. The inhibition of Na^+/Ca^{2+} exchanger in combination with a blockage of Na^+ channel by this alkaloid may significantly reduce Ca^{2+} content in SR, and thus producing strong negative inotropic effect. There is no doubt that due to the significant potency to block reverse mode of Na^+/Ca^{2+} exchanger 15-HAA represent a valuable structure which will be useful in development of novel approaches to protect heart against severe cardiac pathologies associated with Ca^{2+} overload induced by exchanger.

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Section 3. Geography

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Ecological problems of development of the urban settlement in Azerbaijan

Abstract: The article studies the status of ecological system of large cities in Azerbaijan, analyzes and evaluates the factors affecting the urban environment. Observance of hygiene and sanitary conditions for the improvement of quality of the urban environment, comfortable life of people has been determined as a key criterion in the article.

Keywords: ecological system, settlement, urban agglomeration, sustainable development, sanitation and hygiene.

The problems on the effect of development of the productive forces to environmental condition, have recently been one of the main issues during the long term urban planning. These issues have been given a great place in the environmental section of complex plan for social and economic development of regions, cities and settlements. These sections have been developed comprehensively in the complex plans of industrial hubs and centres of Baku, Sumgait, Ganja, Shirvan, Mingachevir, Nakhchivan, Shaki, Yevlakh etc. Just here, the grounds are generated for complex solution of different intersectoral problems occurred in the development process of spheres which build and serve the cities.

Undoubtedly a significant condition was not created less for the improvement of urban environment in taking measures that previously provided in master plan and various documents of cities. But it would be possible to make the environmental problems on account of implementation for the rehabilitation of local areas of only natural environment, due to the solution of separate tactical issues as well as mitigation or abolition of the harmful effects of pollution sources in the development of cities and agglomerations.

Indeed, ensuring environmental safety of urban development is extremely complex and many-sided and it covers all the system of mutual relations of urban-natural environment-human triplet chain and also determines a dynamic balance of numerous factors and condition. The analyses carried out proves the solution of economic-organizational issues of Baku city, its absolute reflection in the character of mutual relations of other urban systems in the status of ecological system.

In other words, the urban development process, particularly, large agglomerations require the determination of dynamic balance in all their systems. Therefore, the key directions of objective processes of forming group objectives will contribute to the laying of foundation of progressive forms of this residence, its regulation, solution of other matters making the usage of potential opportunities more difficult and timely prevention of spontaneous elements. The development of effective measures system which optimize the mutual relation of production and the natural environment, highly depends on richness of analysis of the indicators characterizing nature protection activity and its quality, effect on the environment. It seems that, the there is a need to make extensive use of statistical indexes method for characterization of components of ecological system.

Analysis of literary sources shows that, the statistical method is used widely in developed western countries. The indexes which reflect the pollution level of air basin are applied by coordinating with individual indexes of pollution, any of them indicates the ratio of air pollution to the mentioned quality level in accordance with their established standards. If one of the pollutants included in the calculation is higher than the standard mark or equal to it, in that case the marks of indexes will possibly be equal to a unit.

The specific factors and condition determining the character of ecological system should be found during the analysis of environmental status in the cities. So, the necessary factors for solution of important issues of urban planning in Baku city are-city's access to the sea, tension of demographic situation, failure to comply of engineering facilities with the urban development, the importance of effective use and maintenance of unique coastal landscapes, also the rapid growth of rich cultural and historical monuments, car parks. Complex zoning of large cities in the Republic on the basis of analysis of their ecological system, its further evaluation, analysis based on the factors affecting the natural environment are one of the important means.

First of all, the city's master plan and mapping are used. The essence of implementation of zoning bears different character. Namely, it can be selection of different criteria and analysis of various factors. The key requirement is its having a complex nature and at the same time its individual maps are used temporarily on different elements of natural environment in the practice. From the standpoint of the area, the same zoning can be a tool for substantiation of future actions on the improvement of urban environment, for development of socio-economic prognosis of the city.

The initial phase of the work consists of substantiation of the components and factors as well as assessment of complex criteria. In our opinion, complex assessment of the area is a good method in solving of the issues which are studied. Observance of sanitary and hygienic conditions for comfortable life of people in the quality assessment of urban environment on ecological parameters is taken as the main criterion here. Along with this, the specific peculiarities of components by quality are not the factors affecting to the state of environment but the level of state of environmental elements which allow to the influence of relevant factors.

Studies show that, the main difficulty in the implementation of zoning methods in cities in terms of practice and difficulty in compiling environmental maps is related to the failure in sufficient development of scientifically grounded standards system. If there would be a fully developed normative system, it would be taken as a basis during the determination of local marks.

The important part of analysis of the sectorial section of city's complex plan is the study of effect of economic complex to environmental components. Besides, not only natural but also conditional indicators of production must be determined (additional damage in the pollution of air and air basins and calculation of damage etc.) [2].

In the environmental section of complex plan of the cities studied, substantiation of environmental protection measures, appointment of their priority or the following groups of measures reflecting the ways of effects that may affect on the deterioration of environment and pollution sources are shown:

- Technological group-this includes the effect rendered directly to the sources, their change and neutralization, improvement of technology etc.
- Production and economic group-this includes the change of production structure and fuel balance.
- Urban planning group-this includes the changes in the structures of urban planning by the displacement of production, residential, cultural and household facilities.

Special attention should be paid to the measures included in the last group. This is due to the fact that, environmental condition in the large cities is determined by the peculiarities of difficulties emerged in the planning structures, but in some cases by deepening of the negative impact of economic areas. At the same time, the grounded changes in the planning structures may lead to the positive results.

Studies show that, it would be nonsense to trust in the measures with technological characteristics which require huge financial costs and bearing a local character as a rule. It is true that the technological measures against pollution has an effective tendency to the reduction of harmful effects of production. Unlike the technological measures, the implementation of urban planning measures gives more long-term effects. In some cases, urban planning, technological and productive-economic measures replace each other effectively and in some cases both of them can be applied together.

Literary sources show that, one of the important measures of urban planning is the optimization of systems for the placement of facilities of various purpose in the city. It is effective organization of the area with mutual relation in the direction of different kind of living and welfare, recreation. [2].

In our opinion, taking environmental factors into account in the stage of formation of city's planning structures is of great importance. Their underestimation during the urban development in urban planning policy or incorrect estimation can lead to serious results especially in regions where chemical and metallurgical industry are situated.

The advantage of more radical technological measures is associated with the reduction of opportunities of sanitary protection zones. Until recently sanitary protection zones were considered as the main tool in protecting the cities from harmful effect of industrial production. Creation of such zones was not an easy task. Formerly, the construction of large chemical plants required 5–15 km or up to 25 km sanitary place for more metallurgical plants. [5] But it didn't always render the effect. The estimations carried out show that, the expenses spent on reconstruction and renovation of dust and gas cleaning installations system is almost less three times than the expenses spent on the organization of sanitary protection zones.

There are also other shortcomings in cities with large industrial centers. Chimneys with the height of 180, 250 and even 320 have never been a key method in the protection of air basin in the city. [4]. It is costly measure and it does not reduce the general volume of pollutants entered into the air basin but decreases the level of concentration of harmful substances to layer close to the earth and consequently, provided scattering of toxic substances in the furthest distances. But expanding the field of pollution create opportunities for increasing the level of upper limit local contaminations in separate regions.

The stronger impact on the decrease of negative effect of industrial production is removing of harmful enterprises in terms of sanitary out of the city. This method of combat requires cautious approach. The experience shows that, removal of enterprises is rarely carried out in the specified period. Most of the time it leads significant unexpected losses. A partial hard way is re-organization of production profile.

It should be noted that, every method has its advantages and disadvantages. Selection of specific ways to improve the urban environment is harmonization of various methods and socio-economic substantiation. The unity of the right approach is completed with the passage from planning of measures on the improvement of quality of individual components to the development of complex programs to ecologization of the city and surrounding areas.

Thus, the important issues in the complex plans of social and economic development of Cities in Azerbaijan, are the absolute reflection of storage of the household waste of different origin, recyclable resources, solid household waste as well as different urban waste and their utilization problems.

Its solution will contribute to intensification of substance and energy circulation, to the increase of national economy effectiveness through the storage of unused raw materials and valuable urban lands [3].

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Some problems and essential objectives of improving environmental condition of southern aral sea

Abstract: The article overviews the environmental situation, as well as geographical and legal frameworks of mitigating the environmental situation of the Southern Aral Sea area. Presents priorities for improving environmental sustainability in the Southern Aral Sea region, aiming at reducing environmentally deterministic diseases and death rate.

Keywords: environment, ecology, medical geography, health of population, morbidity, social issues, prioritized aims, sustainable development.

One of the aims of nosogeography is to determine medical-biological and sanitary-hygienic issues in terms of environmental catastrophe and developing theoretical-methodological and practical recommendations for improving the nosogeographical situation in the republic. In the European Charter on Environment and Health, 1989 year it is recognized the right of every individual to an environment conducive to the highest attainable standard of health and well-being. It is emphasized the mutual responsibilities of citizens, government officials and leaders of economical branches of industry in environmental protection, it is it is confirmed that all activities should be based on scientific facts [1].

According to Prokhorov B. B. [4], in studies on human ecology extremely important role is plays the study of the quality of the environment, i. e., the extent to which the natural, economic, political, social, ecological and hygienic factors the needs of people. In order to objectively judge the quality of the living of people in the environment, it is necessary to measure it (by technical measurements, expertise and theoretical calculations) and compare the results with existing standards, i. e. developed regulations.

To ensure environmental and hygienic safety in Uzbekistan it is developed state standards (UzSSt), building norms and regulations (BNaS), labor protection rules and other regulations. In addition, there are active technical, instructional, methodological and official documents on the sanitary and epidemiological well-being, security and safety of living environment of the population and its health.

In the ecology of man it is most often used the following standards: ecological, hydroeconomic, fisheries, forestry, sanitary-hygienic, radiation safety standards, building norms and regulations.

With regard to environmentally harmful factors of the environment in the Republic of Karakalpakstan, in order to establish the relationship between harmful factors and morbidity accordingly managed, first and foremost, environmental, health and hygiene, hydroeconomic and building regulations.

Our investigations results show that the most of the disease rate in the Southern Aral Sea region is higher than average rate in Uzbekistan in whole, indicators, and they are conditioned with harmful environmental and sanitary factors exacerbated by ecological disaster. First of all, it concerns the whole population of the primary disease, and children age under 14 of all diseases, respiratory diseases, diseases of the blood and blood-forming organs, kidney disease, diarrheal diseases, malignant neoplasms, congenital anomalies and tuberculosis.

Reasons for chemical and bacterial pollution of the environment are:

• reduction of the debit and the flow rate of the river Amu Darya has led to a drop in self-purification ability of the river;

• water of open reservoirs contaminated during the descent drainage and wash water (contaminated with chemicals which are applied in crop production) in the Amu Darya River in the upper and middle reaches, in irrigation canals;

• sediments with bare and dry bed of the Aral Sea dried up river beds and flood plains of the river and canals, lakes Aral Sea region during dust storms rise into the air and spread in a southeasterly direction, deposited on the ground, including in the field, water surfaces, settlements and the city;

To the listed issues the following environmental of sanitary and social problems are added:

• More than 35% of the population continues to use as a potable water and in agriculture water of open water bodies and wells;

• tap water prior to feeding the population does not pass sufficient cleaning in 2013. 28.6% of tap water samples for chemical parameters and 2.6% — bacteriological did not meet the state standard;

Undoubtedly, additional aggravating factor is the environmental situation, if the global warming within 20–30 years may lead to an increase in mean annual air temperature for Uzbekistan at 1° C, where in the northern region (South Aral region) it may be 2–3° C above [5].

Of course, by the public authorities have taken proactive measures to address the serious consequences of the Aral Sea ecological disaster. At the same time the main initiator of development of the international recognized Interstate Fund for Saving the Aral Sea ecological disaster is the President of the Republic of Uzbekistan Islam Karimov. In 1995 at a special session of the General Assembly on the occasion of the fiftieth anniversary of the United Nations the President of Uzbekistan Islam Karimov stated that the decision of the Aral problem is a problem of the entire world community.

Five independent states — Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan — are located in the basin of the Aral Sea, correctly assessed the need to seriously address the problem of the Aral Sea and the Aral Sea region (dried coastal zone). Considering the seriousness of the ecological catastrophe of the Aral Sea of Uzbekistan on 11–12 March 2008 held the Tashkent International Conference "Problems of Aral: impact on the gene of population, flora and fauna and international cooperation on mitigation", in which UN representatives took an active part.

As noted above, in November 2010, Tashkent hosted an international conference "Trans-boundary environmental problems in Central Asia: the use of international legal mechanisms to resolve them", which brought together scientists, environmentalists, experts from 30 countries, representatives of 60 international organizations and financial institutions — the UN, the OSCE, the WHO, World Bank, the World Wildlife Fund, World Conservation Union and others.

At present the specialists of the World Bank are developing a new environmental strategy, which will be a new approach to environmental sustainability. However, the main cargo activities to mitigate the Aral Sea ecological disaster rests with the Uzbekistan. To organize and conduct large-scale measures to overcome the consequences of the ecological disaster required a legislative basis.

During the years of independence have been taken such environmental laws of the Republic of Uzbekistan nature as "On Environmental Protection" (1993), "On Specially Protected Areas" (1994), "On Water and Water Use" (1994), "On Subsoil" (1995) "On Air Protection" (1997), "On the Protection and Use of Flora" (1998), "On protection and use of fauna" (1998), "On the Forest" (1998), "On State Land Cadastre" (1999), "On Waste" (2002) and others. There were also adopted the Laws of the Republic of Uzbekistan health nature, as "On the State Sanitary Inspection" (1992), "On protection of the medical-sanitary of citizens" (1994), "On quality and safety Food " (1996)," On Protection of Consumers' Rights (1997) and others [2]. There were made relevant amendments to the Civil Code, the Code of Administrative Liability, and other legislative acts.

In both chambers of the "Oliy Majlis" was established the Committee on environmental issues; Aral Sea Environmental Prosecutor's Office was developed.

In Uzbekistan it is being implemented the following practical measures to overcome the consequences of ecological catastrophe:

— Measures taken related to coastal flooding of lakes, dams were built, in order to consolidate dust salt on the exposed bottom of the Aral Sea is being carried out and continues to work on the cultivation of protective forests;

— Set aside the Amu Darya runoff of Beruni collector;

— In the years of independence on the Amu Darya was built a number of large water facilities, reconstructed irrigation systems Suenli, Kyzketken, Pakhta-Arna et al [3].

The priority tasks of improving environmental sustainability in the Southern Aral Sea area, to reduce environmental deterministic disease and mortality are:

• The implementation of the agreements of heads of Central Asian states to ensure the guaranteed passage of water to the Aral Sea and the Aral Sea area, the conclusion of a new agreement for the protection and sharing of trans-boundary water resources of the river the Amu Darya in accordance with the UN Convention;

• The adoption of a coordinated solution to the problem of construction of the Rogun hydropower station in Tajikistan;

• Maintain a continuous environmental monitoring of the environment by the public (State Committee of Nature, the Center State Sanitary epidemic observing), scientific (research institutes and universities) and civil society organizations;

• Maintain monitoring of nosogeography situation, further development of mathematical modeling, forecasting research with the development of timely practical recommendations;

• Periodic review of the environmental situation in certain territories, with the definition of the effectiveness of interventions, followed by public awareness.

Together with these, proposals on environmental issues may be imperfect and lopsided without reflection of proposals for sanitation-hygiene, medical and other social and economic issues. Therefore, along with others, we have made proposals and to ensure sanitary-hygiene well-being.

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Section 4. Geology

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Moissanite, Native Si and Iron Silicide from the Lower Paleozoic sandstones of the Polar Urals

Abstract: At the Lower Paleozoic sandstones of the Manitanyrd Ridge ($Є_3$–O_1 mn) moissanite have been recently found. It is established that moissanite is presented by two varieties — crystal fragments and grains with aggregate texture. The last ones are composed of hexagonal moissanite crystals cemented by native Si. In one of such grains the inclusion of iron silicide have been found. Association of moissanite, native Si and iron silicide with iron sulphides and chromite allow to suppose that its formation depended on the presence of unknown bodies of basic and ultrabasic volcanites as a sourcer of gold mineralization.

Keywords: moissanite, native Si, iron silicide, volcanites.

Moissanite, iron silicide and native silicon have been found in the sandstones of the Manitanyrd series ($Є_3$–O_1 mn) at studying contact of the Riphean-Vendian basement and Paleozoic cover in the Polar Urals (Manitanyrd Ridge). The sandstones are composed of quartz (78.0%), feldspars (12.7%), stilpnomelane (4.0%), muscovite (3.2%) and chlorite (1.0%). The presence of stilpnomelane is unusual for the Lower Paleozoic terrigenous rocks of this region and indirect sign of presence of the basic pyroclastics [5]. The heavy fractions always contain rutile, zircon, hematite, tourmaline, ilmenite, apatite, pyrite. Rarer — epidote, sphene, leucoxene, moissanite, chromite, chalkopyrite, barite and amphibole. Very seldom — garnet, magnetite, galenite.
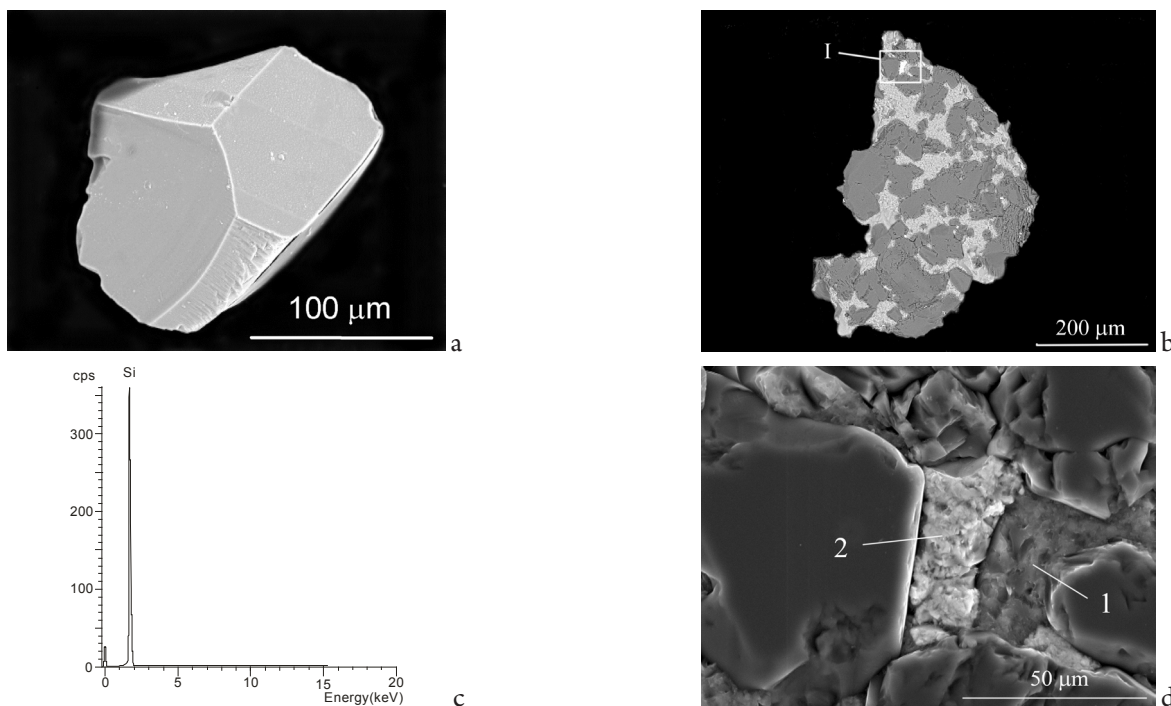
Fig. Moissanite from sandstones of Manitanyrd series:
a — crystal fragment with relics of planes; b — grain with microaggregate structure, light — silicon silicide, dark — moissanite; c — energy spectrum of native silicon; d — crystals of moissanite, native silicon (1) and iron silicide (2), fragment I fig. 2, b. The researches are executed with the use of scanning electron microscope JSM-6400 with X-ray energy dispersive spectrometer Link.

Moissanite is represented by fragments of transparent blue, dark blue, rarer yellow and pink crystals (fig. a) and dark blue grains with microaggregate structure. It is determined that these grains are composed of hexagonal moissanite crystals «cemented» by native Si (fig. b-d). An inclusion of iron silicide was found in one of the grains (fig. d) with composition (mass%): Si 49.58, Fe 40.98, Al 2.66.

The presence of moissanite and native silicon was diagnosed also by X-ray method (symmetric method without standard at X-ray device URS-55 A (RKD camera), radiance $Cu_{\alpha+\beta}$, V=30 κV, I=mA, exposition 8 hours). The moissanite interplanar distances are as follows (Å, intensity in brackets): 2,5164 (0), 2,3660 (4), 1,5406 (8) 1,3168 (7), for native silicon — 3,1620 (5), 1,9241 (6) 1,6354 (3). The mineral is represented by the most frequent low-temperature hexagonal polytype modification 6 H.

Moissanite in association with native silicon, iron silicide, some native metals, intermetallides and carbides are known in the Lower Carboniferous complexes of the central part of the Dnepr-Donetsk depression [2, 293–296], in tails of fumarole «Tube» of the Great Fissure Tolbachik volcano in Kamchatka [1, 796–799], in igneous-sedimentary rocks of the Fadeevsky ore-placer distric the Primorski Region [3, 536–538], in kimberlites and limestones [4, 152–164]. The presence of such associations is related to the activation of endogenic processes accompanied by migration and fractionation of abyssal fluids, separated from the basalt melt or the result of their fast introduction into sediments.

Morphological and chemical features of the moissanites, studied by us, allow assuming their formation as a result of crystalline degassing in the reducing conditions of the closed system. Their greatest resemblance is marked with the moissanites from kimberlites [4, 152–164].

Moissanite and associated minerals could arrive to the sedimental strata from the basic and ultrabasic volcanites, dated to horst-graben structures of riftogenic uralide stage forming level-by-level bodies in the lower part of the Paleozoic section. The closest formations, which could be the sourcer of moissanite, — ultrapotassium basaltoids, located in about 40 km westward from the studied section, but they do not contain moissanite. It is possible to assume the presence of unknown, hidden, overlying Paleozoic and Quarternary deposits igneous formations that became the sourcer of detrital material into the Lower Paleozoic sandstones. The finds of moissanite are confined to a certain dimensional interval of the section and, accordingly, to the time interval when volcanites were driven to the surface, and in the process of coastal line advance eastward, they were buried under newly formed sediments.

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Sectrion 5. Information technology

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The accuracy analysis of signals and noiseinterference identification algorithm

Abstract: The object of the given work is the quantitative measurements of accuracy of the method which gives an opportunity to measure and control the signal and interference at the input of a radiotelecommunication system in real time by the distributions form of probability density of their selective values.

Keywords: signals, noise, algorithm, identification, accuracy.

Influence of interference is estimated by threshold detectors which are based on various methods of decision-making by various criteria: for example, Neyman -Pearson criterion.

The basic fault of threshold detectors is the necessity of knowing beforehand a kind of distribution of probability density of interference and the mix of the signal and interference that essentially limits their application. Their second fault is that the decision on the system applicability is made when negative processes in it become irreversible what leads to complete communication loss.

The object of the given work is the quantitative measurements of accuracy of the method which allows us to measure and control the signal and interference at the input of a telecommunication system in real time by the distribution form of probability density of their selective values.

At the detection of the signal the mix is supervised for a while and, as the result, the realization x (t) or sample $x_1 x_2 \ldots x_{к н}$ is being fixed.

This realization can belong to interference only or to the mix of the signal and interference. To receive analytic forms for optimal algorithm for processing the mix while making a decision on the action of the signal or its absence, it is necessary to describe statistically the long-term passing of the mix with the signal and interference or interference only. For this purpose multivariate functions of distribution should be written out. For the mix containing only fluctuation interference in the form of Gaussian noise, the function is

$$p\left(x_1 x_2 \ldots / n\right) = \frac{1}{\left(2\pi\sigma_n^2\right)^{k_H/2}} \exp\left[-\frac{1}{2\sigma_n^2}\sum_{j=1}^{k_H} x_j^2\right] =$$
$$= \frac{1}{\left(2\pi\sigma_n^2\right)^{k_H/2}} \exp\left[-\frac{1}{N_n}\int_0^{T_H} x^2(t)\,dt\right] \quad, \quad (1)$$

where $k_н = T_{н/}\tau_{кн} = 2T_н f_{пв}$ — sample volume;

$T_н$ — supervision time; $f_{пв}$ — the supreme frequency in a spectrum of interference; N_n — capacity density of interference; σ_n^2 — a dispersion of interference; $\tau_{кн}$ — correlation window of interference.

The mix is also a random process.

$$x(t) = s(t, \beta_1, \beta_2, \ldots) + n(t). \quad (2)$$

Conditional multivariate function of values distributions of the mix, given that parameters of the signal β_1, β_2 … have the certain value, is

$$p\left(x_1 x_2 \ldots x_{k_H} / \beta_1 \beta_2 \ldots, n\right) =$$
$$= \frac{1}{\left(2\pi\sigma_n^2\right)^{k_H/2}} \exp\left\{-\frac{1}{N_n}\int_0^{T_H}\left[x(t) - s(t, \beta_1 \beta_2 \ldots)\right]^2 dt\right\}. \quad (3)$$

Statistical characteristics of random parameters of a signal are described by joint function of distribution

$$p\left(\beta_1, \beta_2, \ldots\right). \quad (4)$$

Then multivariate function of distribution for the mix with the action of the signal, is

$$p\left(x_1 x_2 \ldots x_{k_H} / sn\right) =$$
$$= \iint \ldots \int p\left(\beta_1 \beta_2 \ldots\right) p\left(x_1 x_2 \ldots x_{k_H} / \beta_1 \beta_2 \ldots, sn\right) d\beta_1 d\beta_2 \ldots \quad (5)$$

Specifically, when the signal parameters are known the equation for $p\left(x_1 x_2 \ldots x_{k_H} / sn\right)$ turns into

$$p\left(x_1 x_2 \ldots x_{k_H} / sn\right) =$$
$$= \frac{1}{\left(2\pi\sigma_n^2\right)^{k_H/2}} \exp\left\{-\frac{1}{N_n}\int_0^{T_H}\left[x(t) - s(t)\right]^2 dt\right\}. \quad (6)$$

Integrating multivariate probability density for decisions on the presence or absence of the signal, having substituted the result and having revealed the conditions of the minimal average risk, the acceptance of hypothesis Γ_s or decision-making on presence of a signal is accompanied by the minimal average risk if the following actions (1–3) are carried out:

$$l(x) = \frac{p\left(x_1 x_2 \ldots x_{k_H} / sn\right)}{p\left(x_1 x_2 \ldots x_{k_H} / n\right)} > \Pi, \quad (7)$$

where $\Pi = r_{пр} P(s)/r_{ло} P(0)$ ¾ threshold; l (x) ¾ likelihood ratio.

In many cases it is convenient to move from the likelihood ratio to its logarithm, then the minimal average risk is provided if:

$\ln l(x) > \ln \Pi$ hypothesis Γ_s is accepted;

$\ln l(x) \pounds \ln \Pi$ hypothesis Γ_0 is accepted.

Analyzing the mathematical operations in the equation (7), it is possible to synthesize the optimal circuit of the discrete radio signal detector.

The difference in mathematical equations for $l(x)$ or $\ln l(x)$, resulting from different models of the signal, i. e. the possibility of the signal to have random parameters, leads to the difference in circuits of optimum processing or optimal detectors based on those equations.

The threshold Π is defined by aprioristic data $P(0)$, $P(s)$, $r_{\text{пр}}$, $r_{\text{ло}}$ and does not depend on the properties of the signal. Dependence of threshold Π on aprioristic data plays the important role in the theory of detection.

Frequently there are difficulties with the choice or calculation $P(0)$, $P(s)$, $r_{\text{пр}}$, $r_{\text{ло}}$, as it takes place, for example, in the search, then the realization of the optimal detector providing the minimal average risk is impracticable because of impossibility to establish an optimal level of the threshold. The circuit of the optimal mix processing does not depend on the specified aprioristic data. It remains the same for any variables. Therefore for realization of the detector without aprioristic data it is necessary to develop other rules for the threshold choice.

In the specified conditions the rule of the threshold choice using tolerance probability of the false detection known as Neymann — Pearson criterion is widely used. The aim of this criterion and its usage in the analysis of communication systems are thoroughly described in References [1].

In some cases the term "optimal processing" is used for calculations $l(x)$ or $\ln l(x)$ and comparison with the threshold.

However, it is more convenient to divide them into the optimal processing of the mix and the operation of comparison or decision-making. Their combination gives an optimal reception.

As it is mentioned above, to have a result in the synthesis of a radio signal detection it is necessary to have the concrete mathematical equations describing functions of distribution $p\left(x_1 x_2 \ldots x_{k_H} / sn\right)$ and $p\left(x_1 x_2 \ldots x_{k_H} / n\right)$.

If the interference can be described mathematically (for example to consider it Gaussian) it is difficult to get the equation for $p\left(x_1 x_2 \ldots x_{k_H} / sn\right)$ as the radio signal usually has random parameters and it is required to carry out integration according to (5).

The situation even becomes more complicated, if interference with an unknown function of distribution, or with a function different from the optimum for the given circuit of detection influences the signal. Apparently, the optimal circuit constructed for interference with one distribution function will be completely inconvenient for another.

The second essential fault (with reference to a really working communication systems) of threshold methods of detection is that the decision on the system applicability is made

when negative processes in it become irreversible, that leads to complete communication loss.

In view of aforesaid, the conclusion is: it is necessary to develop methods which allow us to identify a kind of a random process on an input of the receiver.

The algorithm of identification of a distribution kind of a random process on parameter Z on selective variables of the given process is offered in [2]. For the calculation of the identification parameter it is possible to use the formula (1), [3],

$$Z = \frac{k_{\text{э}}}{\chi} + 4s, \qquad (8)$$

where χ — a counterexcess,

$k_{\text{э}}$ — entropic parameter,

s — asymmetry parameter.

Let's consider a technique of computer experiment of detection problems.
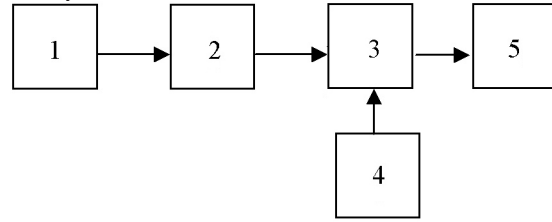
Fig. 1. The block diagram of imitating model.

The block diagram of imitating model is given on fig. 1: 1 — the random-number generator, 2 — the converter of random numbers in random numbers with the required law of probability distribution, 3 — the adder (additive — multiplicative), 4 — the simulator of a signal, 5 — the device of processing (researched algorithm of detection — algorithm of identification of a kind of distribution of casual process on parameter Z).

The given circuit of the computer experiment is general for the problems of detection and recognition of signals on the background of interference.

The random-number generator is used for the modeling interference with various laws of distribution.

The signal simulator forms frequency — shift signal.

If manipulating pulses $X(t)$ change within the limits of $0<X(t)<1$ high-frequency fluctuations on the output of the simulator of a signal can be identified as follows

$$U(t) = U_m \times \sin\left\{\omega_0 t + \Delta\omega \int \left[2X(t) - 1\right] dt + \phi_0\right\}, \quad (9)$$

where U_m — amplitude of a high-frequency signal (after manipulation),

ω_0 — circular data carrier,

ϕ_0 — its initial phase,

$\Delta\omega$ — deviation of frequency.

The adder, realized in the model, gives an opportunity to mix the signal and interference, both additive and multiplicatively, that provides the greatest flexibility for the analysis of interference influence on the signal.

Additive and multiplicative interference are considered as the stationary random processes.

Processing of the files consisting of a mix of the mix of signal and interference or interference only, is made in the block

of the processing device which is modeled on the computer according to the algorithm of identification of the distribution kind of a random process.

For confirmation of adequacy of the suggested model it is necessary to carry out the accuracy analysis of results for the chosen kinds of the signal and interference.

Modeling allows us to estimate relations of the relative mistake dZ/Z for the parameter Z to the signal-to-noise ratio for the frequency — modulated signal 400, 200, 100 kHz, thus, interference is chosen with normal, Laplace and arc sine distributions.

The deviation dZ is defined as $\sqrt{\sigma_z}$, where σ_z — root-mean-square deviation parameter Z, received in 10 series of measurements at the set parameters of a signal and handicapes.
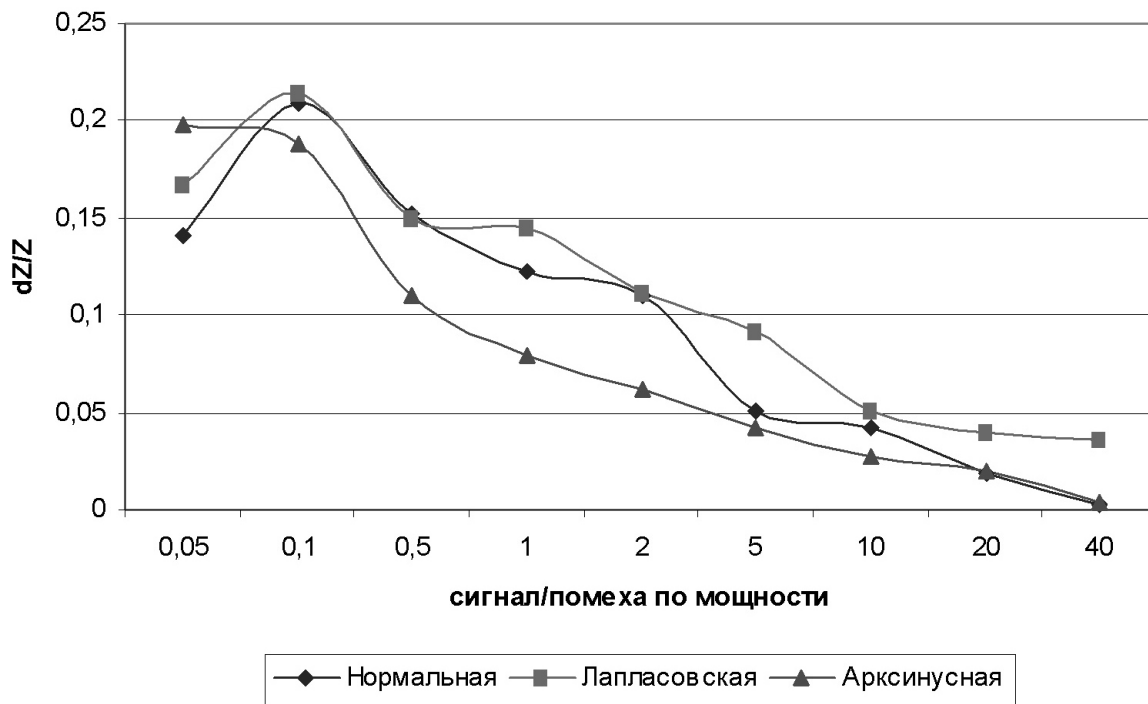
Fig. 2. Relation of the relative mistake of definitions of parameter Z to the signal-to-noise ratio power with frequency band of 100 kHz
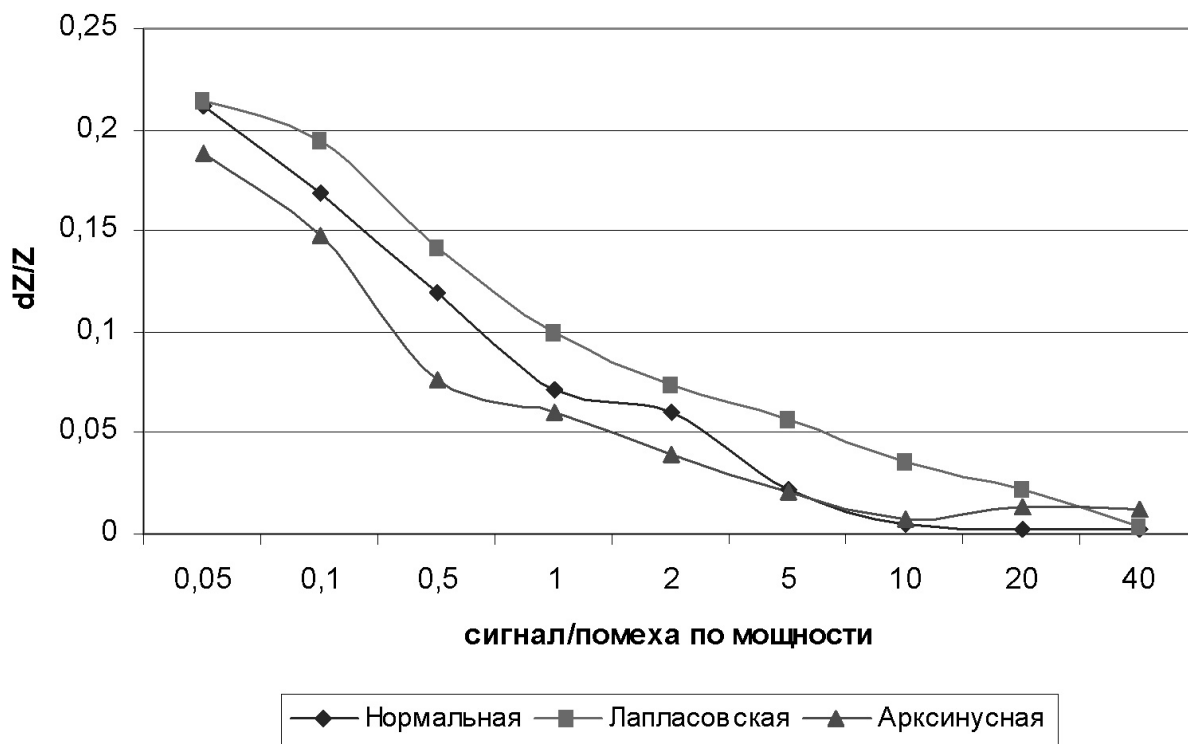
Fig.3. Relation of the relative mistake of definitions of parameter Z to the signal-to-noise ratio power with frequency band of 200 kHz
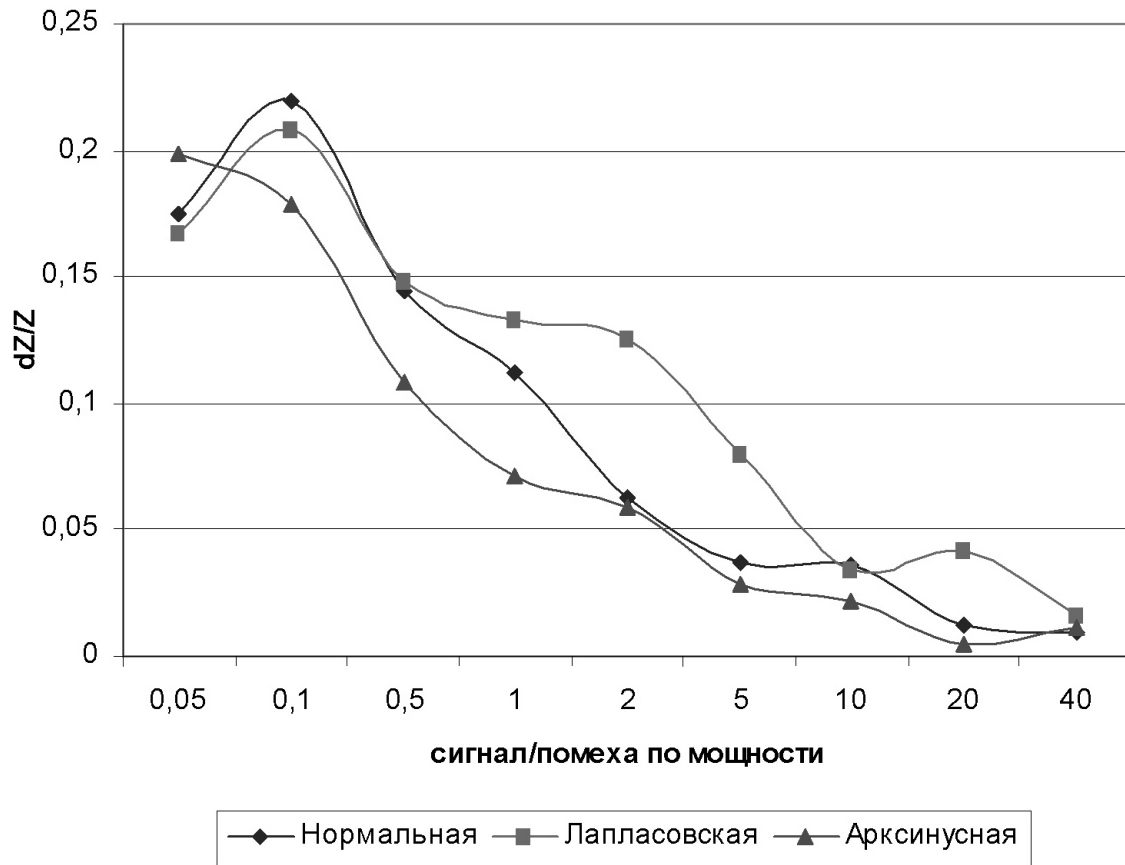
Fig.4. Relation of the relative mistake of definitions of parameter Z to the signal-to-noise ratio power with frequency band of 400 kHz
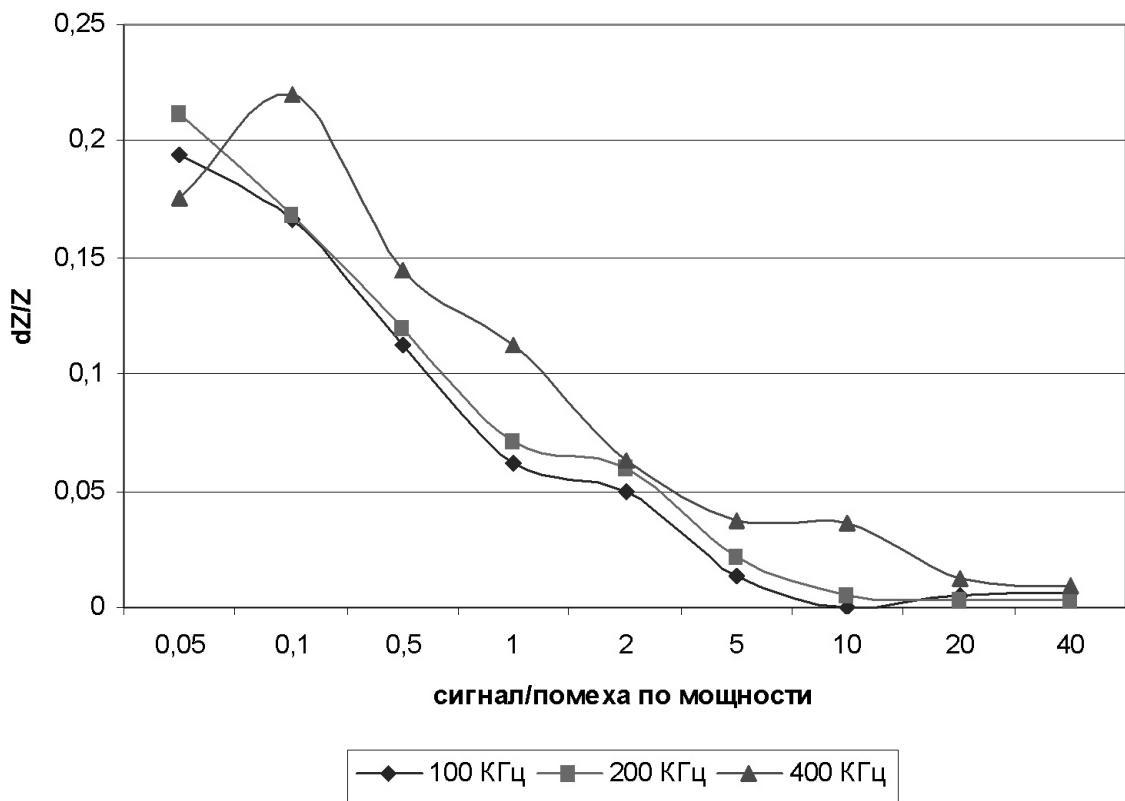
Fig. 5. Relation of the relative mistake of definition of parameter Z to the signal-to-noise ratio power with the influence on frequency-shift signal normal interference for various frequency bands
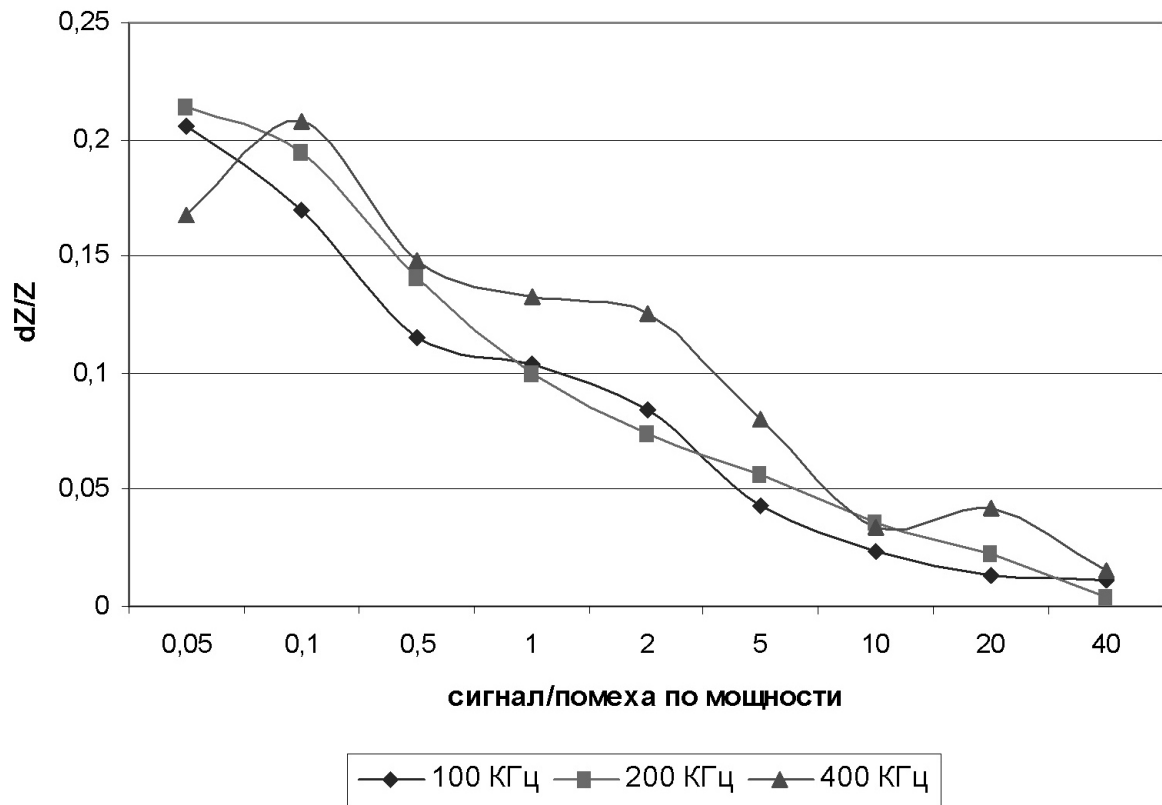
Fig. 6. Relation of the relative mistake of definition of parameter Z to the signal-to-noise ratio power with the influence on frequency-shift signal laplace interference for various frequency bands
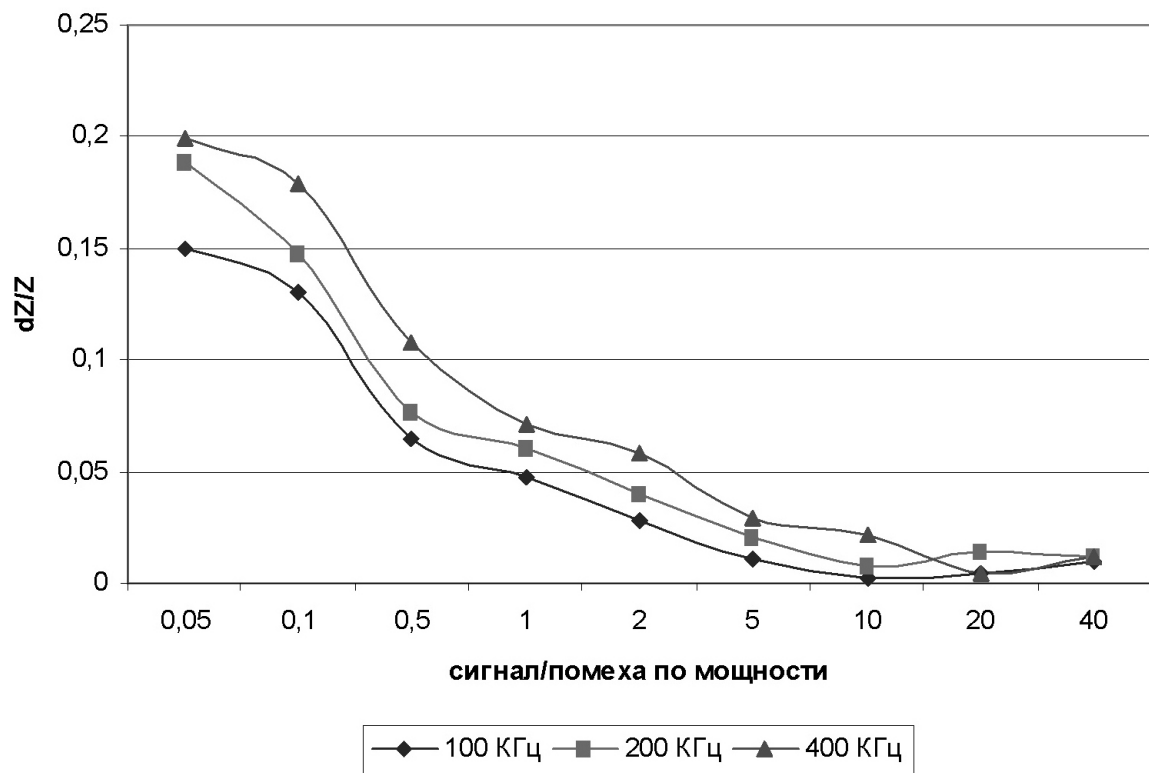
Fig. 7. Relation of the relative mistake of definition of parameter Z to the signal-to-noise ratio power with the influence on frequency-shift signal arc sin interference for various frequency bands

On the graphs (fig 2–7) the increase of a relative mistake of the definition of the parameter Z and the decrease of the signal-to-noise ratio towards 0,1 (fig.2,3) and the signal-to-noise ratio to 0,5 (fig 4) is clearly seen. Further increase of the signal-to-noise ratio leads to the decrease of the mistake. This phenomenon is connected to the change of the distribution law of the additive mix of the signal and noise interference within given variables.

The distribution changes from the arc sine (corresponds to frequency-shift signal without noise interference) to even distribution. The frequency-shift signal is rejected by the noise interference.

The relative mistake dZ/Z of the definition of the parameter Z in all the cases in the graphs doesn't override 0,22.

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Section 6. Mathematics

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Determinant sign of divisibility for polynomials

Abstract: Anntation: We have proposed a new method of working with polynomials — a new sign of divisibility of each other. The method significantly reduces the number of operations when working with polynomials. We have given some examples, and have formulated a generalization of Fermat's last theorem.

Keywords: Determinant sign of divisibility, Fermat's last theorem.

We have proposed a new method of working with polynomials — a new sign of divisibility of each other. The method significantly reduces the number of operations when working with polynomials. We have given some examples, and have formulated a generalization of Fermat's last theorem.

Determinant sign of divisibility (DSD) for the numbers was formulated by the author in $[1-3]$ and is expressed by the following theorem.

Dividend $A = \alpha A_1^n + A_0$ is multiple of the divisor $B = \beta A_1 + B_0$ if and only if $D(A;B) = k \cdot B$, where k is an integer, and $D(A;B)$ is the determinant

$$D(A;B) \equiv \begin{vmatrix} \alpha & A_0 \\ (-1)^{n+1} \beta^n & B_0^n \end{vmatrix}. \qquad (1)$$

When working with integers, in symbolics this theorem looks so

$$\left(\alpha A_1^n + A_0 \right) \vdots \left(\beta A_1 + B_0 \right) \Leftrightarrow$$

$$\Leftrightarrow \begin{vmatrix} \alpha & A_0 \\ (-1)^{n+1} \beta^n & (1)B_0^n \end{vmatrix} = k \cdot B \cdot \qquad (2)$$

As follows from $(1-2)$, by using DSD A_1^n is removed from the calculations, that often greatly simplifies the definition of divisibility.

Example. Let's check the divisibility of $A = 100006$ by $B = 31$. Here

$\alpha = 1,\ A_1 = 10, n = 5, \beta = 3,\ A_0 = 6,\ B_0 = 1,$ Indeed, A
$D(A;B) = 1 - 3^5 \cdot 6 = -1457 = -47 \cdot 31.$
is multiple of $B: 100006 = 3226 \cdot 31$.

Since a polynomial of n-th order $P_n(x) = \sum_{k=0}^{n} a_k \cdot x^k$

determines the number, then the statement (2) is automatically transferred to the polynomials and is written as

$$\left\{ P_N = \left(\alpha P_n^m + P_{N0} \right) \right\} \vdots \left\{ P_L = \left(\beta P_n + P_{L0} \right) \right\} \Leftrightarrow$$

$$\Leftrightarrow \begin{vmatrix} \alpha & P_{N0} \\ (-1)^{m+1} \beta^m & P_{L0}^m \end{vmatrix} = k \cdot P_L. \qquad (3)$$

First we give a simple example proving the theorem. Let $P_N = x^2 - y^2, P_L = x + y$, then $P_n = P_1 = x, \alpha = \beta = 1, P_{N0} = -y^2, m = 2,\ P_{L0} = y,\ D(P_N; P_L) = \begin{vmatrix} 1 & -y^2 \\ -1 & y^2 \end{vmatrix} = 0.$ There is divisibility, and we have a school rule: $x^2 - y^2 = (x+y)(x-y).$

Next, we consider $P_N(x,y) = x^3 + 2x^2 y + 2xy^3 + y^3$ and check its divisibility by $P_L = x + y$. So $P_n = P_3 = x^3, \alpha = \beta = 1, P_{N0} = 2x^2 y + 2xy^3 + y^3, m = 3,$

$$P_{L0} = y,\ D(P_N; P_L) = \begin{vmatrix} 1 & 2x^2 y + 2xy^3 + y^3 \\ 1 & y^3 \end{vmatrix} = -2xy(x+y).$$

Since $D(P_N; P_L) \vdots (x+y)$, then $P_N(x,y) \vdots (x+y)$. Indeed, $x^3 + 2x^2 y + 2xy^3 + y^3 = (x+y)(x^2 + xy + y^2)$. In the general case we obtain

$$(x+y)\sum_{k=0}^{n} x^{n-k} y^k = x^n + 2\sum_{k=1}^{n-1} x^{n-k} y^k + y^n. \qquad (4)$$

Check divisibility $P_3(x,y,z) = x^3 + y^3 + z^3 - 3xyz$ by $P_1(x,y,z) = (x+y+z)$. We work with variable «x». We have $\begin{vmatrix} 1 & y^3 + z^3 - 3xyz \\ 1 & (y+z)^3 \end{vmatrix} = 3yz(x+y+z)$, that indicating at divisibility. Indeed, $x^3 + y^3 + z^3 - 3xyz = (x+y+z) \times \times (x^2 - xy + y^2 - xz + z^2 - xy).$

The next example is related to the famous Euler chain of primes $(x^2 + x + 41)$. For all integer numbers $0 \le x \le 39$, it gives 40 consecutive primes. When $x = 40$ we have a composite number 41^2. The end of this chain can be found by using theorem (3). We write the divider of Euler's equation in the form $P_L = x + \gamma$, where γ — an unknown number. By taking $P_n = P_2 = x^2$, we make a quadratic equation

$$\begin{vmatrix} 1 & x+41 \\ -1 & \gamma^2 \end{vmatrix} = \gamma^2 + x + 41 = k(x+\gamma).$$

The discriminant $\{ k^2 - 4x(1-k) - 164 \} = 0$, where $x = 40, k = 2$, gives the divider of bracket $(x^2 + x + 41)$ equal to «41».

With DSD for polynomials, we can simplify the decision-governmental nonlinear Diophantine equations.. For example, there is $x^2 - 8x + 2y^2 = 1$. We write $1 = x + \alpha$ and make $D = \alpha^2 - 8x + 2y^2 = 0$. Its solution $\alpha = 0, x = 1, y = 2$ satisfies the initial equation.

Considering the solution of the equation $x^2 + y^3 - z^4 = 0$, we introduce the divisor $\{(x + z^2) + \alpha\}$ and make an equation

$$D = \begin{vmatrix} x - z^2 & y^3 \\ 1 & \alpha \end{vmatrix} = \alpha(x - z^2) - y^3 = 0.$$

By introducing a new variable α, we have reduced the degree of the polynomial. His solution: $\alpha = -27; x = 28; z = 6; y = 8$ satisfies the original equation.

With using DSD you can solve the algebraic equation of high degree. For example, the equation $x^5 - 9x^3 - 8x^2 + 72 = 0$ can have the following roots $(\pm)\{1; 2; 3; 4; 9; 12; 18; 24; 36; 72\}$ by theorem Vietta. We check the root $x = 3$ by checking the divisibility of the equation to $(x - 3)$.

$$D = \begin{vmatrix} 1 & -9x^3 - 8x^2 + 72 \\ 1 & -243 \end{vmatrix} = 9x^3 + 8x^2 - 315 = 0.$$

When $x = 3$, equality occurs. We have two other valid roots $\{2; -3\}$.

Applying DSD to Fermat's Last Theorem $x^n + y^n \neq z^n$, when $\{x; y; z\}$ natural number, and n an integer bigger than «2». Formulated 350 years ago, it was proved in 1994 by English mathematician Wiles [4,5]. We will consider odd $n = 2m + 1$ and write the left part of the equality in the form

$$x^{2m+1} + y^{2m+1} = (x + y)\prod_{k=0}^{2m}(-1)^k x^{2m-k} \cdot y^k \equiv (x + y)S_{2m}(x, y).$$

We decompose the polynomial S_{2m} — incomplete degree «$2m$» the difference of two numbers in Taylor series in powers of $(x + y)$.

$$S_{2m} \equiv \prod_{k=0}^{2m}(-1)^k x^{2m-k} \cdot y^k =$$
$$= \sum_{t=0}^{2m}(-1)^k \frac{(2m+1)}{(t+1)} C_{2m}^t (x + y)^t y^{2m-t}. \quad (5)$$

In (5), $C_{2m}^t = \{(2m)!/t!(2m-t)!\}$ — binomial coefficient. For example,

$$S_2 = x^2 - xy + y^2 =$$
$$= (x + y)^2 - 3y(x + y) + 3y^2 = (x + y)^2 - 3xy. \quad (6)$$

We wondered whether $x^n + y^n = z^2$? We take $n = 3$ and get

$$x^3 + y^3 = (x + y)^3 - 3y(x + y)^2 + 3y^2(x + y). \quad (7)$$

Assuming that $x = 3y^2 - y$, we substitute x in (7) and get

$$x^3 + y^3 = 9y^4(3y^2 - 3y + 1).$$

At $y = 1, x = 2$ get $2^3 + 1^3 = 3^2$. There are other sets of numbers, giving $x^3 + y^3 = z^2$:

$$184^3 + 8^3 = 2496^2; 154^3 + (-7)^3 = 1911^2.$$

As for equations $x^5 + y^5 = z^2; x^7 + y^7 = z^2$ and so on, our computer search found no such triples of integers, except in the trivial solution $x = y = z = 0$ and $x = z = 1, y = 0$. We consider $x^5 + y^5 = (x + y)S_4 = z^2$. S_4 can be written, except (5), as $S_4 = (x + y)^4 - 5xy(x + y)^2 + 5x^2y^2$. Let $5x^2y^2 = \beta(x + y)$. If $y^2 = \beta(x + y)$, then $\beta x = y(y - \beta)$, that is forbidden because x and y are coprimality. If $x^2y^2 = \beta(x + y)$, then $y^2 = (\beta/x) + (\beta y/x^2)$, y is not an integer. We consider $(x + y) = 5(x + y) = 5$. Then $x^5 + y^5 = (x + y)^2(125 - 25xy + x^2y^2)$. There are two sets of $(x; y): x = 1, y = 4$ and $x = 2, y = 3$. The second parenthesis in the last equality is equal to «41» or — «11», i.e., $x^5 + y^5 \neq z^2$. Qualitative and computer analysis of this equation for different values of $(x + y)$ also gives $x^5 + y^5 \neq z^k$ for $k = 2; 3; 4$. For other powers n, this approach also provides such inequality. At the moment, we do not claim that our proof is absolutely correct.

Therefore, we put forward the hypothesis: $x^n + y^n \neq z^2$ when $2 \leq k \leq (n-1)$, z is natural odd, $n \geq 5$, x and y are different parity and coprime. If the hypothesis is correct, then we obtain a generalization of Fermat's last theorem in the form: $x^n + y^n \neq z^{1+m}$ when $m \in \mathbb{N}$, which includes the Fermat's theorem.

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On the invariance of the constant multi-valued mapping in the heat conductivity problem

Abstract: In this work is considered the question about strong and weak invariance of the constant multi-valued mapping for equation heat conductivity with border controls. Gets the sufficient conditions for the strong and weak invariance given multi-valued mapping.

Keywords: the invariant set, the control, the multi-valued mapping, control of distributed systems.

1 Introduction

Formerly, interesting results on the invariance of given sets problem in respect to the system with fixed parameters had been received in the works of A. A. Feuer, M. Heymann, V. N. Ushakov, Kh. G. Guseynov, N. S. Rettiev, A. Z. Fazilov and other authors. In works of Sh.Alimov are considered interesting applied problems of the control with convectors on the heat volume distribution [1, 23–39]. Let

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

where $a_{ij}(x) = a_{ji}(x) \in C^1(\Omega), i, j = 1, ..., n, \Omega -$ is a bounded domain in R^n with the piecewise-smooth boundary, $A -$ the elliptic differential operator, i. e. positive constant exists γ as $\sum_{i,j=1}^{n} a_{ij}(x)\xi_i\xi_j \geq \gamma \sum_{i=1}^{n} \xi_i^2$, for all $x \in \bar{\Omega}$ and real number $\xi_1, ..., \xi_n, \sum_{i=1}^{n} \xi_i^2 \neq 0, h(x) -$ the given positive continued function, $\frac{\partial z}{\partial n} -$ the derivative on the outer normal to the frontier of set Ω at $x \in \partial\Omega$. We consider the following problem of the heat exchange control [1, 30–35]

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

with boundary and initial conditions

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

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

here $z = z(t,x) -$ the unknown function, $T -$ the arbitrary positive constant, $z^0(\cdot) \in L_2(\Omega) -$ the initial function. The measurable functions are the control with $u(\cdot,\cdot) \in L_2(S_T)$, where $S_T = \{(t,x) | t \in [0,T], x \in \partial\Omega\}$. In [1, 23–39] is proved that for all $u(\cdot,\cdot) \in L_2(S_T)$ and $z^0(\cdot) \in L_2(\Omega)$ problem (1)–(3) has the only solution $z = z(t,x)$ in Hilbert space $\dot{W}_2^{1,0}(Q_T)$, where $Q_T = \{(t,x) | t \in (0,T), x \in \Omega\}$, consisting of elements space $L_2(Q_T)$, having quadratically integrable on Q_T the generalized derivatives $z_{x_i}, i = 1, ..., n$. It is known that the elliptic operator A with the boundary condition $Pz(t,x) = 0, 0 \leq t \leq T, x \in \partial\Omega$ has a discrete spectrum, i. e. eigenvalues λ_k, such that $0 < \lambda_1 \leq \lambda_2 \leq ... \leq \lambda_k \to +\infty$, and the corresponding eigenfunctions $\varphi_k(x), x \in \Omega$, composing the complete normalized orthogonally system $L_2(\Omega)$.

We determine solution the problem (1)–(3) by Fourier method. If through $f_k(\cdot)$ are designated Fourier function coefficients $f(\cdot)$ concerning the system $\{\varphi_k\}$, in this case solution the problem (1)–(3) is of the form

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

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

Further, we shall determine through U the plurality of the control, which is specified below by the certain positive number ρ.

Definition 1. *The multi-valued mapping $D : [0,T] \to 2^R$, where $R = (-\infty, \infty)$ named strongly invariant concerning problem (1)–(3), if for all $\langle z^0(\cdot) \rangle_{L_2(\Omega)} \in D(0)$ and $u(\cdot,\cdot) \in U$ the injection is carried out $\langle z(t,\cdot) \rangle \in D(t)$ for all $0 < t \leq T$, where $\langle \; \rangle -$ the standard norm, $z(\cdot,\cdot) -$ the corresponding solution to the problem (1)- (3) [2, 266–276; 3, 232–233].*

Definition 2. *The multi-valued mapping $D : [0,T] \to 2^R$, where $R = (-\infty, \infty)$, named weakly invariant concerning problem (1)–(3), if for all $\langle z^0(\cdot) \rangle \in D(0)$ the control exists $u(\cdot,\cdot) \in U$ namely $\langle z(t,\cdot) \rangle \in D(t)$ for all $0 < t \leq T$, where $\langle \; \rangle -$ the standard norm, $z(\cdot,\cdot) -$ the corresponding solution to the problem (1)–(3).*

2 Statement of the problem

In this work the weak and strong invariance of the constant multi-valued mapping is studied in the form of $D(t) = [0,b], 0 \leq t \leq T$, where $b -$ the positive constant.

Our further objective is to find the relations between parameters T, b, ρ so that to provide the strong and weak invariance of the multi-valued mapping $D(t), t \in [0,T]$ concerning problem (1)–(3).

3 Main results

A). Let $\langle z(t,\cdot) \rangle = \|z(t,\cdot)\|, 0 \leq t \leq T$, and

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

Here $\|z(t,\cdot)\| = \sqrt{\int_{\Omega} |z(t,x)|^2 dx} = \sqrt{\sum_{k=1}^{\infty} z_k^2(t)}, 0 \leq t \leq T.$

Proposition l. For any function $u(\cdot,\cdot) \in U$ is right the following inequality

$$\sum_{k=1}^{\infty}\left(\int_{0}^{t}e^{-\lambda_k(t-\tau)}\int_{\partial\Omega}u(\tau,x)\varphi_k(x)dxd\tau\right)^2 \le \left(\frac{1-e^{-\lambda_1 t}}{\lambda_1}\right)^2 \cdot \rho^2.$$

Theorem 1. *The multi-valued mapping* $D(t), t\in[0,T]$, *is strongly invariant concerning problem (1)–(3), when is executed following inequality*

$$\rho \le \lambda_1 b. \qquad (4)$$

The proving of theorem 1. Let $\rho \le \lambda_1 b$. We shall Show the strong invariance of the muilti-valued mapping $D(t), 0\le t\le T$ concerning problem (1)–(3). For all $z(0,\cdot), \|z(0,\cdot)\| \le b$ and $u(t,\cdot), \|u(t,\cdot)\| \le \rho$, we have

$$\|z(t,\cdot)\|^2 = \int_{\Omega}|z(t,x)|^2 dx = \sum_{k=1}^{\infty}z_k^2(t) =$$

$$= \sum_{k=1}^{\infty}\left(z_k^0 e^{-\lambda_k t} + \int_{0}^{t}e^{-\lambda_k(t-\tau)}\int_{\partial\Omega}u(\tau,s)\varphi_k(s)dsd\tau\right)^2 =$$

$$\le \sum_{k=1}^{\infty}|z_k^0|^2 e^{-2\lambda_k t} + 2e^{-\lambda_1 t}\int_{0}^{t}e^{-\lambda_k(t-\tau)}\left(\sum_{k=1}^{\infty}|z_k^0|\left|\int_{\partial\Omega}u(\tau,s)\varphi_k(s)ds\right|\right)d\tau +$$

$$+ \sum_{k=1}^{\infty}\left(\int_{0}^{t}e^{-\lambda_s(t-\tau)}\int_{\partial\Omega}u(\tau,s)\varphi_k(s)dsd\tau\right)^2.$$

Now applying twice Koshi-Bunyakovskiy inequality and proposition 1 we have

$$\|z(t,\cdot)\|^2 \le b^2 e^{-2\lambda_1 t} + 2b\rho e^{-\lambda_1 t}\int_{0}^{t}e^{-\lambda_k(t-\tau)}d\tau + \left(\frac{1-e^{-\lambda_1 t}}{\lambda_1}\right)^2 \rho^2.$$

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

Hence and resulting from inequality (4) $\|z(t,\cdot)\| \le b$.

This means that the multi-valued mapping $D(t), 0\le t\le T$ is strongly invariant concerning problem (1)–(3). Theorem 1 is proved.

Note. *We can demonstrate that the multi-valued mapping* $D(t), 0\le t\le T$ *is always weakly invariant concerning problem (1)–(3).*

Indeed for all $z^0(\cdot), \|z^0(\cdot)\| \le b$, is possible to choose the control circuit $u(\cdot,\cdot)\in U$ so that the multi-valued mapping $D(t), 0\le t\le T$ will be weakly invariant concerning problem (1)–(3).

Really, for all $z^0(\cdot), \|z^0(\cdot)\| \le b$, with $u(t,x)=0, t\ge 0$, we have

$$\|z(t,\cdot)\|^2 = \sum_{k=1}^{\infty}\left(z_k^0 e^{-\lambda_k t} + \int_{0}^{t}e^{-\lambda_k(t-\tau)}\int_{\partial\Omega}u(\tau,s)\varphi_k(s)dsd\tau\right)^2 =$$

$$= \sum_{k=1}^{\infty}\left(z_k^0 e^{-\lambda_k t}\right)^2 \le \sum_{k=1}^{\infty}|z_k^0|^2 \le b^2.$$

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

$$U = \left\{u(\cdot,\cdot): \sqrt{\sum_{k=1}^{\infty}\int_{0}^{T}\left(\int_{\partial\Omega}u(t,s)\varphi_k(s)ds\right)^2 dt} \le \rho\right\}. \quad \text{Here}$$

$$\|z(\cdot,\cdot)\| = \sqrt{\int_{0}^{T}\|z(t,\cdot)\|^2 dt} = \sqrt{\sum_{k=1}^{\infty}\int_{0}^{T}z_k^2 dt}.$$

Let $z^0(\cdot)$ any element space $L_2(\Omega)$, satisfying the condition $\|z^0(\cdot)\|\in D(0)$, i.e. $\|z^0(\cdot)\| \le b$, but $u(\cdot,\cdot)$– any possible control, i.e. $u(\cdot,\cdot)\in U$. We have

$$\|z(t,\cdot)\|^2 = \int_{\Omega}|z(t,x)|^2 dx = \sum_{k=1}^{\infty}z_k^2(t) =$$

$$= \sum_{k=1}^{\infty}\left(z_k^0 e^{-\lambda_k t} + \int_{0}^{t}e^{-\lambda_k(t-\tau)}\int_{\partial\Omega}u(\tau,s)\varphi_k(s)dsd\tau\right)^2 =$$

$$\le \sum_{k=1}^{\infty}\left(|z_k^0|^2 e^{-2\lambda_k t} + 2e^{-\lambda_1 t}|z_k^0|\sqrt{\int_{0}^{t}e^{-2\lambda_1(t-\tau)}d\tau} \times\right.$$

$$\times \sqrt{\int_{0}^{t}\left(\int_{\partial\Omega}u(\tau,s)\varphi_k(s)ds\right)^2 d\tau} +$$

$$\left.+ \int_{0}^{t}e^{-2\lambda_1(t-\tau)}d\tau\int_{0}^{t}\left(\int_{\partial\Omega}u(\tau,s)\varphi_k(s)ds\right)^2 d\tau\right) \le$$

$$\le b^2 e^{-2\lambda_1 t} + 2b\rho e^{-\lambda_1 t}\sqrt{\int_{0}^{t}e^{-2\lambda_k(t-\tau)}d\tau} + \rho^2\int_{0}^{t}e^{-2\lambda_k(t-\tau)}d\tau.$$

Consequently,

$$\|z(t,\cdot)\| \le be^{-\lambda_1 t} + \frac{\rho}{\sqrt{2\lambda_1}}\sqrt{1-e^{-2\lambda_1 t}}. \qquad (5)$$

We introduce the following function $f(t) = be^{-\lambda_1 t} + \dfrac{\rho}{\sqrt{2\lambda_1}}\sqrt{1-e^{-2\lambda_1 t}}\ t\ge 0.$

Proposition 2. *For all positive parameters* b, ρ *is right the following equality* $\sup\limits_{t\ge 0}f(t) = f(t_0) = \sqrt{b^2 + \dfrac{\rho^2}{2\lambda_1}}$, *where*

$$t_0 = \frac{1}{2\lambda_1}\ln\left(1 + \frac{\rho^2}{2\lambda_1 b^2}\right).$$

The proving of Proposition 2. We study upon the function extremum $f(t)$ on the half-line $[0,\infty)$. We Calculate derived

$$f'(t) = \frac{\lambda_1 e^{-\lambda_1 t}}{\sqrt{2\lambda_1\left(1-e^{-2\lambda_1 t}\right)}}\left(\rho e^{-\lambda_1 t} - b\sqrt{2\lambda_1}\sqrt{1-e^{-2\lambda_1 t}}\right).$$

Hence it is easy to demonstrate that if $0<t\le t_0$, that $f'(t)\ge f'(t_0)=0$, if $t_0<t$, that $f'(t)<f'(t_0)=0$.

Consequently, $\sup\limits_{t\ge 0}f(t) = f(t_0) = \sqrt{b^2 + \dfrac{\rho^2}{2\lambda_1}}.$

Theorem 2. *If* $\rho \le b\sqrt{2\lambda_1(1-T)/T}$, *the multi-valued mapping* $D(t), 0\le t\le T$ *is strongly invariant concerning problem (1)–(3).*

Theorem 3. *If* $2\lambda_1 \ge 1$, *the multi-valued mapping* $D(t), 0\le t\le T$ *is weakly invariant concerning the problem (1)–(3).*

The proving of theorem 2. Let $\rho \le b\sqrt{2\lambda_1(1-T)/T}$. The following inequality results from (5) and proposition 2

$$\|z(\cdot,\cdot)\|^2 = \int_{0}^{T}\|z(t,\cdot)\|^2 dt \le \int_{0}^{T}|f(t)|^2 dt \le \int_{0}^{T}|f(t_0)|^2 dt =$$

$$= \left(b^2 + \frac{\rho^2}{2\lambda_1}\right)T \le b^2.$$

Consequently, $\|z(\cdot,\cdot)\|\in D(t)$ for all $0\le t\le T$, i.e. $D(t)$ is strongly invariant concerning problem (1)–(3). Theorem 2 is proved.

The proving of theorem 3. Let $2\lambda_1 \geq 1$. We Make sure that the multi-valued mapping $D(t), 0 \leq t \leq T$ is weakly invariant. For all $\|z^0(\cdot)\| \in D(0)$ we choose the control $u(t,x) = 0, t \in [0,T], x \in \partial\Omega$, i.e.
$\int_{\partial\Omega} u(t,s)\varphi_k(s)ds = 0, k = 1,2,\dots$. Then,

$$\|z(\cdot,\cdot)\|^2 = \int_0^T \|z(t,\cdot)\|^2 dt =$$

$$= \sum_{k=1}^{\infty} \int_0^T \left(z_k^0 e^{-\lambda_k t}\right)^2 dt \leq b^2 \frac{1-e^{-2\lambda_1 T}}{2\lambda_1} \leq \frac{b^2}{2\lambda_1} \leq b^2.$$

Consequently, $\|z(\cdot,\cdot)\| \in D(t)$ for all $0 \leq t \leq T$, i.e. $D(t), 0 \leq t \leq T$ is weakly invariant concerning the problem (1)–(3). Theorem 3 is proved.

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Necessary conditions of summability of spectral expansion on eigenfuction of the operator laplace

Abstract: The spectral decomposition connected with self-conjugate expansion are considered the operator Laplace in N of dimensional area. It is proved that if spectral decomposition of any function in some point is summarized by Riesz's means, its average value about α in the specified point possesses the generalized continuity.

Keywords: eigenfuction, eigenvalues, spectral expansion, local bounded variation, Riesz's means, generalized continuity, summability, operator Laplace.

Introduction. The question on sufficient conditions at which performance it is possible to approximate function by its spectral decomposition connected with self-interfaced expansion of the elliptic operator, by present time is well studied and in detail shined in the mathematical literature as in our country, and abroad. Recently interest to these problems has noticeably increased, and the delicate questions connected with spectral decomposition of rough functions have undergone to research more.

From the mathematical literature well-known the examples showing, that spectral decomposition can converge even in those points where decomposed function has break so the usual requirement of smoothness is not necessary. However in all these examples functions in some the generalized sense nevertheless is continuous in a considered point. This fact for the spectral decomposition ad equating to self-interfaced expansion of operator Laplace in any multivariate area for the first time has been established in E. C. Titchmarsha's work [1, 255–258]. Corresponding results have been received by them for Riesz means of spectral decomposition in case of when the order of averages is an integer, and also in the assumption, that dimension of considered area is not so great.

Conseder the following orthonormal system of eigenfuctions of Laplace operator:
$$-\Delta u_k(x) = \lambda_k u_k(x), \qquad x \in \Omega \subset R^N$$
Define the spectral expansions:
$$E_\lambda(x,f) = \sum_{\lambda_k < \lambda} f_k u_k(x).$$
We introduce Riesz means of order $s \geq 0$:

$$E_\lambda^s f(x) = \sum_{\lambda_k < \lambda} \left(1 - \frac{\lambda_k}{\lambda}\right)^s f_k u_k(x) = \int_0^\lambda \left(1 - \frac{t}{\lambda}\right)^s dE_t f.$$

Denote

$$S_R^\alpha f(x) = \frac{R^{-N}}{\omega(\alpha,N)} \int_{|y|<R} \left(1 - \frac{|y|^2}{R^2}\right)^\alpha f(x+y)dy,$$

where

$$\omega(\alpha,N) = \int_{|y|\leq 1} \left(1 - |y|^2\right)^\alpha dy.$$

Theorem 1. *Let $f \in L_2(\Omega)$ and $s \geq 0$. Suppose that for some $x \in \Omega$ the following ratio is carried out*
$$\lim_{\lambda \to \infty} E_\lambda^s f(x) = A.$$
Then for any $\alpha > s - (N-2)/4$ the following equality
$$\lim_{R \to 0} S_R^\alpha f(x) = A$$
is valid.

First we prove some Propositions.

Proposition 1. *Let* $-1 < s < \dfrac{v}{2} - \dfrac{1}{4}$. *Then*

$$\int_1^\infty z^{-\frac{v}{2}}(z-1)^s J_v(a\sqrt{z})dz = \Gamma(s+1)2^{s+1}a^{-s-1}J_{v-s-1}(a).$$

For the proof we can refer, for example, on $[3, 717{-}718]$.

Set

$$\Phi_A(t,R) = \begin{cases} \displaystyle\int_t^A (\lambda - t)^s \lambda^{-\frac{(l+s+1)}{2}} J_{l+s+1}(R\sqrt{\lambda})d\lambda, & 0 \le t \le A, \\[2mm] 0, & t > A. \end{cases}$$

Proposition 2. *Let* $l > s - 1/2$ *and* $s > -1$. *Then the following equality*

$$\lim_{A\to\infty}\Phi_A(t,R) = t^{\frac{(s-l+1)}{2}}\Gamma(s+1)2^{s+1}(R\sqrt{t})^{-s-1}J_l(R\sqrt{t})$$

is valid.

Proof. We have

$$\Phi_A(t,R) = \int_t^{A/} t^s t^{-\frac{l}{2}-\frac{1}{2}-\frac{s}{2}}(u-1)^s u^{-\frac{l}{2}-\frac{1}{2}-\frac{s}{2}} J_{l+s+1}(R\sqrt{tu})tdu =$$

$$= t^{\frac{s}{2}-\frac{l}{2}+\frac{1}{2}}\int_1^{A/t}(u-1)^s u^{-\frac{l}{2}-\frac{1}{2}-\frac{s}{2}} J_{l+s+1}(R\sqrt{tu})du.$$

We set $v = l+1+s$. Then since $l > s-1/2$ and $s > -1$ we have

$$v - 1/4 = l/2 + s/2 + 1/4 = (l-s+1/2)/2 + s > s, \quad \text{or}$$
$$-1 < s < v/2 - 1/4.$$

In this case the required equality follows from **Proposition 1.**

Q. E.D.

Proposition 3. *Let* $l > s+1/2$. *The following inequality*
$$|\Phi_A(t,R)| \le \Phi(t,R), \quad t \ge 1,$$
where
$$\Phi(t,R) = C(R)t^{-(l-s-1/2)/2}$$
is valid.

Proof. We have

$$|\Phi_A(t,u)|t^{-\frac{(l-s-1)}{2}} = \left| \int_1^{A/t}(u-1)^s u^{-\frac{(l+1+s)}{2}} J_{l+1+s}[(R\sqrt{t})\sqrt{u}]du \right| \le$$

$$\le \int_1^\infty u^{\frac{s}{2}-\frac{l}{2}-\frac{1}{2}}\left|J_{l+1+s}(R\sqrt{ut})\right|du \le$$

$$\le C(R)t^{-1/4}\int_1^\infty u^{\frac{s}{2}-\frac{l}{2}-\frac{3}{4}}\cos(R\sqrt{tu})du =$$

$$= C(R)t^{-\frac{1}{4}}\int_1^\infty v^{s-l-\frac{3}{2}}\cos(R\sqrt{tv})dv \le$$

$$\le C(R)t^{-\frac{1}{4}}\int_1^\infty v^{s-l-\frac{1}{2}}\cos(R\sqrt{tv})dv = C(R)t^{-\frac{1}{4}}.$$

Q. E.D.

Proposition 4. *Let* $g(t)$ *be the function of local bounded variation on the half-line* $t \ge 0$ *and for some* $\beta > 0$ *the following inequality*

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

is valid. Set

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

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

$$\int_0^\infty (R\sqrt{t})^{-l}J_l(R\sqrt{t})dg(t) =$$

$$= 2^{-s-1}\frac{R^{s+1-l}}{\Gamma(s+1)}\int_0^\infty (\sqrt{\lambda})^{-l-1+s}J_{l+1+s}(R\sqrt{\lambda})E_\lambda^s f d\lambda$$

is valid.

Proof. Consider the following integral

$$I_A = \int_0^A (\sqrt{\lambda})^{-l+s}J_{l+1+s}(R\sqrt{\lambda})g^s(\lambda)d\lambda \cdot$$

Then

$$I_A = \int_0^A (\sqrt{\lambda})^{-l+s}J_{l+1+s}(R\sqrt{\lambda})g^s(\lambda)d\lambda =$$

$$= \int_0^A \lambda^{-\frac{l}{2}-\frac{1}{2}+\frac{s}{2}}J_{l+s+1}(R\sqrt{\lambda})\left[\int_0^\lambda\left(1-\frac{t}{\lambda}\right)^s dg(t)\right]d\lambda =$$

$$= \int_0^A \lambda^{-\frac{l}{2}-\frac{1}{2}+\frac{s}{2}}J_{l+s+1}(R\sqrt{\lambda})\left[\int_0^\lambda(\lambda-t)^s\lambda^{-s}dg(t)\right]d\lambda =$$

$$= \int_0^A dg(t)\int_t^A(\lambda-t)^s\lambda^{-\frac{l}{2}-\frac{1}{2}-\frac{s}{2}}J_{l+s+1}(R\sqrt{\lambda})d\lambda =$$

$$= \int_0^A \Phi_A(t,R)dg(t).$$

Hence,

$$I_A = \int_0^\infty \Phi_A(t,R)dg(t).$$

Remaind $l > s - 1/2$. In this case, according to **Proposition 2,**

$$\lim_{A\to\infty}\Phi_A(t,R) = \Gamma(s+1)2^{s+1}(R\sqrt{t})^{-s-1}J_l(R\sqrt{t})$$

Further, since $l > s+1/2$ according to **Proposition 3,**

$$\int_1^\infty |\Phi(t,u)|\,\|dg(t)\| \le C(h)\int_1^\infty t^{-(l-1-1/2)/2}|dg(t)| \le C\int_1^\infty t^{-\beta}|dg(t)| < \infty$$

Hens, we may apply theorem of Lebesgue:

$$I = \lim_{A\to\infty}I_A = \lim_{A\to\infty}\int_0^\infty \Phi_A(t,R)dg(t) =$$

$$= \Gamma(s+1)2^{s+1}R^{-s-1}\int_0^\infty t^{\frac{l}{2}}J_l(R\sqrt{t})dg(t).$$

Q. E.D.

From this moment we set $l = N/2 + \alpha$.

Proposition 5. *Let* $l = N/2 + \alpha$, *where* $\alpha > -1/2$. *Then*

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

and integral converges absolutely and uniformly.

For the proof we can refer on $[1, 255{-}258]$.

Proposition 6. *Set* $g(\lambda) = E_\lambda f(x)$. *Let* $\beta > N/4$. *Then*

$$\int_0^\infty \lambda^{-\beta}|dg(t)| \le C\|f\|.$$

Proposition 7. *Let* $l = N/2 + \alpha$, *where* $\alpha > s - (N-2)/4$. *Then*

$$S_R^\alpha f(x) = 2^{l-s-1}\frac{\Gamma(l+1)}{\Gamma(s+1)}R^{s+1-l}\int_0^\infty (\sqrt{\lambda})^{-l-1+s}J_{l+1+s}(R\sqrt{\lambda})E_\lambda^s f d\lambda.$$

Proof follows from **Proposition 2** and **3.**

Corollary. Let $l = N/2 + \alpha$, where $\alpha > s - (N-2)/4$.

Then

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

Proposition 8. Let $l = N/2 + \alpha$, where $\alpha > s - (N-2)/4$.

Then

$$\int_0^\infty t^{-(l+1-s)/2} \left| J_{l+1+s}(\sqrt{t}) \right| dt < \infty.$$

Proof of the Theorem 1 follows from **Propositions 7, 8.**
Q. E. D.

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Section 7. Machinery construction

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On the problem of neural network process control metalworking

Abstract: This work is dedicated to the increase of metal-working efficiency with the help of neuron network adaptive systems. The neuron network adaptive systems provide the automated correction of cutting modes during change of master schedules.

Keywords: neyrokontroller; a neural emulator; learning sample; the test sample; adaptive control system.

The efficiency of metalworking was traditionally increased through creation of adaptive systems allowing to adjust the processing of cutting conditions. Study of the works considering adaptive control of the cutting process shows that the management problem ultimately comes down to stabilization of the temperature-force and power parameters of the process [1; 2; 3]. Any variation of these parameters while in operation denotes the presence of perturbing factors, primarily tool wear, and requires correction of the processing modes [1; 2]. As a rule, adaptive systems are built on the basis of a two-dimensional constraint control for the values of cutting speed v and feed s.

A real challenge of implementing such systems lies in the need to build mathematical models of the process. Unstable dynamics of the cutting process depends on many factors and is determined by the specific conditions of processing, which makes it necessary to make the model more complex, while any changes in the controlled object require rebuilding of the model and development of a new control law.

Attempts to use flexible non-linear neural network models also encounter difficulties related to the on-line training of neural networks and sampling of the training. The sample should be representative, cover the entire range of possible changes in the control variables. In addition, there is a need for continuous updating of the training sample in the control system activity. The proposed control system, enabling the temperature and cutting power stabilization, is built on the double-network scheme with a neural controller (NC) and a neural emulator (NE) (Fig. 1).
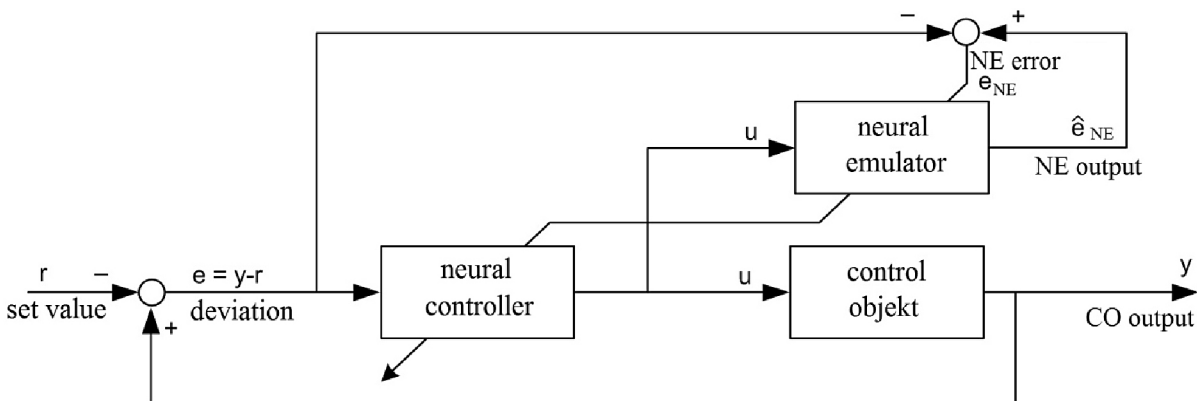
Fig. 1. The overall structure of neural controller and neural emulator control

This scheme, which uses multi-layer feedforward networks, allows training NC by means of back-propagation algorithm without reference to the function of the control object, that is, knowledge of the dependence of output parameters of the cutting process (temperature and power) on the control parameters — speed and feed. When training the NC, the neural controller and neural emulator are considered as a single multi-layer network, and the error can propagate through the currently trained neural emulator in opposite direction [4].

The neural controller generates control actions - the speed and feed values in the current and proceeding time $v(t), s(t), v(t-1), s(t-1)$, which are components of vector u. The deflection vector is fed at the input of the neural controller $e = y - r$, where $y = (y_t(t), y_{\text{м}}(t), y_t(t-1), y_{\text{м}}(t-1))$ vector, containing the actual values of monitored parameters of the control object - temperature and power in this and the previous time, and vector $r = (r_t(t), r_{\text{м}}(t), r_t(t-1), r_{\text{м}}(t-1))$

– their set values. The parameters values delayed at one cycle are used for the account of the dynamics of the control object.

The neural controller determines the amount of deviation e. In the training of the neural emulator, the mean square error is minimized E_{NE}, which is calculated as the square of the difference between the neural emulator output e and the actual process output deviation from the target value $e = y - r$, that is $E_{NE} = \frac{1}{2}(\hat{e} - e)^2 = \frac{1}{2}e_{NE}^2$.

The control signals are sent to the NE input – vector u values, which are the NC output.

The number of inputs and outputs are determined by the u and e vectors length, respectively, and the NC – by the u and $\hat{e}$ vectors length, respectively. Thus, the NC and NE are similar networks containing four inputs and four outputs; both networks also contain one hidden layer with five neurons.

Control signals u, set by the neural controller, are fed into the numerical control system, providing the control and stabilization of temperature and power parameters of the cutting process in accordance with the procedure described in [5].

In the operation of the adaptive system there is a continuous training of the NE, as well as formation of training and test samples for the NC. In the case of increasing control errors, estimated from the root mean square criterion $E = \frac{1}{2}(e - r)^2$, NC weights are captured, and NC training based on the training sample available at a given time is initialized. In case of a successful NC training, the old NC is replaced with a new one.
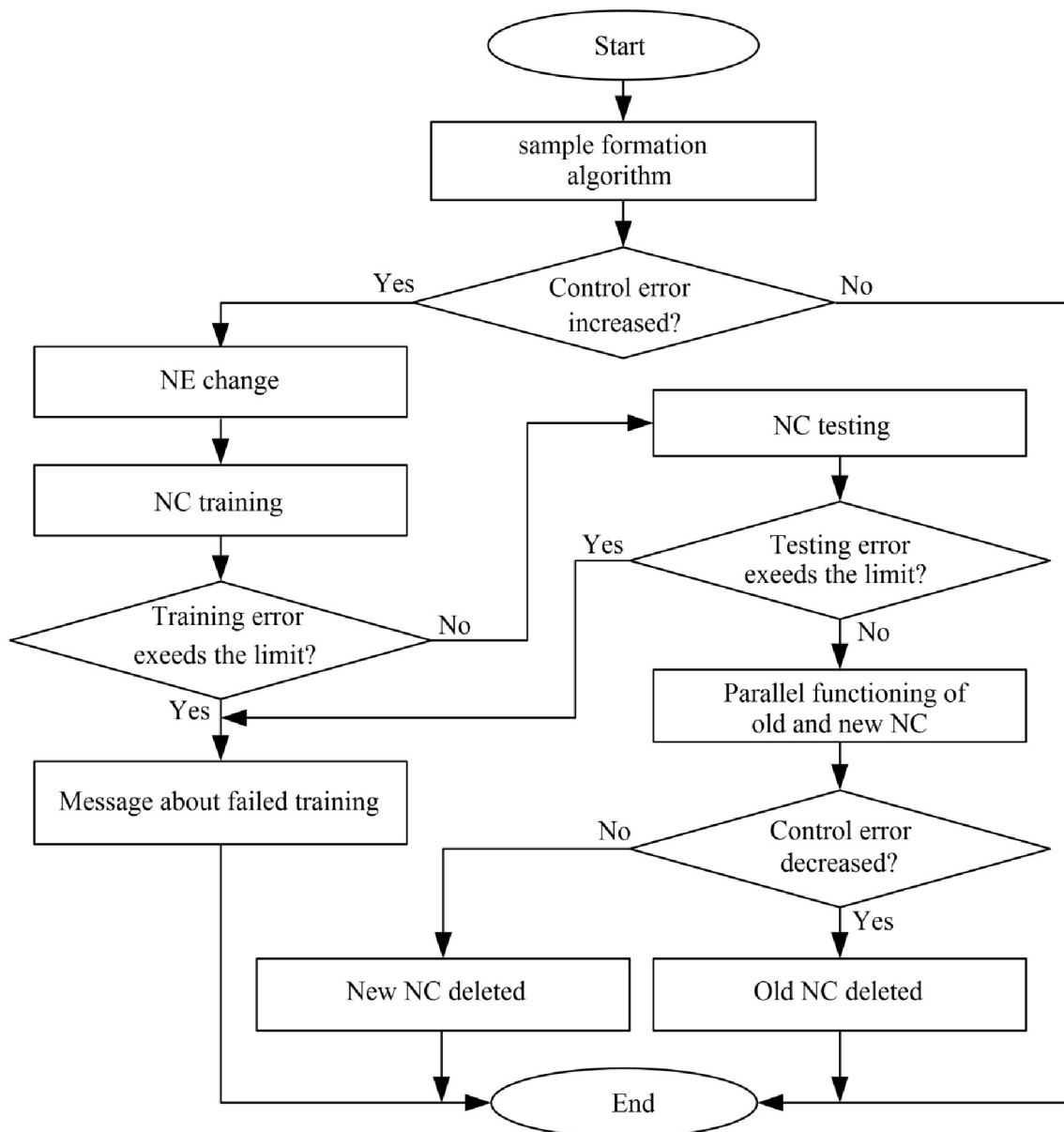
Fig. 2. NC training algorithm

Retraining cycle time (excluding the time of training sample formation) does not affect the performance of the system, since it depends only on the computing power and can be reduced to the length of one cycle. In order to avoid undesirable effects connected with "re-training", a copy of the NC should be trained "from scratch" (again) every time. In

this case the training sample must be continuously updated and contain both old and new examples. Thus, the new NC will not inherit and accumulate obsolete information, and all unwanted results of training of the previous NC will be totally eliminated when replacing the old with a new NC.

There is a smooth transition from the old to a new NC when updating the NC. Initially, the new regulator comes into operation in parallel with the old one, the values and control actions from both controllers are averaged over the switching time. The NC training algorithm is shown in Fig. 2.
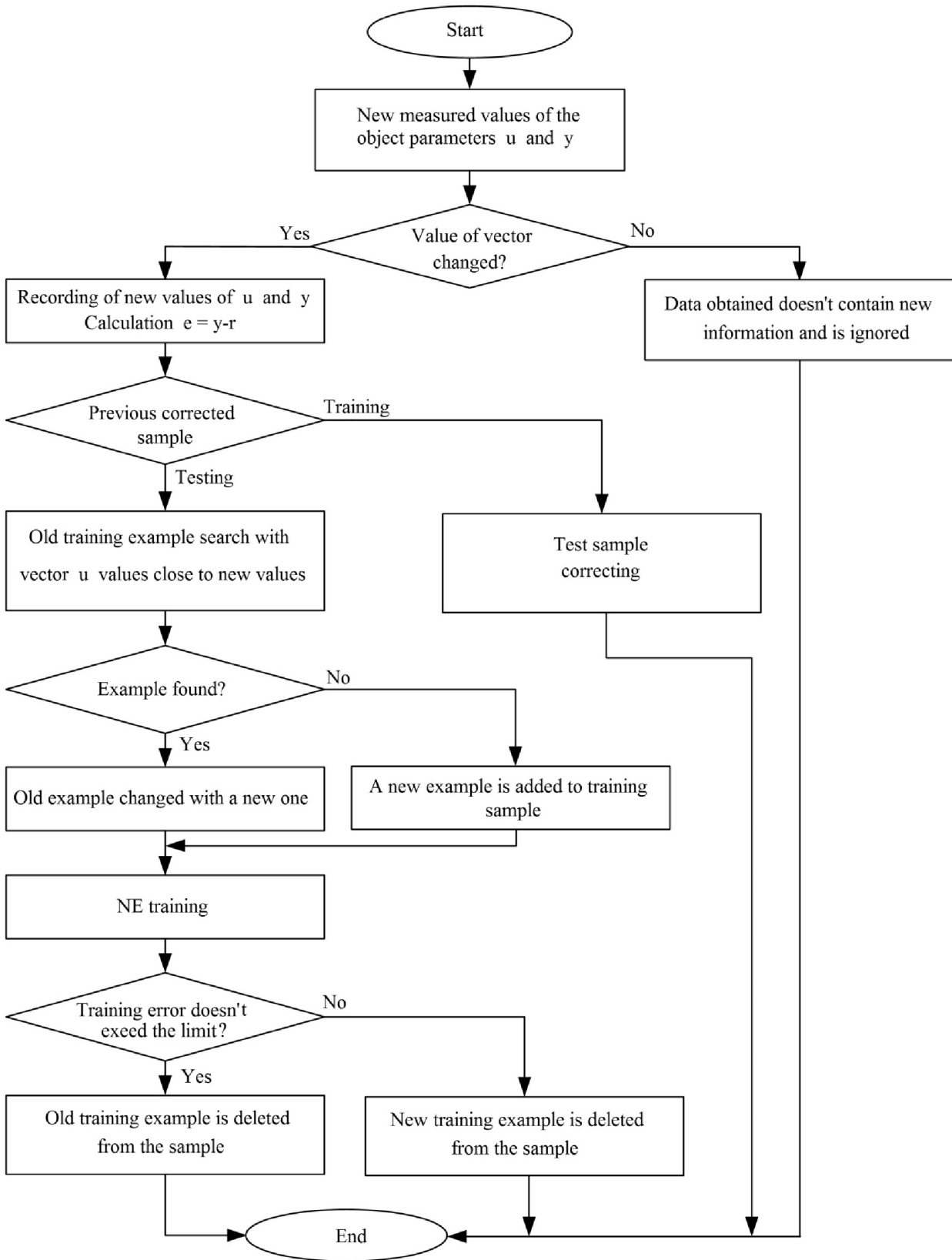
Fig. 3. Algorithm of formation and updating the training and test samples for NC

Since operation of the NC is not related to training, it occurs at a rate of regular mathematical calculations, almost instantaneously, i.e., the control system with a neural controller does not introduce additional delay in the generation of control signals.

Pairs $\langle e, u \rangle$ represent examples for the neural controller. The sample of the neural controller consists of two parts. One part is designed for training, the second — for testing. The sample must cover the entire range of possible changes in the values of speed and feed. Both samples should be continuously updated by adding new and removing outdated examples in the operation of the control system while measuring values of the vectors y and u.

The algorithm for generating training and test samples is shown in Fig. 3.

Upon receiving new measured values of control signals v_{new}, s_{new}, contained in vector u, differing from previous values, error is computed $e = y - r$, and a new example is formed $\langle e, u \rangle$. Along with this, the sample, available at the current time, is searched for the example of the speed v and feed s values, approximating the new values v_{new}, s_{new}. If such an example is found, in which the following inequalities are valid: $v - v_{new} < \delta_1$ and $s - s_{new} < \delta_2$, where δ_1 and δ_2 stand for some predetermined values, then the example found becomes out-of-date and is replaced by a new one. If this example is not found, then a new example is added to the sample without replacement. The values δ_1 and δ_2 are defined experimentally. It is not advisable to reduce values δ_1 and δ_2 (to monitor the situation more accurately), since it leads to a significant increase in the range of the training and test samples formed. In addition, if values of differences are too small, it can lead to contradictory examples in the sample, that is, it may turn out, that similar inputs will correspond to different outputs.

Accumulation of the sample occurs gradually as the new process parameters are measured.

In case of subsequent successful NE training, the new example is stored in the sample, otherwise it is removed from the sample, and there is a rollback to the old example (in the case of the removal of the old example). Training and test samples are updated alternately. Updating the test sample is similar to updating the training one.

In the case of frequent disturbances there is an intensive update of the examples of training and test samples; if no disturbances occur, there is no change of control actions, and there is no update of the samples.

The NC change frequency depends on the extent and stability of control error. At low and constant extent of control error there is no need to frequently change the NC, in this case the change can occur with fixed frequency.

Training of neural network components discussed above was carried out on a computer AMD Athlon™ II× 4 640 Processor 3, 00 GHz using the following software: NeuroSolutions 5.05 and NeuroPro 0.25, and proved to be effective. The sample sizes for the training and testing of the NC were limited to app. 200 examples. The neural controller training time does not exceed one second, and can be reduced in training due to the transition to half fully connected networks according to the procedure described in [4].

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Section 8. Medical science

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Features Glu298Asp polymorphizm GENE NOS-3 in patients with chronic heart failure of uzbek nationality

Abstract: Investigated the genetic determinants of the development of endothelial dysfunction — alleles and genotypes Glu298Asp NOS-3 gene in patients with CHF of Uzbek nationality.

Keywords: endothelial dysfunction, chronic heart failure, gene polymorphizm.

According to numerous studies, it became obvious that the effect of environmental factors is realized in connection with the genotype of the individual features. The problem is that not previously manifested in other living conditions of the particular genotype in the changed social conditions "implemented" its potential pathogenetic significance, become individual genetic risk factors, so the study of genetics of cardiovascular disease becomes more theoretical and practical significance [1; 2]. Identification of genetic risk factors for cardiovascular disease and to assess their contribution to the development of disease — one of the main problems of molecular cardiology. Genetic risk factors, as opposed to a clinical, biochemical, environmental and others. Risk factors are not modifiable (not subjected to correction) [3; 4]. Testing of susceptibility genes allows, first of all, to form a group of persons of high cardiovascular risk for the purpose of therapeutic and preventive measures aimed at reducing the extent of the risk under the supervision of a physician. Identification of the genetic predisposition to any disease can be carried out well before the onset of clinical symptoms, which can effectively prevent its development or postpone deadlines demonstrations [5]. However, molecular genetic testing can detect features of etiopathogenesis and course the most common cardiovascular disease in each patient.

It has long been proven that in the development of cardiovascular disease in general and heart failure, in particular, occupies a special place endothelial dysfunction [6; 7]. It has been suggested that endothelial dysfunction may be a primary, genetically determined. One of the genes, whose role in the development of endothelial dysfunction has been widely discussed in recent years, is the gene of endothelial NO-synthase (eNOS). The gene of endothelial NO-synthase (eNOS), responsible for the synthesis of nitric oxide (NO) and endothelium is a key enzyme in the regulation of vascular tone, smooth muscles in the vascular wall and thrombotic processes. The gene encoding eNOS, located on chromosome 7q35–36, consists of 26 exons and encodes a protein with a mol. weight of 135 kDa, consisting of 1203 amino acids [3; 8]. ENOS gene promoter contains multiple domains, i. e. can be adjusted near the transcription factors [9].

It is the most studied polymorphism 4a/b 4th intron polymorphism G894T (Glu298Asp) 7th exon polymorphism and T-786S promotora gene eNOS. The exons and introns eNOS gene are the most important three polymorphic sites. This minisatellite repeat in intron 4 (4a/b polymorphism eNOS) and transversion G/T at position 894 of the nucleotide sequence of the gene eNOS, which leads to a mutation at position 298 of the protein sequence, leading to the substitution of glutamic acid for aspartic (Glu-Asp298) and polymorphism T-786S promotora gene eNOS [10; 11].

Genotype prevailing in one population may be minor to another, which makes the research for each ethnic and population groups with unique and meaningful [5; 7]. Genetic factors undoubtedly play an important role in the pathogenesis of heart failure, however, information about the clinical relevance of polymorphisms of genes in CHF is clearly not enough. The existing data or very vague or contradictory. According to reports, the frequency of polymorphisms of individual genes associated with the disease. However, the degree of evidence of this view in a number of cases is being questioned. Given the above it is of interest to study the features of polymorphism Glu298Asp NOS-3 gene in patients with CHF.

Material and methods. In patients with CHF 114 Uzbeks have been studied the genetic determinants of the development of endothelial dysfunction — alleles and genotypes Glu298Asp NOS-3 gene. The control group consisted of 75 healthy individuals — men of Uzbek nationality. Groups

of age were sopostovimy. The study was performed according to the standards of Good Clinical Practice (Good Clinical Practice) and the Declaration of Helsinki. The study protocol was approved by the ethics committees of all participating clinical centers. Before inclusion in the study all participants provided written informed consent. All patients were divided into three groups of functional class (FC) of CHF according to the New York Heart Classification (NYHA) according to the test of 6-minute walk (TSHH): the first group consisted of 19 patients with CHF FC I, the second group 44 patients with FC II and 3 group — 51 patients with FC III classification NYHA. Study polymorphism Glu298Asp (894 G> T) gene of endothelial nitric oxide (eNOS) was conducted using polymerase chain reaction on programmable thermocycler CG-1–96 «Corbett Research» (Australia) and 2720 «Applied Biosystems» (USA), using kits LLC "Medlab" (St. Petersburg), according to the manufacturer's instructions. In our work allele polymorphism G/T894 revealed after digestion of the amplified fragment of 206 bp containing the polymorphic site.

Oligonucleotide primers used for PCR
f5-CATGAGGCTCAGCCCC-3'
r5'- AGTCAATCCCTTTGGTGCTC-3'

Evaluation of deviation of the distribution of genotypes of studied polymorphisms of DNA from the canonical distribution of Hardy-Weinberg equilibrium was performed using the computer program for the analysis of genetic data "GenePop" ("Genetics of Population"). To calculate the "odds ratio" (OR — odds ratio) with 95% confidence intervals (CI — confidence interval), $\chi 2$ and p values used statistical package statistical software package «OpenEpi 2009, Version 2.3».

Results and discussion

Analysis of the distribution of genotypes Glu298Asp NOS-3 gene in patients with CHF showed: Glu/Glu — I in patients with CHF FC was 84.2% in patients with FC II — 70.4%, and FC III — 64.7% (Table 1). Glu/Asp genotype 3 patients met FC I — 15.3%, in 12 patients with FC II and –27.3% in 17 patients with FC III CHF –33.7%. In the group of healthy individuals Glu/Glu genotype occurred in 92%, Glu/Asp at 6.7%.

Patients in the control group allele Glu was — 95.3%, and Alel Asp — 4,7%. Patients frequency vstechaemosti Glu — allele was distributed as follows: 92.1% in patients with CHF FC I, 84.1% in patients with class II and 81.4% in patients with FC III CHF.

Table 1. – The distribution of allele and genotype frequencies polimorfizma- Glu298Asp NOS-3 gene

№	Surveyed group	The frequency of alleles		The frequency of genotypes			Total surveyed (n)
		Glu	Asp	Glu/Glu norm (n)	Glu/Asp Heterozygote (n)	Asp/Asp Mutation (n	
1	CHF FC I	92.1	7.9	84.2 (16)	15.8 (3)	–	19
2	CHF FC II	84.1	15.9	70.4 (31)	27.3 (12)	2.3 (1)	44
3	CHF FC III	81.4	18.6	64.7 (33)	33.3 (17)	2.0 (1)	51
4	Total	84.2	15.8	70.2 (80)	62.7 (32)	1.75 (2)	114
5	Control	95.3	4.7	92.0 (69)	6.7 (5)	1.3 (1)	75

The analysis of population frequency in the control group showed that the frequency of allele distribution of RCE in the control group: Glu = 0.95; Asp = 0.05. The expected frequency distribution of genotypes of RCE in the control group: Glu/Glu = 0.908; Glu/Asp = 0.089; Asp/Asp = 0.02. The observed frequency distribution of genotypes of RCE in the control group: Glu/Glu = 0.92; Glu/Asp = 0.067; Asp/Asp = 0.013. (X2 = 4.7; P = 0.03 (between expected and observed.).

In patients with heart failure frequency distribution of alleles in patients RCE: Glu = 0.84; Asp = 0.16. The expected frequency distribution of genotypes in patients RCE: Glu/Glu = 0.71; Glu/Asp = 0.27; Asp/Asp = 0.02. The observed frequency distribution of genotypes in patients RCE: Glu/Glu = 0.70; Glu/Asp = 0.28; Asp/Asp = 0.02 (X2 = 0.3; P = 0.5 (between expected and observed.).

Table 2. – The difference between the expected and observed frequencies of heterozygosity Glu298Asp

Groups	Observed heterozygosity	Expected heterozygosity	D *
CHF	0.28	0.27	–0.04
CHF FC I	0.16	0.145	–0.1
CHF FC II	0.27	0.27	0
CHF FC III	0.33	0.3	–0.1
Control group	0.67	0.89	+0.33

In patients with CHF FC I allele frequency distribution of RH in patients: Glu = 0.9; Asp = 0.08. The expected frequency distribution of genotypes in patients RCE: Glu/Glu = 0.85; Glu/Asp = 0.145; Asp/Asp = 0.0062. The observed frequency distribution of genotypes in patients RCE: Glu/Glu = 0.84; Glu/Asp = 0.16; Asp/Asp = 0.00

(X2 = 0.1; P = 0.7 (between expected and observed.). In patients with class II alleles frequency distribution of RCE in patients: Glu = 0.84; Asp = 0.16. The expected frequency distribution of genotypes in a group of RCE Patients: Glu/Glu = 0.71; Glu/Asp = 0.27; Asp/Asp = 0.025. The observed frequency distribution of genotypes in patients

RCE: Glu/Glu = 0.71; Glu/Asp = 0.27; Asp/Asp = 0.02 (X2 = 0.01; P = 0.9 (between expected and observed.). The frequency of allele distribution of RCE in patients with FC III CHF: Glu = 0.81; Asp = 0.19. The expected frequency distribution of genotypes in patients RCE: Glu/Glu = 0.66; Glu/Asp = 0.30; Asp/Asp = 0.035. The observed frequency distribution of genotypes in patients RCE: Glu/Glu = 0.65; Glu/Asp = 0.33; Asp/Asp = 0.02. (X2 = 0.5; P = 0.5 (between expected and observed)).

Relative deviation from the expected heterozygosity observed (D) polimorfizma- Glu298Asp NOS-3 gene was calculated using the formula: D = (hobs-hexp)/hexp, where hobs and hexp — expected and observed heterozygosity, respectively. **Conclusion.** Thus, the study of the distribution of alleles and genotypes Glu298Asp NOS-3 gene in patients with heart failure showed that progressirovinie CHF depends on the polymorphism of this gene and gene Glu298Asp NOS-3 is effective prognostic markers.

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Evaluation of the effect of omega-3 PUFA on lipid profile in patients with postinfarction cardiosclerosis complicated by congestive heart failure

Abstract: The effect of omega-3 PUFA on lipid profile in patients with postinfarction cardiosclerosis complicated by heart failure.

Key words: chronic heart failure, omega-3 PUFA, hypercholesterolemia.

The most common cause of heart failure (congestive heart failure) is coronary heart disease (CHD), which is 54–68,6%. About 50% of patients with CHF, despite the use of combination therapy, died within 5 years after the onset of clinical symptoms. The problem of the treatment of coronary heart disease (CHD) complicated with chronic heart failure (CHF) remains relevant,

as it has great social and economic importance. Today the main cause of morbidity, disability and mortality worldwide are cardiovascular disease. The prevalence of chronic heart failure (CHF) in the general population is 1.5–2%, and in persons over 65 years amounts to 10%. Forecasts are also disappointing: the researchers suggest that the prevalence of heart failure in

the population will increase in the next 20 years by 40–50%. Despite the advances made in diagnosis and treatment, in recent years, mortality remains high [1]. According to the Framingham study die about 80% of men and 65% of women over 6 years after the first signs of heart failure. Currently, along with the use of antianginal and lipid-lowering drugs, the search for new drugs that can korregirovat atherosclerotic lesions of the vascular bed. In particular, a new group of drugs, ω-3 polyunsaturated fatty acids (ω-3 PUFA), Omacor (Abbott), the use of which is due to their ability to work on various parts of the atherosclerotic process: hypertrigiceridemia, growth of atherosclerotic plaque, endothelial dysfunction, and others. [2]. The study GISSI-Prevenzione, which involved 11,324 patients with myocardial infarction, studied the effectiveness of standardized capsules of omega-3 PUFAs. It was found that after 3.5 years of mortality (both general and cardiovascular) decreased significantly in patients treated with omega-3 fatty acids, the addition of vitamin E did not significantly affect the results. In men, acute myocardial infarction and treated with omega-3 PUFAs in fish oil at a dose of 500–800 mg/day showed a reduction in mortality associated with cardiovascular disease, by 62%, and a reduction of total mortality by 56%. (Burr M. L. et al., 1989). It is shown that omega-3 fatty acids may slow the growth of atherosclerotic plaque, as evidenced when playing cholesterol atherosclerosis in experimental animals (pigs, rabbits, rats and monkeys). And based on the results of clinical work C. vonSchacky et al (1999), AT Erkkilä et al (2004) found that a diet with sufficient intake of omega-3 PUFAs from fish helps to slow down the progression of angiographically documented coronary atherosclerosis. In a randomized controlled clinical trials (level of evidence A) shows that people who have had cardiac events, the reception of oily fish (200–400 g/week, which corresponds to 500–800 mg daily produce omega-3 PUFA) or supplements of omega-3 PUFA (containing 850–1800 mg of EPA and DHA) reduced the risk of nonfatal heart attack, sudden death and death from all causes (TullS. P., YatesC. M., MaskreyB. H. et al. 2009). Of particular interest is the lipid metabolism plays an important role in the pathogenesis of coronary heart disease complicated by heart failure.

Purpose of the study Assess the impact of long-term therapy of omega-3 PUFA on lipid profile in patients with postinfarction cardiosclerosis complicated by heart failure.

Materials and methods:

In 125 patients with CHF FC I–III (with the original content of total cholesterol> 4.5 mmol/L and/or the original content of triglycerides> 1.7 mmol/L.) To evaluate the comparative effectiveness of lipid-lowering statin — atorvastatin and omega 3 PUFAs. The patients were divided into two groups: the first group (I) accounted for 67 patients who on the background of basic therapy (beta blockers, ACE inhibitors, antiplatelet agents, statins, spiranolakton) taken against a background of basic therapy (Omacor) at a dose of 1 g/day, the second group (II) — 58 patients receiving basic therapy.

In Group I — patients with I, II and III CHF FC were 16, 26 and 25 patients, respectively, in group II — 15, 24 and 19 patients, respectively. All patients were determined the levels of total bilirubin, ALT, AST, the number of erythrocytes, leukocytes, erythrocyte sedimentation rate in blood, determination of total cholesterol (MBF), high density lipoprotein (HDL) and low density lipoprotein (LDL), triglycerides (TG) at baseline and after 6 months treatment.

Results and discussion

Evaluation of the 6-month course of treatment ω-3 PUFAs in patients with CHF showed a good tolerability of Omacor: side effects have been reported in any of the patients.

Inclusion in the complex therapy of Omacor has led to increased lipid-lowering efficacy of traditional treatments CHF. The level of TC in the blood by the end of 6 months. treatment decreased by 16,7% (p <0,001), while in the control group changed its concentration of 15.5% (0.01).On Omacor therapy was revealed changes in the level of LDL cholesterol. By the end of 6 months. therapy group showed decrease in value of the level of low density lipoprotein (LDL) to 22,3% (p <0,01). In the control group, the rate changed to 15.9% (0.01). The content of HDL in serum by the end of 6 months. in the intervention group increased by 30.9% compared to baseline and was 1,1 (p <0,0005). In the control group the level of HDL during the study changed to 23,1% (p <0,0005). By the end of 6 months. Omacor therapy serum Tg levels decreased by 30,5% (p <0,0005) compared with baseline. Traditional therapy has reduced this figure by 21.3%.

Thus, according to the results, Omacor therapy influenced the individual parameters of lipid profile. This is consistent with other meta-analysis of clinical traylov [1,7], where it was found the effect of concentrate ω-3 PUFAs in the blood lipid profile. The evaluation was conducted ω-3 PUFAs in the form of dietary supplements in various dosages.

In our study, it was confirmed gipotriglitseridemicheskoe effect of Omacor due to a decrease in the synthesis of triglycerides and apolipoprotein B (apo-B) in the liver [9], as well as inhibition of the synthesis of chylomicrons in the intestine and to facilitate contacts with unsaturated chylomicrons lipoprotein lipase [8; 5]. We identified changes in the level of LDL cholesterol may be associated with a decrease in the initial substrate for their education. [9] Raising HDL complex therapy Omacor is associated with increased formation of HDL-like fragments of VLDL cholesterol particles, with their ω-3 PUFA-mediated lipoproteidlipolize having high ability to absorb cholesterol from the cell membrane [3; 4].

Our results showed a significant effect of Omacor on the level of TC, LDL, HDL, and triglycerides, as opposed to jobs where food additives were used, which showed less significant changes in lipid profile [4]. Also, similar results may be associated with symptoms of synergies between ω-3 fatty acids and a statin that has been demonstrated in a number of large international

studies — JELIS [10], COMBOS [6]. In the GISSI-HF study included approximately 7000 patients with heart failure. Use of Omacor in a dose of 1 g/day for an average of 3.9 years, caused a significant reduction in the risk of death from any cause by 9% compared with placebo. According to the results of many studies have highlighted the effectiveness of Omega 3 PUFA-in terms of their ability to reduce the severity of hypertriglyceridemia. It has been shown that their use will reduce the serum concentration of triglycerides by more than 60%. Application ω3-PUFA during the initial hypertriglyceridemia also contributes to a marked reduction in the likelihood of thrombus formation, decrease cardiovascular risk.

Findings

The preparation of omega-3 PUFA (Omacor) has lipid-lowering effect of reducing the level of TC, LDL–C, TG and increasing the concentration of HDL in patients with coronary artery disease and heart failure. Our experience of Omacor has shown that the drug has a sufficient efficiency, well tolerated and can be recommended for use in patients with coronary artery disease and heart failure with hypercholesterolemia.

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Non-invasive brain cooling in severe multisystem brain injury complicated by septic shock

Abstract: The basis of the therapeutic effect of non-invasive brain cooling in severe traumatic brain injuries is to protect brain tissue from the damaging effect of oxygen deficiency. From this perspective, the results of studying the effect of nasopharyngeal cooling on the state of the brain stem structures both in primary and secondary ischemic injury are of interest.

Keywords: severe brain injury, non-invasive brain cooling, nasopharyngeal cooling, brain stem structures.

Traumatic brain injury (TBI) is a critical public health and socio-economic problem throughout the world. It is a major cause of death, especially among young adults [1], and lifelong disability is common in those who survive. Although high-quality prevalence data are scarce, it is estimated that in the USA, around 5.3 million people are living with a TBI-related disability [2], and in the European Union ('old' Member States), approximately 7.7 million people who have experienced a TBI have disabilities [3]. In Uzbekistan incidence of TBI is 91 cases per year per

100 000 adult population [4], in the United States — from 20 to 536 [5]. Defeat brainstem structures (BS) to 81% by histological study in vitro [6] and 12–47% — in accordance with the data of a magnetic resonance tomography (MRT) in vivo [7, 8, 9]. 66% of these injuries result in adverse (death, severe disability) outcome of the disease [8].

The worldwide burden of sepsis is high and is increasing [10]. Brain dysfunction is a severe complication of sepsis with an incidence ranging from 9% to 71% that is associated with increased morbidity and mortality [11]. High body temperature in patients with increased intracranial pressure may be a deleterious association [10]. Various drugs acting on sepsis-induces blood-brain barrier dysfunction, brain oxidative stress and inflammation have been tested in septic animals but not yet in patients [12].

The wide variety of mechanisms of injury that are exaggerated by hyperthermia and may be ameliorated by moderate hypothermia. They include mechanisms of neuroexcitotoxicity [11], release of free radicals, changes in blood-brain barrier and vascular permeability, the release of proinflammatory mediators, drawing leucocytes across the blood-brain barrier, increasing the number of inflammatory cells in the brain tissue and the passage of neutrophils, phagocytes, monocytes and macrophages into the brain, additionally injuring neuronal cells by stimulating further immune reactions [13]. We are aiming to reduce rates of morbidity and mortality through the new methods of therapy being studied [13]. The aim of our study was to optimize prevention and treatment of septic shock and toxic encephalopathy in patients with multisystem severe TBI.

Material and methods of research. During the period from 2010 to 2015, 113 patients with TBI were admitted to our hospital urgently after accidents, falls, fights. 91 (80.5%) patients were subjected to emergency surgery: 46 (50.5%) patients underwent neurosurgical intervention on the removal of intracranial hematoma hydroma, the rest — midline laparotomy (ML), 10 of them (22%) cases of simultaneous operations: removal of intracranial hematoma (hydroma) with ML. ML accompanied nephrectomy (3 patients), nephrectomy with splenectomy (3 patients), nephrectomy with resection of the liver (2), splenectomy (3), resection of liver and intestine (4) and bowel resection (3). After ML laparostomy set to the disappearance of inflammation signs.

Brain cooling started all patients immediately after admission to the hospital. The control group was carried out using conventional cooling techniques: cooling of the cranial vault and the projection of the carotid bifurcation. The study group receives conventional cooling techniques in aggregate nasopharyngeal cooling (NFC).

The main indication of the developed method of brain hypothermia — is NFC component by use intranasal balloons connected with the outer system, where circulation of cold water provided by a roller pump. NFC directly influences on BS, where located the centers of the respiratory, circulatory, endocrine, and thermoregulation. In addition NFC can block the activity of the thermoregulatory center, located in the hypothalamus, which is especially relevant in our febrile septic patients.

As a rule, this method should be combined with known methods of cooling of the cranial vault and the projection of the carotid vessels by icepacks. For relief general and motor excitation and shivering performed neurovegetative blockade (NVB), which was achieved by intravenous continuous infusion of propofol 1 mg/kg/h (dormicum 0.125 mg/kg/h, thiopental 2 mg/kg/h), fentanyl (1 mcg/kg/h) and droperidol (0.08 mg/kg/hr).

Blood pressure is maintained at the required level by infusion of norepinephrine and/or dobutamine.

Received results and their discussing. It should be noted that all patients had risk factors for the development of sepsis: intubation, catheters in the stomach, bladder and central vein. Furthermore, the general hypothermia is also one of the main factors in the development of infectious complications by impairing the secretion of proinflammatory cytokines and suppresses leukocyte migration and phagocytosis [14, 15]. Recently it has been speculated that hypothermia may induce insulin resistance leading to hyperglycemia possibly promoting infection onset [15, 16]. That's why in our work we have used the local cooling, mainly to stabilize the functional state of BS, and inhibit the activity thermoregulation center, located in the hypothalamus.

In the control group three-five days in 12 patients showed signs of toxic encephalopathy, 5–8 days — liver failure (3 patients), 7–11 — renal failure (5), 6–12 — septic shock (11), 4 — refractory septic shock, 8 — hyperthermic syndrome. Malignant fever was observed in 4 patients. Due to the above, for 2–4 days in all patients on the basic therapy with prophylactic or therapeutic purposes began recurring brain cooling.

In study group brain cooling for 24–72 hours contributed to the complete disappearance/prevent symptoms of toxic encephalopathy, as well as hyperthermia syndrome and malignant fever. No need for the implementation of repeated sessions of brain cooling. This will reduce the length of stay of patients in intensive care unit (ICU) and greatly reduce the costs associated with the treatment of septic patients.

Results shows a statistically significant absolute predominant influence on the NFC on course and outcome of patients with severe TBI: the study group noted reduction in the length of stay of patients in the ICU of 1.4 times in the hospital — 1.4, the length of hemodynamic instability — 1.7, depending on from mechanical ventilation (MV) — 1.3, coma — 2 times. Glasgo outcome scale (GOS) was also the most favorable in the study group — 4.7 b versus 3.8 in the control group. The mortality was 25.35, and 30.95%, respectively.

From the 71 patients only 10 (14.1%) had severe sepsis with temperature response. Besides, the duration of intubation, catheterization of central vein, bladder and stomach was significantly lower.

Further, we supported prophylactic normothermia in patients with sepsis and fever. It is noteworthy that 14 (33.33%) patients of the control group has moderate neurological failure (GOS — 4). From 71 patients of the study group 18 died (25.35%), 43.62% — fully recovered, 11.32% — has moderate neurological failure.

Using these data, we were able to design a model of economic efficiency of the use of NFC for patients with severe TBI. Of course, the main advantage of using the NFC at TBI should be a decrease in the patient's disability throughout his life and improve its quality. The economic effect of reducing disability in the implementation of a new method of treatment in clinics of Uzbekistan amounted to UZS 171 944 017.2 UZS/year, by shortening the time of disability — 28 458.47 UZS/day, by reducing the cost of treatment (shortening hospital stay) — 7 920 484.7 UZS/day.

Conclusion. Add to NFC set of simple methods leads to a significant reduction in brain temperature, the temperature gradient brain-body reaches 3,1 °C. NFC by circulating in the intranasal balloons with cold water in the presence of normal blood circulation contributes to BS neuroprotection with located in these vital centers of the respiratory, circulatory, endocrine, and thermoregulation in contrast to conventional cooling methods of the cranial vault and the projection of the carotid bifurcation. Positive stabilizing effect on the NFC on BS appears to reduce the length of stay in ICU, normalization of hemodynamic and respiratory parameters. Brain cooling, in according to our method, allowed us to obtain good results in the treatment of patients with toxic encephalopathy, malignant hyperthermia, septic shock.

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Factor analysis of cause-effect relationship of fetal infections of children by the agents of TORCH — complex

Abstract: A factor analysis of cause-effect relationships of fetal infection of babies by the agents of TORCH — complex (CMV, SHV 1, 2 types, Ch. trachomatis) was performed according to the results of clinical-laboratory, functional, immunologic, molecular-biologic and statistic research methods for new-born babies (216) in catamnesis up to 4 years old (116) and children from 20 days of life to 4 years old (202), born from mothers with chronic latent persistent TORCH infections and complicated by obstetric-gynecologic anamnesis.

Keywords: children of young age, fetal infection, TORCH — infections, cytomegalovirus, simple Herpes virus 1, 2 types, Ch. trachomatis, factor analysis.

The closest and remote complications of fetal TORCH infections and their latent-persistent progress often become the reason of deviations in young children's health and invalidization in elder age groups [1; 2; 3; 4; 5; 6].

TORCH- infections are one of the reasons of congenital defects of development, children's mortality and invalidity in childhood. According to official data in 2000 the infant lethality rate in Uzbekistan was 52 per 1000 alive born children, in 2002–62. Among them 8.9% were congenital abnormalities, 7% — fetal infections [1; 3; 7; 8].

The problems of TORCH infections impact on the health status and formation of a chronic pathology of various systems and organs in children, and immunological aspects of fetal infection realization are at the stage of study.

The aim of the study: is to perform factor analysis of cause-reaction links of fetal infection of children by the agents of TORCH — complex.

Materials and methods of the research. We performed a clinical monitoring of new-born babies (216 — main group) in catamnesis up to 4 years old (116) and children from 20 days to 4 years old (202 — comparison group), born by mothers with chronic latent-persistent TORCH infections and complicated obstetric gynecologic anamnesis for 2006–2010 period.. Etiologic diagnostics (by means of PCR, PCR-rt methods in real time, IEA) was done for 216 new-born babies and their mothers (130). 98 children who were infected intra uterine by cytomegalovirus (CMV), Simple Herpes virus 1 and 2 types (HSV) and Ch.trachomatis (Ch.t), we studied cell-mediated and humoral immunity with cytokine profile (IL-1β, IL-2 IL-8, IL-10, IFN-α).

419 children had cardiac rhythm graphic analysis with the study of spectral parameters of cardiac rhythm variability (CRV). Division of the children of the main group was done taking into account the agents of fetal TORCH infection:

I group — intra uterine infected by cytomegalovirus (CMV) (n=35).

II group — intra uterine infected by simple herpes virus 1 and 2 types (HSV 1 and 2 types) (n=27).

III group — infected intra uterine by Ch.trachomatis (n=10). The control group involved non-infected children (n=25).

In all these children (main group — 216 and comparison group — 202 children aged from 20–28 days to 4 years old with suspicion to FI, selected by means of randomization) we studied the risk factors of fetal infection and the results of complex clinical and para-clinical checking. For the construction of the model and the performance of the factor analysis the method of the main components was used. An optimal number of the isolated factors was defined taking into account Kaiser's criterion, «Scree-test» and factorization complicity degree, while all insignificant and non-identifiable factors of the model were united in so-called "zero" factor (F-0) [9; 10].

The results of the research and discussion. The factor analysis of CMV fetal infection impact provided the definition of five common factors to 73.5% of factorization complicity and "zero" factor to 26.5%.

The structure of the general factor impact on the realization of fetal CMV infection of children was presented (25.7%) by the action of the first (F-1: Factor of viral load) the most significant factor. The second factor according to its significance (F-2: CMV DNA factor in blood) defined about 14.9% of the impact on the outcome of infection. The influence of the rest 3 significant factors (F-3: LF Factor (power of low frequency part of the spectrum — slow waves 1st line or vasomotor waves, which characterizes the status of sympathetic part of VNS, and particularly the vascular tension regulation system); F-4: Speech development retardation Factor (SRF); F-5: Fetal development retardation factor (FRF), in the general structure of that factor model was conditioned by the parts from 12.4% to 9.8%.

In the analysis of the first factor impact (F-1, 25.7%) it was found out that the most significant factor load was supplied by high cytomegalovirus load in the blood samples of mothers of children infected intra uterine by CMV (–0.912). At the same time significant factor loads were noted for the value of positive PCR marker of CMV in blood and urine samples

among the mothers (–0.901), absence of pregravid preparation to pregnancy (–0.716), frequency of fetal-placental failure manifestations (negative Doppler metric symptoms), and that conditioned cause-reaction link of fetal CMV infection of children. Astenoneurotic — ANS (–0.802) and convulsive (–0.729) syndromes, functional disorders in intestine (–0.507) gain a specific actuality in the prognosis of fetal CMV infection outcomes, in the realization of which HF-1 (high frequency fluctuations, linked with respiratory waves and activity of parasympathetic nerve system) parameters convey high factor load (0.773), immune regulatory index — IRI (–0.765), IL-1β (–0.760), CD16+ (–0.590) IL-10 (–0.491).

The second factor defined by us according to its significance with the greatest impact on fetal infection, presence of CMV DNA in blood samples of the mothers (–0.889). Medical abortions (–0.686) and chronic colitis (–0.415) in mothers' anamnesis have the lower degree of factor load. Perinatal damages of CNS (–0.870), head and thoracic cage circumference ratio less than 1.0 (ПC<1.0 –0.564), later conditioning cognitive and verbal development of a baby, more often can become an outcome of fetal CMV infection.

Persistent character of the infection is determined by secretion of IL-8 (–0.746), big values of HF-1–1 (0.735), HF-1–5 (0.604), CD25+ (–0.708), IgM (–0.589), low values of CD4+ (-0.570). Secretion of F-3 factor (12.4%), interrelated with the value of LF (0.779), negative symptoms on neurosonography (–0.640), low rates on Apgar scale 6/7 points (–0.622), retardation of cognitive and motor development (–0.606), cerebral development defect (–0.586), myopia (–0.528), testify a possible interrelation of the main manifestation of fetal infection and CMV persisting.

Regular manifestation of F-4 impact (10.7%) determined the outcome severity for fetal CMV infection of children: verbal development retardation (0.773), angiopathy of retina (0.688), affect-respiratory paroxysms (–0.671), dysmetabolic nephropathy (0.551), low Ponderal index (0.489), chronic enterocolitis (0.453), conditioning high values in HF-2–3 sub-range (–0.618).

The threat of abortion (–0.560) in anamnesis and iron deficiency anemia in the mothers (–0.555) became the risk factors of fetal CMV infection of children. The action of the fifth factor F-5 (9.8%) united such manifestations of fetal infection as fetal development retardation (–0.695), defects of kidney development (0.631), in post-natal period infections of urinary ducts (–0.622), growth retardation in the age category "from birth to 6 months" (0.563). Cause-effect relationship of these states on mother side was exacerbation of pyelonephritis (0.577), chronic colpitis (–0.558) during pregnancy, body weight deficiency (BWI <19) (–0.495), and on the baby side — great values of IgG (0.511), CIC 4% (small circulating immune complexes containing IgG) (0.486).

The factor model of fetal HSV 1 and 2 types infection with factorization complicity 70.2%, was also represented by 5 factors. Great viral load HSV 1, 2 types in mothers' blood samples was the basis of cause-effect relationship for fetal infection by simple Herpes virus, and that determined the working title of the first factor F-1 (25.4%).

The complication of fetal HSV 1,2 types infection was perinatal damage of CNS (-0.870), convulsive syndrome (–0.629), RFD (–0.607), great amount of IL-8 (–0.578), low values of IRI (–0.565), CD4+ (–0.491), VLF-4 («very» low frequency fluctuations (slow waves 2 line), reflecting cerebral ergotropic impact on the lower levels and providing the data for judgment about the functional status of brain) (–0.690) and high density of spectral sub-range HF-1–22 (0.573). the risk factors of fetal infection were the following factor relevant to mother such as positive HSV 1 and 2 types marker in blood and urine samples (–0.870), only in blood (–0.811), and absence of pregravid preparation (–0.716).

Factor F-2 («Factor LF-1» — 14.1%) was determined by the factor load in LF-1 sub-range (–0.889), it was reflected in the values VLF-5 (0.708), HF-2–14 (0.735), HF-2–19 (0.604), CD20+ (–0.570) and it was related with the manifestations of frequent bronchial obstructive syndrome (–0.626), allergic-dermatitis syndrome — ADS (–0.615), ANS (–0.686), angiopathy of retina (–0.589), deficiency of weight (–0.564), VDR (–0.509). The presence of HSV 1,2 type DNA in urine samples determined the high factor impact on the fetal infection (–0.801).

The impact of the third factor F-3 («Factor CD23+» — 12.8%) displayed in the value of factor loads CD23+ (0.879), cerebral development defects (–0.635), Apgar scale (–0.622), retardation of cognitive and motor development (–0.610), defects of kidney development (–0.580), retardation of physical development in the age category "from birth to 6 months" (–0.540). Consequently, the parameters of LF-8 (0.583), HF-1–29 (0.471), HF-2–11 (0.422), HF-3–6 (–0.511) were diagnostically significant for the risk stratification of fetal HSV 1,2 types infection of children.

The analysis of the factor impact of F-4 («Early toxicosis factor» – 9.3%) showed the interrelation of that factor with early toxicosis of pregnant women (–0.787), chronic salpingooophoritis (–0.567), cervical erosion (–0.560), conditioning the high risk of fetal infection. Prognostically significant outcomes of fetal HSV infection were negative symptoms on neurosonography — NSG (–0.677), Ponderal index <60.0 (–0.509), great values of INF-α (–0.618), LF-20 (0.590), IL-10 (0.561), CIC 4% (0.488) and low values of IgA (–0.653).

Factor F-5 («Factor of transitory symptoms in new-born period» — 8.6%) was determined by factor load of transient manifestations syndrome during new-born period (–0.690). The most significant impact on the fetal HSV 1 and 2 types infection was characteristic for iron deficiency anemia — IDA (–0.522), one-parent family (0.513), father's low social-economic profession (–0.511), mother's age above 30 (0.504), matrimonial problems (–0.490). That risk was interrelated with the birth of premature babies (–0.579), high frequency of urinary infections — UI (–0.526) in children and it was associated by IgG high values.

The model of factor impact of fetal Ch. trachomatis infection (78.9%) had an isolated character. High risk of fetal Ch. trachomatis infection was conditioned by factor F-1 («Factor of positive PCR marker of Ch. trachomatis» — 26.1%), manifested in the positive PCR result of Ch. trachomatis (−0.902), UI (−0.870), cervical erosion (−0.802), endocervitis (−0.629) of mother, FRF (−0.607). Appearance of kidney development defects (−0.578), neutrophilosis with the drift to the left in new-born babies during the first day of life (−0.565), development of ANS (−0.690), UI (0.573), ENT-organs pathology (−0.491) in post-natal period, low values of ULF-2 (area of ultra low frequency, characterizing energetic balance and cortical regulation mechanisms, coordinating functional activity of all systems of organism) (−0.798), VLF-3 (0.716), LF-3 (−0.811) were prognostic factors of fetal Ch. trachomatis infection outcomes.

The analysis of F-2 («Factor of pregravid preparation» — 15.8%) displayed united impact of the pregravid preparation absence (−0.889), IDA (−0.870), exacerbation of pyelonephritis (−0.686), high water level (−0.564), chronic salpingo-opharitis (-0.415) on the realization of fetal Ch. Trachomatis infection. The manifestation of action of fetal infection was mostly on the value of factor loads of VLF-5 (0.708), LF-18 (0.604), LF-20 (0.574), HF-1–17 (0.601), IRI (0.735), dys-adaptation syndromes frequency (−0.746), FDR (−0.589), psychomotor retardation — PMR (−0.570).

The impact of the third factor F-3 («Factor VLF» — 14.4%) was determined for the values of very low frequency spectrum VLF CRV (0.879), with the highest factor load for NSG symptoms (−0.540), frequency of myopia manifestations (0.589), bronchial obstructive syndrome — BOS (−0.528) in children infected intra uterine by Ch. trachomatis. It was noted, that target impact of that factor on the prognostic values of infection risk changed under the influence of low frequency LF-20 activity (0.712), high frequency HF-2–22 (−0.681), HF-3–6 (−0.634) sub-ranges of CRV spectrum, and less due to the body weight value in the age category "from 6 months to 2 years" (0.610), severity of asphyxia according to Apgar scale (−0.580), relative and absolute amount of CD4+ (−0.511), CD8+ (0.422) and secretion of IL-8 (−0.471) in these children. The risk of fetal infection by Ch. trachomatis was determined by the severity of early toxicosis

manifestations (0.635) and low water level (0.622) in pregnant women with chronic persistent TORCH — infection.

The forth factor F-4 («Factor CD95+» — 11.9%) had its effect to the values of lymphocyte activation marker CD95+ (−0.709), amount of IL-10 (0.509) and CIC4% (0.453), phagocyte activity of neutrophils (−0.477), determining, in its turn, conditions for Ch. trachomatis persisting in baby's organism. Greater manifestations of fetal infection and persistence of Ch. trachomatis was noted at the level of prevalence of convulsive syndrome (0.526) and physical retardation in the age category "from 6 months to 2 years" (0.517).

The fifth factor F-5 («Factor of dysmetabolic nephropathy — DMN — 10.7) was linked with the severity and frequency of dysmetabolic nephropathy manifestations (0.645), transient symptoms of new-born period (0.513), verbal development retardation (0.504) in children infected intra uterine by Ch. trachomatis. The risk of fetal infection by Ch. trachomatis was directly conditioned by social-demographic status of the family: mother's age above 30 (0.479) and one-parent family (0.422).

Conclusion. The factor analysis provided the isolation of the most significant factors determining the risk of fetal infection by the aforesaid agents and the possibility to prognoze its outcomes. The complex analysis of cause effect determining the risk of infection and original state of the infected children in catamnesis, on the basis of a common model helped us to isolate five the most significant factors for each infection with summary impact value 73.5%, 70.2% and 78.9%, correspondingly for CMV, HSV 1 and 2 types and Ch. trachomatis.

The greatest risk of fetal infection by CMV and HSV 1 and 2 types composed the "Factor of high viral load" (25.7% and 25.4%, correspondingly), and for Ch. trachomatis "Factor of positive PCR marker of Ch. Trachomatis" (26.1%), which determined the impact of the rest isolated common factors, integrally characterizing neurologic and somatic status of the children infected intra uterine.

The designed model of the factor analysis of cause-effect interrelationships of fetal and new-born infection by CMV, HSV 1 and 2 types and Ch. trachomatis let us optimize the measures taken for prophylactics and diagnostics of fetus and new-born babies' infection.

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Characteristics of the cellular immunity in HIV-infected patients with pyoderma

Immune system, being one of the major homeostatic systems, occupies the central place in the development of adaptation response to effects of the factors of an environment, with which the human body meets in the various periods of ontogenesis.

Pyoderma is one of the most widespread nosologies, accounting for to 40% of all cases of skin diseases [1]. Despite of distinctions in etiology, clinical picture, morphological changes and outcome, all pustular diseases, nevertheless, are unified by one common pathogenic mechanism — deviations in the immune system that has been confirmed by the numerous evidences [4; 5]. It is real, as the skin is considered as to be a component of immune system. As an immune organ it is capable of isolation, pressing, antigen presentation, production of immunoregulatory cytokines and development both of the local immune response and of the common, systemic to the antigens penetrating to the human organism. [9]. The high migration ability of the immune competent cells provides persistent connection of the skin to the central organs of immunogenesis. Any disorder of the skin integument integrity results in activation of immunocompetent skin cells providing elimination of local aggression and formation of immune memory [6; 8].

The lesions of skin and mucous environments at a HIV-infection are considered as the constant manifestations of the clinical picture, they occur in 84% of the patients [7]. From twelve AIDS-indicator diseases five apply to the skin pathology. In dynamics of HIV-infection the lesions of skin and mucous membranes have recurring character, with the periods of aggravations and remissions, and gain heavy, not peculiar to their clinic variants in the advanced forms of disease [10; 11].

In the patients with pyoderma with HIV-infection there are revealed various variants of immune deviations — from immune deficit to activation of some parameters in T- or B-cellular populations, which are interpreted differently. Some researchers state the point of view, according to which immune disorders are found only in the patients with heavy clinical course of dermatosis. At staphyloderma some authors note inhibition of T-cellular immunity, others — its activation [2; 3]. The similar data are received during study of humoral immunity at the various forms of pyoderma [12; 14].

The purpose of research was to study parameters of cellular immunity in HIV-positive patients with primary and secondary pyoderma.

Materials and methods. Under supervision there were 71 HIV-infected patients at the age of from 18 till 35 years, median was 27,7±1,3 years. The first group included 34 patients with the primary deep pyoderma, group two was constituted by 37 patients with secondary pyoderma. Group of the control consisted of 21 healthy volunteers, comparable by age and sex. The immunological investigations were performed on 1–2 day of admission to the hospital.

The immunological investigations were performed in the laboratory of immune cytokines of the Institute of Immunology of the Academy of Sciences of the Republic of Uzbekistan according to the methodical recommendations developed in the Institute of Immunology of the Ministry of Health of the Russian Federation and in the Institute of Immunology of the AS RUz (1992, 2001). Phenotype of immunocompetent cells was determined with use of monoclonal antibodies of the Joint Venture Ltd. "Sorbent" of the Institute of Immunology MH RF with method of indirect rosette using stabilized erythrocytes.

Results and discussion.

During study of HIV-infected patients with primary and secondary pyoderma at admission to the hospital there was observed tendency to the reliable reduction of the cellular immunity in comparison with healthy participants (P < 0,001). The results of study were presented in Table 1. The reliable differences between patients from group 1 and 2 were not found (P> 0,05).

In both groups of the patients the contents of relative and absolute parameters of lymphocytes was registered, on the average, reliably lower the control values (P < 0,001). We did not reveal reliable differences in the contents of lymphocytes in pyoderma, divided into groups depending on the clinical form of disease (P> 0,05).

Evaluation of the parameters of T-cellular immunity in the patients with HIV-infection, associated with secondary pyoderma, allowed to establish the tendency to decrease (P < 0,001) of relative T-lymphocyte counts with phenotype CD3 + (47,6±1,12%) in comparison with control group (59,3±1,1%).

In the patients with primary deep pyoderma there was noted sharp decrease in the relative contents (P < 0,001) in blood of CD3 + lymphocytes (42,3±1,05%) and it was reliably lower than results of the studied patients of group 2 (P < 0,001), 1482 ± 24 cells/µl and 1293 µ 47 cells/µl, respectively.

It should be noted that during study of immune status the assessment of absolute parameters seemed to be more informative, because it characterizes the real CD3 + lymphocyte counts, circulating in blood of the studied patients. The received results of CD3+lymphocyte counts in the patients with HIV-infection, associated with primary pyoderma indicated about significant reduction of their absolute counts (P < 0,001), that consequently was 3,3 times less than control parameters of the healthy persons. It is interesting, that in the patients with secondary pyoderma the decrease of the absolute counts of CD3 + lymphocytes (482 ± 24) was noted 2,7 times more rare. The difference was reliable in comparison with the first group and with healthy persons (P < 0,05; P < 0,001), respectively. The decrease in the counts of CD3 + lymphocytes occurs, mainly, at the expense of decrease in CD4 + lymphocytes.

HIV has increased tropism to T-lymphocytes and other cells containing co-receptors, having structural similarity with CD4 + (T-helpers, B-cells, monocytes, macrophages). This is explained by extremely high affinity of gp120 virion to co-receptor CD4, distributed on the surface of CD4 + lymphocytes [15].

The counts of relative and absolute parameters (CD3+ and CD4+) of helpers in the healthy people was in limits from 24 to 44% and from 532 to 1127 cells/µl with mean value 32,3 ± 1,1% and 704±32 cells/µl.

Is was established more expressed (P < 0,001) reduction of relative counts of immunocompetent cells with phenotype (CD3+CD4+) in the patients with HIV-infection, associated with primary pyoderma, in comparison with the patients with secondary pyoderma (P<0,05). As against relative parameters in HIV-infected patients, the absolute parameters of CD4+lymphocytes were reduced more marked. The difference was reliable between the patients of the first group and healthy participants (P < 0,05; P < 0,001), respectively.

Immunophenotyping of mononuclear (CD3+CD8 +) cells including T-ccytotoxic lymphocytes in the patients with associated pathology of deep pyoderma with HIV infection allowed to establish, that their relative counts (22,2±0,76%) increased significantly (P < 0,001) and was higher 1,4 times than the normative references (16,4±0,7%). The similar data of increases of the relative counts of CD3+CD8 + lymphocytes were noted in the patients in the second group (20,4±0,75%), but these changes had less expressed character and exceeded 1,2 times the parameters of norm (P> 0,05).

One of the informative parameters during study of immunological status is study of IRI, the ratio CD4/CD8. At such approach there is found more latent disorder in the immuno-regulatory subpopulations of T-lymphocytes (9). The examinations showed that IRI of the healthy people accounted for

from 1,22 to 3% with mean value 2,01±0,09%. As it is visible from the table submitted, during study patients from group 1 and 2 at their admission to the hospital there was revealed reliable decrease in IRI in comparison with control group (P < 0,001). The parameters of change between groups had no statistically reliable character (P>0,05). Hence, in the patients with pyoderma and HIV-infection the deeper immuno-dysproportions were recorded with decrease of the contents of T-helpers in the blood and increase of relative parameters of cytotoxic T- lymphocytes.

As it is known, if the quantitative and functional parameters of T-suppressors are higher than of T-helpers, then the real conditions for development of immune deficit state have been created. The shift of this ratio to the left — is lower than 1,5 (in our case IRI is lower — 1,0) — such immunoregulatory index is characteristic for immunodeficit conditions, especially for AIDS [13].

In turn NK-lymphocytes which are involved both in specific, and in unspecific parts of immunity in our researches showed the following results. The comparative analysis of the counts of NK- lymphocytes with phenotype (CD3-CD16+) in the patients with associated pathology in the first group showed that the relative counts of the natural killers was increased 1,4 times (16,2±1,1%), in comparison with the control (11,5±0,67). It is necessary to note that at secondary pyoderma with HIV infection in the studied patients there was observed more marked (1,7 times) increase in quantity of (CD3-CD16+) lymphocytes (P < 0,001) in comparison with the appropriate normative references. The parameters of changes between groups also had statistically reliable character (P < 0,001). It is connected, most likely, with the fact that such parameters are characteristic for polymicrobic etiology at the secondary pyoderma with the HIV infection in comparison with associated pathology of the deep pyoderma with HIV infection where the monoinfection took place mainly. However, in the patients of both groups the absolute parameters were reduced in comparison with the control data by 1,7 and 1,2 times (P < 0,001), respectively.

In the patients of the first and second groups the relative values of marker CD25 + were reduced. The lowest level of CD25 + markers was observed in the patients of group 1–16,2±1,1% and 149±14,2 cells/µl, that was reliably lower (1,7 times) in comparison with parameters of control group (P < 0,001). The absolute values decreased even more and were registered 4,1 and 3,2 times lower than the control data (P < 0,001), respectively. These data indicated about inhibition of the functional activity T-lymphocytes helpers. The decrease in the serum concentration of beta-2 microglobulin and its CD25 (receptor IL-2) correlated with intensity of HIV replication and velocity of the disease progressing in the patients with pyoderma with HIV infection.

The measurement of the quantity of all lymphocytes, expressing activation marker CD38 + allowed to establish moderate growth of lymphocytes with receptors CD38+, exceeding parameters of the control, their contents in the patients

of group 1 were 1,7 times higher (P < 0,001). The change of CD38 + positive lymphocytes in the second group was observed in a lesser degree in comparison with group 1 (P < 0,05) and parameters higher in comparison with the control group (P < 0,001). The literature data about estimation of the expression of the activation marker CD38 on the lymphocytes CD8 correlates with a level viremia (10), and in some reports — with the velocity of disease progressing [14; 15]. This is also concerns expressions of CD38 on the lymphocytes CD4 [6]. Besides, expression of CD38 was inversely proportional to increase of CD4 lymphocyte counts as response to antiretroviral therapy [7]. The data of the populational investigations support the model, according to which HIV replication stimulates immune system, that contributes to destruction of lymphocytes CD4 [11].

The counts of relative and absolute parameters of CD95 + lymphocytes in the healthy people were in limits from 19 to 35% and from 372 up to 867 cells/µl with mean values 25,7±0,94% and 559±25 cells/µl.

The data received from the analysis of the counts of lymphocytes expressing CD95 +, inducing apoptosis of cells in the patients of the first group showed that the relative counts of natural CD95 + cells increased by 1,3 times in comparison with the control. It is necessary to note that in the studied patients in the second group there was observed more marked (1,4 times) increase in (CD95 +) lymphocytes (P < 0,001). However, the relative parameters between groups had no statistically reliable character (P>0,05), while the absolute quantity of these cells had only tendency to decrease in comparison with control group (P < 0,001). Thus, it is obvious,

that qualitative and quantitative disorders of the expression of lymphocytes CD25+D38 + and CD95 + receptors were key and critical in progressing of AIDS in pyoderma with HIV infection.

The determination of the counts of B-lymphocytes (CD20 +) in the patients with HIV associated with deep pyoderma allowed to establish reliable (P < 0,001) increase of their relative counts (26,7±0,93%). In the patients of the second group there was observed increase in the greater degree in comparison with group 1 (P < 0,05) and control (P < 0,001). And their absolute counts in the patients with HIV decreased in both groups (P < 0,001) in comparison with norm (21,7±0,56%; 472±21 µl/ml). In the patients of the first group the more deep deficit of the counts of CD20 + lymphocytes was observed — 1,3 times more in comparison with group 2 and 2 times more in comparison with norm (P < 0,001). It is connected, probably, to unspecific activation of the relative counts of CD20 + lymphocytes in the patients because of the raised level of endogenous protein and polysaccharide stimulators of B-lymphocytes, characteristic for bacterial pyoderma in HIV infection.

Conclusion. It is necessary to note, that during performance of the comparative study of some immunological parameters there were established the most informative prognostic criteria of the fast progressing HIV-infection in the patients with pyoderma. They were presented by significant reduction of the counts of T lymphocytes, including helper cell subpopulation (CD3+CD4 +), increase in counts of T-cytotoxic lymphocytes, expressing CD38 (CD8+CD38 +) and lymphocytes with receptors of Fas-apoptosis CD95 +.

Table 1. – Immunity parameters and markers of lymphocyte activation in the blood of the HIV-infected patients. (at admission)

Parameters		Control group, n=21	Group 1, n=34 (Primary deep pyoderma)	Group 2, n=37 (Secondary pyoderma)
Leucocytes	abs	6459 ± 161	3790± 115**	3986± 115**
Lymphocytes	in%	33,7 ± 0,66	24,3±0,64**	25,4±0,60**
	abs	2177 ± 65	921±38**	1013±34**
CD_3	in%	59,3 ± 1,1	42,3±1,05**	47,6±1,12**••
	abs	1293 ± 47	1391±22**	1482 ±24**•
CD_4	in%	32,3± 1,1	18,1±0,74**	21,2±0,83**•
	abs	704± 32	174±14**	215 ±14**•
CD_8	in%	16,4 ± 0,7	22,2±0,76**	20,4±0,75**
	abs	358 ± 21	204±11**	207 ± 8,1**
CD_4/CD_8	in%	2,01 ± 0,09	0,98±0,04**	1,07±0,06**
CD_{16}	in%	11,5 ± 0,67	16,2±0,58**	19,9±0,68**••
	abs	251 ± 19	148±7,2**	201±8,4**••
CD 25	in%	27,9 ± 1,23	16,2±1,1**	18,7±0,91**
	abs	608 ± 28	149±14,2**	189±15**
CD 38	in%	23,1 ± 0,78	39,2±1,42**	34,9±1,08 **•
	abs	500 ± 19	361±11**	353±11**
CD 95	in%	25,7 ± 0,94	34,2±1,23**	36,5±1,14**
	abs	559 ± 25	315±11**	369±12**••
CD 20	in%	21,7 ± 0,56	26,2±0,93**	30,6±0,99**•
	abs	472 ± 21	241±10,4**	305 ±12,07**••

Note: Reliability of difference from control. * – P< 0,05; ** – P< 0,001; and from data of group 1 (•• – P<0,001; • – P<0,05).

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The structure of neural psychological disorders in patients with symptomatic and idiopathic epilepsy

Abstract: Symptomatic and idiopathic forms of epilepsy have several differences in neural psychological values. The most expressed cognitive deficit in the form of cognitive disorders is characteristic for patients with symptomatic epilepsy. The absence of inter-hemisphere asymmetry of P300 wave amplitude was revealed in cases of idiopathic and symptomatic forms, indicating functional disorders.

Keywords: epilepsy, cognitive disorders, cognitive-induced potentials

The problem of epilepsy is still in the center of scientist-neurologist attention. It is linked with not only variety of neural physiologic peculiarities of the disease, diversity of clinical progress, but also with various complications developing together with regular administration of antiepileptic agents [2; 3].

Recently the number of publications, dedicated to the study of cognitive functions in cases of various neurologic diseases, is increasing. The problem of cognitive deficit increase was considered in close link with progressing of the pathologic process, including epilepsy in adults. In 30–50% of patients with epilepsy psycho-neurological disorders [1] were observed. Among these disorders there were cognitive, affective and behavior ones and disorders of the highest psychic functions, including those linked with inadequate and inopportune administration of antiepileptic agents (AEA) [6; 9].

Cognitive disorders take one of the leading places in clinical progress of epilepsy. The most often manifestations of cognitive dysfunction in case of epilepsy is depression, disorder of memory, attention and bradiphrenia during the period between seizures [5]. In fact, as it is reported in literature references, the presence of more than 100 general tonic-clonic seizures in anamnesis in the majority of cases leads to development of cognitive disorders or pre-dementia disorders [7].

As it is mentioned in references, study of the link of cognitive disorders with personal and psychopathologic characteristics of the patients with various forms of epilepsy and various kinds of seizures gains scientific interest [4; 8]. Besides that, the problems of antiepileptic agents' effect on aggravation of cognitive disorders are not studied well, and it of great importance for clinical neurology.

The aim of the research: is to study the impact of common clinical characteristics of epilepsy (its form and duration, type of seizures, etc.) on the development of cognitive disorders.

Materials and methods of the research: the study was based on the results of checking of 264 patients with epilepsy.

The study of cognitive disorders was performed in all patients with epilepsy (n=264). Control group involved 30 clinically healthy people of the corresponding age and sex.

Taking into account clinical progress, semiology of seizures, data of neural visualization and electroencephalographic tests the following forms of epilepsy were isolated in the main group: idiopathic (55 patients) and symptomatic one (209 patients).

The first group (group 1) involved 55 patients with idiopathic epilepsy (IE; n=55): 27 men (49.1%) and 28 women (50.9%). The age varied from 15 to 71 years of age; the average age was 34.3±1.8 years.

The second group (group 2) included 209 patients with symptomatic epilepsy (SE; n=209): 123 men (58.9%) and 86 women (41.1%) aged from 15 to 90 years old; average age was 42.5±1.1 years.

For the revealing of interictal cognitive dysfunction all patients underwent neural psychological checkings using common neurological practical tests. The test included in the protocol were aiming detection of cognitive disorders the most often met in cases of epilepsy, such as disorders of memory, attention, concentration (mini mental status examine — MMSE, repeating of digitals (DS), 5 words remembering test, verbal activity test, watch-drawing test).

The study of acoustic cognitive induced potential (ACIP) or P300 was done in compliance with standard strategy «oddball paradigm». MEDELEC «Sapphire premier» four-channel electromyography was used for the study. Calculation of P300 peaks was performed automatically with markers set in the progress of the analysis. Measurement of latent periods of N2, P3 peaks, interval between N2 — P3 peaks was done in milliseconds (ms), в миллисекундах (мс), N2/P3 complex amplitude in micro Volts (mkV) as a sum of amplitude values of N2 and P3 peaks from isoline. Maximal positive component with latency equal to 300ms and more was taken for P300. Measurements of P300 in central leads underwent quantitative analysis.

Statistic processing was performed with the help of "Statistics" package. Correlation dependence was calculated by means of quadrates method (Pirson's method).

Results of the research: The progress of paroxysmal syndrome differed by its significant severity degree in the majority of the patients: benign or little progradient progress, with achievement of remission or decrease of severity and polymorphism of seizures, detected in 158 patients (59.8%). At the moment of checking the frequency of seizures more than one per month was registered in 82.6% of the patients, and in 29.9% of the examined patients polymorphic seizures were noted.

39.7% of the patients administered polytherapy with anticonvulsive agents. Only 53 patients (20.1%) didn't get any AEA.

Cognitive disorders were observed in 76.4% of the patients with IE and 88.5% patients with SE. That group included patients with expressed mnestic-intellectual defect, which defined the severity of the clinical progress, but not reaching dementia degree.

Clinical manifestations of cognitive disorders were mostly decrease of memory and concentration of attention, difficulty to summarize, abstract, predict, slow speed of thinking, difficult perception of a new material and its understanding. Majority of the patients had partial disorders of orientation in time. The aforesaid disorders often served to be the cause of social disadaptation.

Total point according to MMSE in that group was average 25.1±3.4 versus 29.5±0.1 in the control group (P<0.05).

According to MMSE scale in both groups of the patients there was significant decrease of the values in comparison with the control group. In the majority of the cases both with SE and IE we observed slight and moderate cognitive disorders (62.7% and 58.2% correspondingly).

On the basis of the achieved results we concluded, that SE was accompanied by more explicit cognitive disorders. It can possibly be linked with morphologic disorders of cerebral structures and high frequency of epileptic seizures and, as a result, longer administration of AC, and that was confirmed by correlation analysis.

Correlation link of the MMSE test results with the frequency of seizures was r=+0.628, and with the term of the disease — r=+0.795, i. e. there is close direct correlation link.

Patients with epilepsy had decrease in the values of praxis, especially explicit in the cases of SE. With the qualitative analysis we could determine that patients with IE reliably more often (19.1%; 40 patients; P<0.05) depicted clock dial with certain time indication in comparison with the patients with SE (9.1%; 5 patients).

Analysis of the values of the verbal activity test showed diminishing of the number of indirect associations in the patients with idiopathic epilepsy, testifying expressed cognitive dysfunction.

Comparative characteristics of the verbal activity test showed reliable low values of semantically mediated associations and phonetically mediated associations in the patients with SE.

Diminishing of the number of semantically mediated associations was one of the earliest symptoms of dementia, which was more characteristic for SE and it was linked with dysfunction of temporal-limbic system (3.9±0.29 and 4.1±0.34; P<0.05). Patients with IE had prevailing subcortical-frontal dysfunction, as the quantity of phonetically mediated associations diminished faster, than the number of semantically mediated ones (8.1±0.23 and 5.7±0.19; P<0.05).

The next stage of our work was the study of tests of 5 words remembering and repetition of numerals in the reverse order. Patients with epilepsy had reliable decrease of these values, especially expressed with SE.

Thus, 78.5% patients with epilepsy had cognitive disorders such as disorder of memory, attention, praxis, space orientation, which were more expressed in the cases of SE.

Patients with IE had dysfunction of attention, praxis, memory and speech, while in the cases of SE these disorders were more expressed. Besides that, in cases of SE we registered disorders of thinking and gnosis.

Detected expression of cognitive defect was in the direct correlation with the duration of the disease and frequency of seizures. It should be noted, that in the patients with IE correlation dependence was average (r=+0.68), while in the patients with SE it was weak (r=+0.271).

The terms of therapy using anticonvulsants were different: from 0 to 5 years of therapy in 128 patients (48.5%), from 5 to 15 years in 103 patients (39.0%), more than 15 years in 33 patients (12.5%). Duration of the therapy of the patients with IE in the majority of the cases was more than 5 years 61.8%, while in the cases of SE from 0 to 5 years (51.2%). We revealed correlation link with duration of the disease and expression of cognitive disorders.

Thus, the achieved results of the study showed that cognitive disorders together with convulsive seizures were one of the leading clinical symptoms of the various forms of epilepsy.

In the system of objective evaluation methods for cognitive disorders, the most adequate for the modern time are neurophysiologic strategies providing reliable and objective evaluation of the status of cerebral systems, and particularly study of P300 [7].

The data of cognitive induced potentials (CIP) were analyzed among 72 patients with epilepsy, and thirty-eight of them had SE and thirty-four — IE. The control group involved 20 healthy people, with corresponding age and sex.

With the help of the achieved data we could reveal heterogeneous severity and quality characteristics of alterations. In the study of LP P3, in compliance with the data achieved by us, reliable differences between the values of the control group and the type of epilepsy were determined (P<0.01).

We observed reliable rise of that value in the patients with epilepsy in comparison with the values of the control group (P<0.05). Besides that we registered reliable rise of P3 in the patients with SE to 18.5 ms in the C3 lead and to 20.2 ms in C4 lead (P<0.05).

There was no reliable difference in the values of N2-P3 interval in the patients with epilepsy compared with the control group.

For the calculation of ACIP amplitude we summed up the values of N2 and P3 amplitude from isoline. It was linked with the fact, that sometimes it is difficult to determine isoline for each peak because of instability of the registered impulse. As a result in the cases of IE we revealed slight emotional, regulation disorders, reflecting dysfunction of cortical-subcortical structures. It was displayed by the absence of clear inter-hemisphere asymmetry of P300 amplitude. Patients with SE showed more significant disorders, characterized by the absence of inter-hemisphere asymmetry of P300 amplitude and reliable increase of P300 latent period.

Thus, patients with epilepsy had neural physiological values of cognitive induced potentials which objectively reflected the status of the highest cerebral functions. In cases of IE and SE we revealed absence of inter-hemisphere asymmetry of P300 amplitude indicating dysfunctional disorders. The values of the P300 latent period increased in cases of SE, different from IE, and reflect inhibition of cognitive processes.

Expressed decrease of P300 amplitude, which we had detected, inversely correlating with a significantly increased latent period, reflects deficiency of limbic-reticular impact regulation, leading to misbalance of cortical-subcortical relationships, and as a result of which sufficient level of cortex activation compulsory for optimal processing of perceived information and salvation of cognitive problems is not provided.

Conclusions:

1. The character and degree of cognitive deficit expression in the patients with epilepsy depend on the form and duration of the disease. It was established that the most expressed cognitive deficit in the form of cognitive disorders was characteristic for the patients with symptomatic epilepsy.

2. In the patients with epilepsy neurophysiologic values of cognitive induced potentials objectively reflect the status of the highest cerebral functions. In cases of idiopathic and symptomatic forms we revealed absence of inter-hemisphere asymmetry of P300 wave amplitude, indicating functional disorders. Values of P300 latent period were increased in the cases of symptomatic epilepsy, different from idiopathic one, and reflected inhibition of cognitive processes.

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The diffusion weighted magnetic resonance imaging in diagnostics of symptomatic epilepsy in children

Abstract: In this article the possibilities of MR diffusion weighted imaging in symptomatic epilepsy patients have been presented. We determined the quantitative standards of numerical values of diffusion of white matter in children with symptomatic epilepsy of various etiology. The regions with abnormal white matter FA and ADC values not only matched to limbic circle zones, but also to areas of intra- and interhemispheric connections uniting the frontal, temporal, parietal and occipital lobes of the brain. Determining the specific clusters of brain tracts in symptomatic epilepsy, regardless of etiology, is important to predict the prognosis of the disease and the likely possibility of cognitive impairment. The study proved that symptomatic epilepsy is characterized by a variety of changes in the white matter of the brain tracts that lead to the dissociation of certain regions of the brain, interrupting connections between cortical and subcortical regions and inhibiting transfer of information. It can be concluded, that diffusion-weighted imaging are much more sensitive to the structural and metabolic changes occurring in the brain, in comparison with conventional MRI images.

Keywords: Symptomatic epilepsy, MR diffusion, Fractional anisotropy, Average diffusion capacity.

Introduction

In vivo visualization of structural morphological changes of the brain in patients with epilepsy and epileptic syndromes, has been made possible due to the introduction into daily medical practice of neuroradiologist diagnostic methods of research aspects such as: computed tomography and magnetic resonance imaging (CT and MRI) that are classified as "structural" neuroimaging techniques [1, 21–26]. The introduction of MRI in clinical practice has greatly expanded the identification of various structural changes in the brain tissue underlying the formation of the epileptic focus, which usually leads to the subsequent development of epilepsy. MRI allows radiologists to identify of malformations such as licencephaly, periventricular heterotopy, shizencephaly, a focal cortical dysplasia and other brain anomalies [2, 33–39]. But epilepsy do not always manifest on the background of congenital abnormalities of the brain, particularly if they are not localized in the cortical regions of brain. Congenital disorders of brain has a major part in epilepsy origin, which manifest themselves in early periods of childhood [10, 353–361].

However, in practical medicine, it is not always possible to determine what is the basis of locally-induced epilepsy. Conventional MRI provides information about structural changes not in all cases [5, 95–97]. In this regard, at modern neuroradiology, it became necessary to use functional neuroimaging techniques that allow not only in vivo study the pathological changes of different brain structures, but also capable to clarify some of the mechanisms of epileptogenesis. These methods include diffusion tensor MRI tractography, which is the technology of the future to obtain morphological images of brain.

Diffusion imaging is an MRI method that produces in vivo magnetic resonance images of biological tissues sensitized with the local characteristics of molecular diffusion, generally water (but other molecules can also be investigated using MR spectroscopic approaches) [8, 719]. Diffusion-weighted images are much more sensitive to the structural and metabolic

changes occurring in the brain, in comparison with conventional MRI images. The most important parameter of DT MRI, characterized by the integration of the white matter is fractional anisotropy (FA), which is defined as the magnitude of the direction of water diffusion in three-dimensional-space. Tightly arranged bundles of white matter provide structural coherence, whereby the diffusion of water has a definite direction, and FA is a high enough. In case the structural organization of the white matter decreasing and diffusion of water is less orderly manner, the values of FA subsequently diminishes [6, 401–407]. Average diffusion capacity (ADC) is used as indicator to evaluate the results of diffusion tensor MRI. When the values of ADC are increasing it can be associated with a defect in neurogenesis or cell loss of brain with a consequent increase of the extracellular space of brain [4].

The aim of this study was to determine the quantitative standards of numerical values of diffusion-weighted imaging of white matter in children with symptomatic epilepsy of various etiology.

Materials and methods

MRI studies were performed in 31 children with symptomatic epilepsy. Their age ranged from 2 to 12 years. Debut of epileptic seizures was observed from birth to 13 years, mean age debut 4,2 ± 0,96 years. Disease duration averaged 3,2 ± 0,47 years. The patients were examined and treated at the Department of Paediatric Neurology of Tashkent Paediatric Medical Institute and underwent diagnostic procedures in «MDS» diagnostic centre from 2012 to 2014 and StarMed diagnostic centre in Tashkent. Among the etiological factors of symptomatic epilepsy 11 children had cerebral palsy, 10 children had outcomes of meningoencephalites and 10 children had anomalies of brain. MRI studies were performed on a GE tomography with a magnetic field of 1.5 T using a head radio frequency coil consisting of 18 elements. The study protocol included a standardized program of MRI of the brain, as well as aiming neuroimaging the mediobasal temporal lobe with thin sections with the possibility of post processing and imaging in different planes. Among the special programs used fast spin-echo T2-weighted, perpendicular to the longitudinal axis of the hippocampus slice thickness of 2 mm, and 3D T1 SP6R — pulse sequences with the reform and obtaining images mediobasal temporal lobe perpendicular and parallel to the longitudinal axis of the hippocampus. Measurement of anisotropy and diffusivity. Nowadays in clinical neurology, various brain pathologies may be best detected by studying at particular measures of anisotropy and diffusivity. The underlying physical process of diffusion (by Brownian motion) causes a group of water molecules to move out from a central point, and gradually reach the surface of an ellipsoid if the medium is anisotropic (it would be the surface of a sphere for an isotropic medium). The ellipsoid formalism functions also as a mathematical method of organizing tensor data. Measurement of an ellipsoid tensor further permits a retrospective analysis, to gather information about the process of diffusion in each voxel of the tissue [7]. In an isotropic medium such as cerebrospinal fluid, water molecules are moving due to diffusion and they move at equal rates in all directions. When various barriers and restricting factors such as cell membranes and microtubules interfere with the free diffusion, we are measuring an "apparent diffusion coefficient" or ADC because the measurement misses all the local effects and treats it as if all the movement rates were solely due to Brownian motion [1, 259–267]. The ADC in anisotropic tissue varies depending on the direction in which it is measured. Diffusion is fast along the length of (parallel to) an axon, and slower perpendicularly across it. Once we have measured the voxel from six or more directions and corrected for attenuations due to T2 and T1 effects, we can use information from our calculated ellipsoid tensor to describe what is happening in the voxel. If you consider an ellipsoid sitting at an angle in a Cartesian grid then you can consider the projection of that ellipse onto the three axes. The three projections can give you the ADC along each of the three axes ADC_x, ADC_y, ADC_z. This leads to the idea of describing the average diffusivity in the voxel which will simply be $(ADC_x + ADC_y + ADC_z)/3 = ADC_i$.

We use the *i* subscript to signify that this is what the isotropic diffusion coefficient would be with the effects of anisotropy averaged out. All three of these are perpendicular to each other and cross at the centre point of the ellipsoid. We call the axes in this setting eigenvectors and the measures of their lengths eigenvalues. The lengths are symbolized by the Greek letter λ. The long one pointing along the axon direction will be λ_1 and the two small axes will have lengths λ_2 and λ_3. In the setting of the DTI tensor ellipsoid, we can consider each of these as a measure of the diffusivity along each of the three primary axes of the ellipsoid. This is a little different from the ADC since that was a projection on the axis, while λ is an actual measurement of the ellipsoid we have calculated. The diffusivity along the principal axis, λ_1 is also called the longitudinal diffusivity or the axial diffusivity or even the parallel diffusivity $\lambda_\parallel$. Historically, this is closest to what Richards originally measured with the vector length in 1991 [9]. The diffusivities in the two minor axes are often averaged to produce a measure of radial diffusivity $\lambda\perp = (\lambda_2 + \lambda_3)/2$.

This quantity is an assessment of the degree of restriction due to membranes and other effects and proves to be a sensitive measure of degenerative pathology in some neurological conditions [12]. It can also be called the perpendicular diffusivity $(\lambda\perp)$. Another commonly used measure that summarizes the total diffusivity is the Trace — which is the sum of the three eigenvalues, $tr(\Lambda) = \lambda_1 + \lambda_2 + \lambda_3 ...$ where Λ is a diagonal matrix with eigenvalues λ_1, λ_2 and λ_3 on its diagonal. If we divide this sum by three we have the mean diffusivity, $MD = (\lambda_1 + \lambda_2 + \lambda_3)/3$.

The values of FA and ADC were calculated on the same sections for all the resulting images. The data obtained were subjected to statistical processing on a PC Pentium-4 program, developed in the package EXCEL using a library of statistical functions with the calculation of the arithmetic mean (M), standard deviation (SD), standard error (SE), relative values

(frequency,%), Student's t test (t) with the computation of error probability (P). Differences were considered significant mean values at a significance level of P <0.05.

Results of the study

In a study of 11 children with epilepsy on the background of symptomatic epilepsy with cerebral palsy diffusion tensor MRI tractography allowed to determine the micro structural changes in 9 children. The most important indicator of the integration of the white matter of the brain is the value of the FA [4]. This indicator is in group of children with cerebral palsy was 0,40 ± 0,011 for the front quadrants and 0,41 ± 0,013 for the rear quadrants. Hemispheric asymmetry in this parameter revealed only for the rear quadrant, the main area which represented the temporal lobes, with preferential reduction of FA was determined in the hemisphere with epileptic focus (p <0.01) (Table. 1).

Table 1. – Indicators of FA and ADC on MRI diffusion in children with symptomatic epilepsy with various etiology

| Etiology of symptomatic epilepsy	Indicators of FA		Indicators of ADC	
	Front quadrants	Rear quadrants	Front quadrants	Rear quadrants
Normal brain	0,50±0.004	0,51±0.004	1,2±0,03	1,25±0,04
Cerebral Palsy	0,40±0,011*	0,41±0,013*	1,57±0,02*	1,62±0,02*
After meningoencephalites	0,41±0,009*	0,41±0,01*	1,55±0,02	1,63±0,009
Brain anomalies	0,38±0,02*	0,37±0,03*	1,50±0,06	1,59±0,06

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

Source: Author.

At the same time 10 children had the lowest level of FA for the front quadrants, with deviation of 3.7%. In 8 children observed deviations of FA in rear quadrants with 4.3%. The values of ADC have been counted to study the mechanisms of micro structural changes in brain. ADC values in 54.5% of children with symptomatic epilepsy on the background of cerebral palsy differed from normal values for the front quadrant of the hemisphere with the epileptic focus and posterior regions of the cerebral hemispheres (P <0.01). While observing 11 children with symptomatic epilepsy in 6 children ADC value for front quadrant of the hemisphere was increased by an average of 1.53% then normal values, and for the rear quadrant of the hemisphere on average by 1.1% of normal values (Fig.1).

Figure 1: The percentage of abnormalities in FA values in children with symptomatic epilepsy, depending on the etiology (%)

Source: Author (2014).
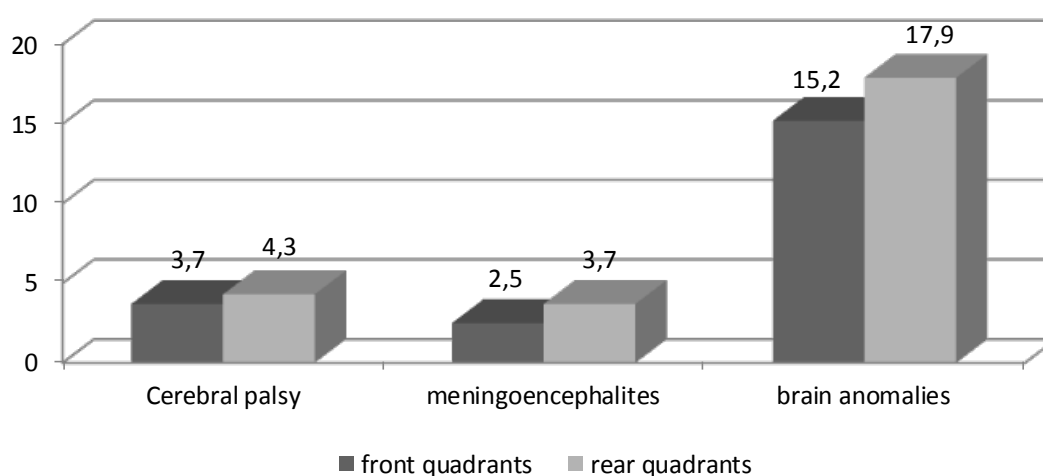
Thus, in children with symptomatic epilepsy on a background of cerebral palsy in most cases there was a decrease of FA for both front and rear quadrant on the background of increasing ADC.

Among the 10 children with symptomatic epilepsy after meningoencephalitis FA values was different, because the average number of FA values were 0,41 ± 0,009 for the front quadrants and 0,41 ± 0,01 for the rear ones. Indicators of ADC for front quadrants were 1,55 ± 0,0 and for the rear ones were 1,63 ± 0,009. Deviations from normal values to down on average in FA was 2.5% for front quadrants, for the rear was 3.7%. When analyzing ADC values different pattern was revealed, so the mean deviation from the normal values to upwards in front quadrants was 3.6%, for the rear ones was 2.6% (Fig.2)

Analyzing the data of MR diffusion in children with symptomatic epilepsy on the background abnormalities of brain development we have identified low levels of FA for both front and rear quadrants (0.38 ± 0.02 and 0,37 ± 0,02, respectively; P <0.01) as compared with the normal values. A deviation from the normal FA had 15.2% for the front quadrants and 17.9% for the rear. Indicators of ADC in children with symptomatic epilepsy on a background of developmental abnormalities of the brain underwent the following changes: the front quadrants figures were 1,50 ± 0,06 (p <0.01) for the rear — 1,59 ± 0,06

(P <0.01). There was a significant deviation of ADC from normal values, 22.11% for the front quadrants and 2.2% for the rear. Thus, in children with symptomatic epilepsy on a background of developmental abnormalities of the brain there was a sharp decline of the FA for front and rear quadrants and a huge increase of the ADC for the front quadrants.

Figure 2: The percentage of abnormalities of ADC in children with symptomatic epilepsy depending on the etiology (%)
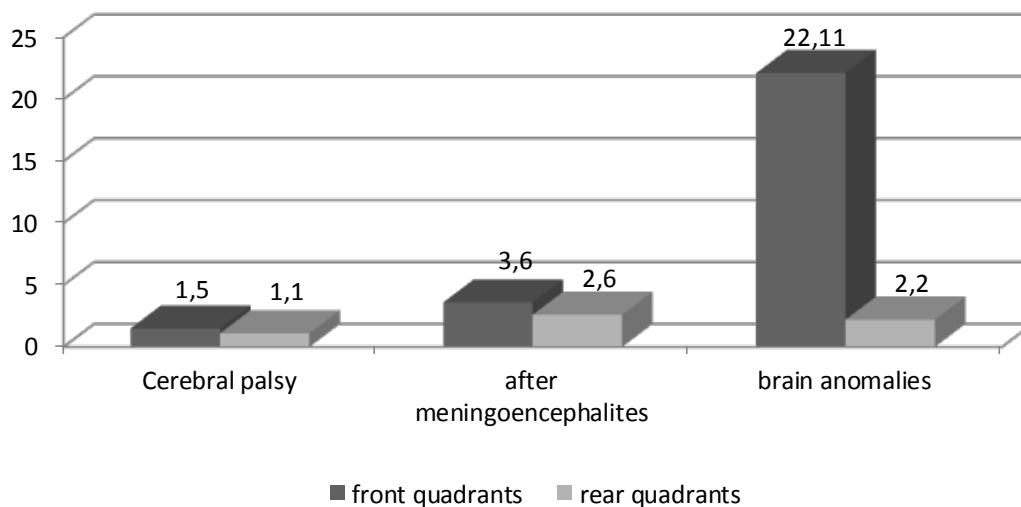
■ front quadrants ■ rear quadrants

In children with symptomatic epilepsy on the background of cerebral palsy in most cases first, second, third clusters were detected (7, 10 and 6 children, respectively). The combination of these clusters observed in 8 cases (72.7%). In children with symptomatic epilepsy on the background of meningoencephalites in most cases, there was a first and second cluster (7 and 10 children, respectively). The combination of all four clusters were recorded in 90% of children. Changes in the state of integrity of the corpus callosum was observed among 54.5% of children with cerebral palsy, and 50% of children with developmental abnormalities of the brain appeared as a hypoplasia or hypogenesia. According to other authors state integrity of the corpus callosum provides stability of cognitive and emotional status of the children. Thus, the presence of these clusters to some extent indicates the "interest" of the various regions of the brain in promoting epileptic seizures, and is being as predictor of the developing of the disease.

Conclusion. We revealed that in children with symptomatic epilepsy, regardless of its etiology, the presence of discrete regions of the abnormal changes of the white matter of the brain was discovered, while the pathological changes of white matter were localized not only in the epileptogenic, but also in the opposite hemisphere. The regions with abnormal white matter FA and ADC values not only matched to zones of limbic circle, but also to areas of intra- and interhemispheric connections uniting the frontal, temporal, parietal and occipital lobes of the brain. Determining of specific clusters of lesions of the brain tracts in symptomatic epilepsy in children, regardless of etiology, is important to predict the prognosis of the disease and the likely possibility of cognitive impairment. Status integrity of the corpus callosum provides stability of cognitive and emotional status of children [11, 1267]. Thus, this study showed that symptomatic epilepsy in children is characterized by a variety of changes in the white matter of the brain tracts that lead to the dissociation of certain regions of the brain, which subsequently causes further breaking connections between cortical and subcortical regions and interrupting transfer of information. MRI tractography allows to extend the representation of micro structural changes in integrity of gray and white matter of brain in symptomatic epilepsy and clarify the structural and metabolic etiologic subtype of the disease according to the recommendations of the International League Against Epilepsy.

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Peculiarities of cardiac hemodynamic in pregnant women with mild preeclampsia

Abstract: Study the characteristics of cardiac hemodynamic in pregnant women with mild preeclampsia. Inadequate marker of cardiovascular adjustment in PE is to develop disproportionately LVM, the formation of isolated diastolic left ventricular dysfunction and the development of circulatory system in all organs and tissues. Thus, a disproportionately high rate of LVM, in patients with mild preeclampsia is as a predictor of severe preeclampsia before its clinical manifestation, and the indication for revision of the tactics of pregnancy.

Keywords: Doppler, pre-eclampsia, left ventricular, cardiohemodynamics.

The problem of preeclampsia — one of the most urgent in modern obstetrics [1; 2; 4; 8; 9]. Preeclampsia is a progressive disease, forms, manifestations of which may be very different, as well as the pace of growth of its manifestations [4; 5; 6; 7].

Analyzing the numerous studies on preeclampsia (PE) and eclampsia (E), it can be concluded that a very significant role in the pathogenesis of this complication of pregnancy and childbirth plays violations in the circulatory system of mother and fetus. All of the above, and strongly suggests a more in-depth study of the state of different parts of the circulatory system in the dynamics of the development of PE, and E. And, of course the very heart (myocardium) can not participate in the changes taking place throughout the circulatory system [5; 6; 7; 8].

It is still unclear what are the real changes in the parameters in different types of preeclampsia, and whether there is a possibility of restoring LVM after birth, which is extremely important for judging questions about early detection of developing complications from the heart, and the prevention of targeted therapy.

Objective: study the characteristics of cardiac hemodynamic in pregnant women with mild preeclampsia.

Materials and methods

The basis of this paper on the results of a survey of 60 women in the III trimester of pregnancy. I made -group 30beremennye with physiological pregnancy, 30 pregnant women with mild PE (II group). From instrumental methods were applied Doppler echocardiography. The study was conducted at 30–34 weeks of gestation. Echocardiography was performed on the machine. The company Sono Scape models SSI-5000 (China). The method of tissue doppleroehokardiografii (TMDEhoKG) were determined left ventricular myocardial mass.

LVM was calculated in the one mode — the formula Devereux R.B and Riechek N in accordance with the Penn-convention:

LVMi (r)= 1,04 x [(PW d, mm + IVS d, mm + EDD, mm)³ – (EDD, mm³)] –13,6

The criterion for LVH takes a value and LVM> 110g/m² Statistical processing of the results was performed using

Student's t test using a software package Statgraf and Microsoft Excel version for Windows.

Results and discussion.

Considering that one of the most important features of a PE hypertension violation organ blood flow, we considered extremely important in the groups studied pregnant women to trace the dynamics of changes in the circulatory system as a whole, and drawing attention to the indicators of cardiac hemodynamics (CG) starting with the gestational age of 30–34 weeks.

The table below describes the function of the heart in patients of Group II, received us in by Doppler studies where we give a comparison and reference values of these parameters.

Table 1. – Doppler echocardiography volume indices of cardiac function in pregnant women groups I and II in terms of gestation 30–34 weeks. (n = 60)

Indicators	I group n=30	II group n=30	P
EDV, ml.	139,9± 1,0	135,6 ± 4,3 (120–146)	> 0,05
ESV, ml.	45,5 ± 3,1	49,1 ± 2,4 (38–59)	> 0,05
EF,%	67,2 ± 4,2	63,7 ± 2,1 (59–68)	> 0,05

Note: In parentheses are the scatter data II study groups of pregnant women.

When analyzing the performance parameters of the pump and myocardial contractility in pregnant group II in the III trimester, compared with those patients in the control group, we did not find the distinctive changes. There have been a downward trend in indicators of EDV and EF, with an increase in ESV.

Indicators EDV, EF, pregnant Group II in the III trimester of pregnancy in terms of 30–34 weeks of 3.1 and 5.3% were below the reference values, while ESV is 7.9% greater than the number of the control group.

Analyzing the data, one must assume that the accession of PE due to changes in cardiac hemodynamics appropriate change of contractile function in ventricular myocardium. For a more detailed understanding of the changes of cardiac pump function within a specified time of gestation in pregnant women with mild PE indicators we studied the geometry of the heart.

Table 2. – These Doppler echocardiography to assess left ventricular function in pregnant women groups I and II in terms of gestation 30–34 weeks. (n= 60)

Indicators	I group n=30	II group n=30	P
EDD, mm	48,3 ± 2,0	45,2 ± 1,6 (40–51)	> 0,05
ESD, mm	33,4 ± 1,6	33,0 ± 1,9 (29–38)	> 0,05
LA, mm	31,5 ± 1,0	31,7 ± 1,6 (25–35)	> 0,05
RV, mm	24,7 ± 1,1	25,9 ± 2,0 (20–31)	> 0,05
PW d, mm	8,1 ± 0,3	11,0 ± 0,9 (9–13)	< 0,05
IVS d, mm	8,4 ± 0,4	10,4 ± 0,7 (9–12)	< 0,05
DA, mm	28,5 ± 0,7	29,3 ± 0,4 (26–31)	> 0,05
LVM, g	159,9 ± 8,7	204,7 ± 9,0 (144–258)	< 0,05
LVMi, g/m^2	97,9 ± 4,0	111,9±5,3 (85 –160)	< 0,05
RWT	0,38 ± 0,04	0,49 ± 0,04 (0,37–0,60)	< 0,05
DC,%	129,0 ± 4,7	141,0 ± 3,8 (97–184)	< 0,05

Note: in brackets shows the percentage of pregnant women scatter group II.

In analyzing the data in the table, it may be noted that the figures and EDD, ESD compared to control values in pregnant Group II have a tendency to decrease (not statistically significant).

As for the size of the wall of the left atrium, right ventricle, aortic diameter, they also do not undergo significant changes, but the thickness of the left ventricular posterior wall and inter ventricular septum accession PE even mild undergoing significant changes. PW d and IVS d were increased respectively by 35.8% and 23,8% (p <0,05) in both cases. There was also a significant increase in the relative thickness of the wall of the left ventricle to 28,9% (p <0,05).

Increasing the thickness of the walls of the left ventricle causes an increase in left ventricular mass by 28% and the index of left ventricular mass to 14,3% (p <0,05) in both cases.

What indicative of developing left ventricular hypertrophy, peripheral work against high pressure. Increase DC 9.3% indicated the proportional increase of left ventricular myocardium.

At 6 pregnant women (20%) of this group LVMI values were in the range 119–127 g/m^2 and RWT was within 0,47–0,60 units. That is higher than normal, indicating whether they are concentric hypertrophy, which and led to a decrease in contractile ability of the left ventricle manifested in the decline in the EDV within the 120–131 ml of EF within 59–61%.

Indicators LVMMI and OTC in 13 pregnant women (41.9%) indicated they have a concentric remodeling. LVMMI these patients did not go beyond the norm. RWT ranged 0,51–0,60 units. In 11 pregnant women in this group (35.5%) stated the normal geometry of the left ventricle. Since the rate of pregnant LVMMI was within normal limits, and RWT ranged 0,46–0,49 units. Only in this group of a pregnant transferred from the control group in Group II took place Eccentric type of left ventricular geometry (3.3%).

All pregnant women with type concentric left ventricular geometry during the therapy (basal magnesia, hypertensive, and antispasmodic) were taken by us under monitor observation periods of 30–34 weeks or more. In three of them, in spite of the ongoing corrective therapy, we were awarded us with resistant hypertension deterioration in the pumping function of the left ventricle, reduced ejection fraction. All this required the transfer of the three patients in the group of pregnant women with severe preeclampsia, followed by addressing the issue of timing and method of delivery.

Considering that in 13 pregnant women with type concentric remodeling, reduced performance single and minute cardiac output, ejection fraction on the background of hypertension and increased peripheral vascular resistance, leading to increased left ventricular mass and LVMI, which were indicators of the growth of pathological changes in the circulatory system. These indicators show the progression of the pathological process with the transition into concentric concentric remodeling of the left ventricle geometry type.

In this group of pregnant women against the background of corrective therapy we monitored the study parameters. In all cases, the therapy was effective, as indicated by our data reduction RWT index <0.45 units. (0,39 ± 0,02 units.).

Thus, in our opinion, it is necessary to distinguish between situations where the increase in the number and weight of functioning structures of the myocardium is a compensatory process and when the increasing demands on the heart are responsible for the transition of the adaptive mechanism in the pathological process.

Inadequate marker of cardiovascular adjustment in PE is to develop disproportionately LVM, the formation of isolated diastolic left ventricular dysfunction and the development of circulatory system in all organs and tissues.

Thus, a disproportionately high rate of LVM, in patients with mild pre-eclampsia is as a predictor of severe preeclampsia before its clinical manifestation, and the indication for revision of the tactics of pregnancy.

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Features of renal function and some indicators of homeostasis in women with mild preeclampsia

Abstract: Study of features of renal function, some indicators homeostasis in women with mild preeclampsia. We have studied 50 women with physiological pregnancy, 100 pregnant women with mild PE (II group) in gestational age 30–34 weeks. The results of the data, it should be emphasized that among the numerous violations of various functions of the body of pregnant women with mild preeclampsia. The most prominent is hypovolemia due to preferential reduction of plasma volume, hypoproteinemia due to proteinuria and reduced renal perfusion parameters with the deterioration of their functional capacity.

Keywords: Kidney, renal hemodynamic, homeostasis, renal plasma.

Preeclampsia — pregnancy pathology related to the most serious complications for both mother and fetus and is characterized by functional disorders of vital organs and systems [3; 4; 6]. The blood supply to the kidney is closely related to their function. Glomerular filtration as renal blood flow increased during the first trimester of 30–50% and then gradually decreases. The direction of changes in renal blood flow and glomerular filtration rate during pregnancy is the same, but the strict parallelism of these changes is not marked [2; 5; 6]. Structural changes in the kidneys during pregnancy and are accompanied by certain changes in their physiology. In particular, pregnancy is characterized by dilatation of the afferent and efferent arterioles with a 50% increase in renal plasma flow. In the same extent (50%) and increased glomerular filtration

Objective: studying of features of the functional state of some indicators of renal homeostasis in women with mild preeclampsia.

Materials and methods

We have studied 50 women with physiological pregnancy, 100 pregnant women with mild PE (II group) 30–34nedel gestation. We used clinical and laboratory studies including blood tests and urine tests, fibrinogen, the study of the protein in the blood, count the amount of protein in the daily urine and functional methods for assessing the condition of pregnant women. Laboratory diagnosis included biochemical studies of renal function and determination of coagulation factors. Qualification excretory renal function is important both from a clinical and research with view. It is known that an increase in serum creatinine, decreased creatinine clearance or estimated glomerular filtration rate (GFR), microalbuminuria are independent predictors of cardiovascular disease and, in particular, hypertensive syndrome. Precise direct measurement of GFR is methodologically difficult; therefore, to the last time in clinical practice commonly used indicators of elevated levels of creatinine in the blood plasma and special formula. Thus their use is not only possible, but does not suggest a substantial increase in the cost of an assessment of renal function at the undoubted increase in the accuracy of the study.

Formula (Cockcroft-Goult, FCG).

FCG= {140 — Age x weight/Serum Creat (mg/dL) x 72} x 0.85

where {} geometric ratio (fraction), which is multiplied by a factor of 0.85 for women.

Statistical processing of the results was performed using Student's t test using a software package Statgraf and Microsoft Excel version for Windows.

Results and discussion.

The complex research of renal function and homeostasis parameters in 100 women with mild preeclampsia at term of 30 to 34 weeks.

Table № 1. – Data from clinical studies of blood and urine samples from women with mild preeclampsia, n = 150

Indicators	Mild preeclampsia (n=100)	Control group (n=50)	P
Кровь			
Hemoglobin, g/l	97,5±1,72	101,3±2,31	>0,05
Erythrocyte, 10^2/l	3,04±0,06	3,1±0,12	>0,05
Ht,%	36,0±0,18	36,3±0,26	>0,05
Total protein, g/l	69,3±2,14	81,0±0,35	<0,001
urine			
Diurnal diuresis, ml	950,7±27,6	1276,1±56,7	<0,001
relative density			
maximum	1,0322±0,0055	1,0240±0,0084	>0,05
minimal	1,0210±0,0044	1,0104±0,0084	>0,05
Protein, g/L	2,57±0,01	0,46±0,012	<0,001
leukocytes	4–10	2–8	

The above table reflects the performance of clinical studies of blood and urine of pregnant women in this group (for greater clarity, given identical control group). The table shows that for women with mild PE characterized by proteinuria and hypoproteinemia. The content of total protein in blood they 14.4% lower than the control group. Characteristic turned and a reduction of the daily urine output by 25.5%, relative to that of women with normal pregnancy with an increase in night-fraction and certain decrease variations in the relative density of urine. Almost 18% increased proteinuria. The results of our research showed that in III trimester of pregnancy complicated by preeclampsia mild, a decline to glomerular filratsiya (GF) 1,067 ± 0,061 mL/s, whereas in pregnant women in the control group it was 1,751 ± 0,076 mL/s (P <0,001). Reduced filtration ability of the kidneys in the study group of pregnant women with preeclampsia mild relatively healthy pregnancy is 39.1%.

Changes tubular reabsorption were less pronounced in pregnant women with mild preeclampsia. Amounting to 98,4 ± 0,4, it is only a tendency to decrease with respect to reabsorption in the control group, 98,7 ± 0,5%.

Reduced filtration ability of the kidneys in pregnant women with mild preeclampsia was associated with deterioration of concentration function. The concentration of urea and creatinine in their blood, were, respectively, 5,6 ± 0,7 mlmol/l and 96,3 ± 6,1 mmol/l, did not come out for the redistribution of physiological values, but somewhat higher than that of pregnant women in the control group (4 43 ± 0,21 mlmol/l

69,8 ± 5,3 mmol/l). Only the difference in creatinine was significantly (P <0,05).

The table below reflects the nature of the changes related to blood electrolytes in pregnant women with mild preeclampsia (for comparison, the data of the control group).

Table 2. – Biochemical parameters of the blood of women with mild preeclampsia

Indicators	Mild preeclampsia (n=100)	Control group (n=50)	P
natrium, mmol/l	137,7±2,51	130,5±3,20	<0,05
Potassium, mmol/l	3,7±0,06	3,6±0,03	>0,05
Calcium, mmol/l	1,90±0,034	2,45±0,02	<0,001
Urea, mmol/l	5,67±0,09	4,4±0,04	<0,001
Creatinine, mmol/l	96,3±1,81	69,8±2,10	<0,001

The table shows that the greatest change in the electrolyte composition of pregnant women with mild preeclampsia as for calcium, the level of which is even more reduced relative to that in healthy pregnant women. As for the solution, despite a statistically significant increase relative to the control of its numbers, its values do not exceed the physiological norm.

In general, women with mild preeclampsia there is an increase in the blood concentration of electrolytes (except calcium) without going beyond the normal range normal. Decline was the coefficient of purification of urea in pregnant women with mild preeclampsia by 13.5% compared to healthy pregnant women. Urea purification factor in the control group was 85,9 ± 1,9%, while in the test group it was equal 74,3 ± 2,6% (P <0,001).

Indicators clearance of all investigated electrolytes in mild preeclampsia was at the lower limit of normal and lower than those in the control group. The clearance of sodium was 0,62 ± 0,03 ml/min at 0,73 ± 0,05 ml/min in women with normal pregnancy. Clearance potassium — decreased by 39.0%. Clearance calcium — was lower by 20.5%. All the data were statistically significant (P <0,05)

Thus, the results of the data obtained, it should be emphasized that among the many disorders of various body functions pregnant women with mild preeclampsia. The most prominent is hypovolemia due to preferential reduction of plasma volume, hypoproteinemia due to proteinuria and reduced renal perfusion parameters with the deterioration of their functional capacity.

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About the detection of HIV — infection in relation to gender of surveyed persons

Abstract: The authors been studied the specific significance of men and women in the amount of detected HIV-infected patients in the republic for 1987–2013 years. Presents a comparative evaluation of detection of HIV infections among men and women as well as depending on the regions of the country for 2008–2013 years. Despite

the increase in the number tested for HIV infection between men and women in 2013 compared with 2008 figures detection of HIV-infected women have decreased in 2,0–3,8 times, which indicates a decline in detection of the infection in the whole country. Relatively high detection rate of HIV observed among men than among women.

Keywords: HIV, AIDS, gender, men, women, incidence, detection.

It is generally recognized that HIV infection is one of the most dangerous infectious diseases in humans. The infection remains one of the most pressing problems for practical health and medical science in all countries without exception. HIV infection — greatly increasing the cost of national budgets, leads to a budget deficit and has a negative impact on economic growth [2; 4; 5; 6; 8]. HIV epidemic swept the globe and has long become a pandemic. According to estimates by WHO and UNAIDS on 1 January 2010, the number of HIV-infected world is 33.4 million persons [1; 3; 10; 11; 12]. However, the geography of HIV infection is inhomogeneous and globally women account for half of all cases of HIV infection. Prevalence of HIV infection among women involved in the street sex business the city of Moscow SW is variously estimated from 3.1 to 14.0%. More than 80.0% SWs have sexually transmitted infections, 22.0% subject to sexual violence and more than 30.0% did not use a condom by sexual contact with a commercial partner [2; 4; 8; 9; 10]. Women, because of anatomical and physiological features are the most sensitive group to HIV infection [3; 7; 9; 13].

The purpose of work

Given the above purpose to this work was to study the specific importance of men and women in the amount of detectable HIV-infected patients in 1987–2013 and comparative evaluation of detection of HIV infection among men and women, and also depending on the regions of the country in 2008–2013.

Materials and Methods

The material for this work were used the reported data about detection of HIV infection among different populations obtained from the national, regional AIDS centers and inter district AIDS laboratories. The diagnosis of HIV infection is confirmed in accordance with the applicable country to normative documents; obtain 2-fold positive results of the blood sample to the IFA followed by confirmation of the result by immunoblotting (IB). Analyzed the data registers HIV infected persons, maps the epidemiological investigation case detection HIV infection. A statistical analysis of the indicator of the detection of HIV infection among different populations depending on of their sex to calculating the mean values of 10 thousand the surveyed. In the work have been used laboratory, epidemiological and statistical methods of research.

Results and discussion

The first case of HIV infection in the country was recorded in 1987 and for 13 years (1987–1999) in the country have been identified only 76 HIV-infected individuals. Since 2000, in the Republic, there was a step climb detection of HIV infection. However, this increase on one hand is of a statistical nature since been associated with increasing amounts of tested for HIV infection (picture 1).
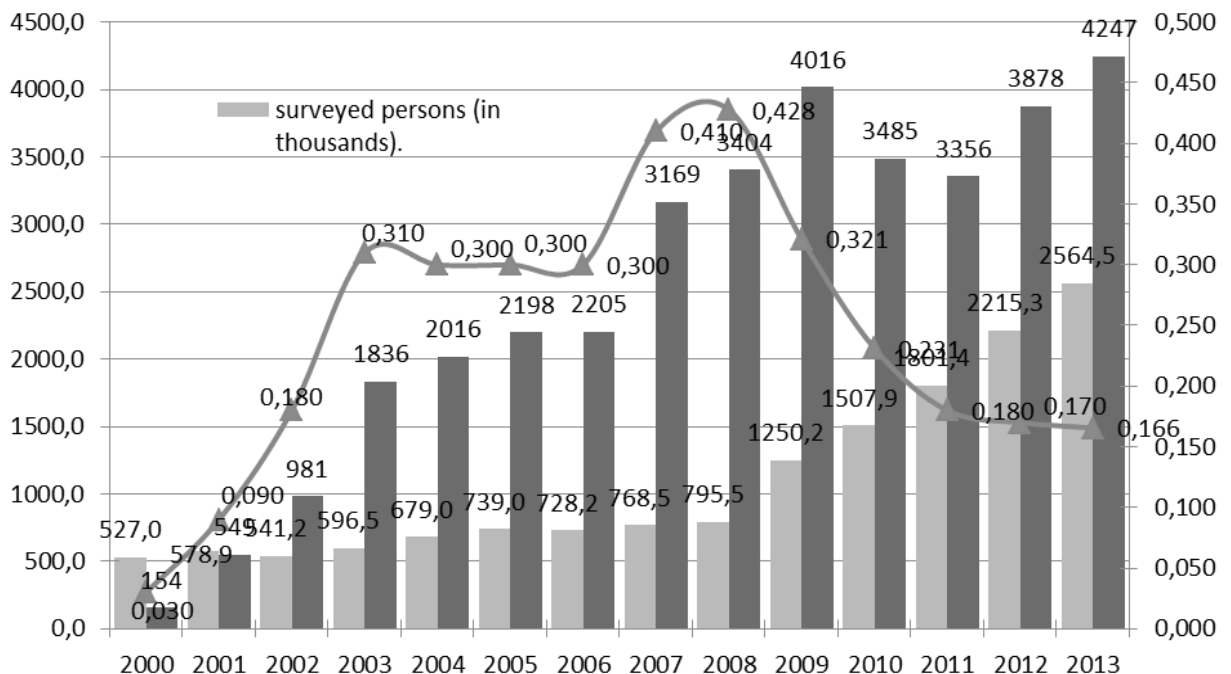
Figure 1. Amount tested for HIV infection and the amount of people identified HIV infected patients in republic in 2000–2013 (in absolute number and in%%)

For example, in 2000, testing for HIV were covered 527.0 thousand persons that in 2013 amounted to more than 2564.5 thousand, which was associated with the strengthening of material and technical and legal framework AIDS services, organization and implementation in practice of cabinets for anonymous testing and counseling for HIV infection.

Should be noted that increasing the amount of test persons for HIV in 2013 has also been associated with measures adopted in the performance of the protocol of the meeting of the Republican Commission for the coordination of activities on counteraction the spread of HIV infection (№ 165 of 1 June 2013) "About the survey HIV infection of citizens of Republic Uzbekistan, long visited foreign countries and improve the effectiveness prevention activities spreading of diseases".

Currently HIV infection is detected in all regions of the republic. Though, indicators of detection of this infection depending on the region, remains not identical. In the epidemic process involved nearly all sectors of the population, regardless of age, gender and social background. Analysis of available data shows that in the last years in the total number revealed HIV-infected patients is increasing the proportion of women (picture 2).

Figure 2. Proportion of men and women in the amount revealed HIV-infected persons in republic in the 1987–2013 years. (in%%)

For example, in 2005 detected among the HIV-infected proportion of women was 21.7%, which in 2012 amounted to 47.5%. At first glance, it seems that from year to year in republic amount of HIV infected women is increasing (picture 2).
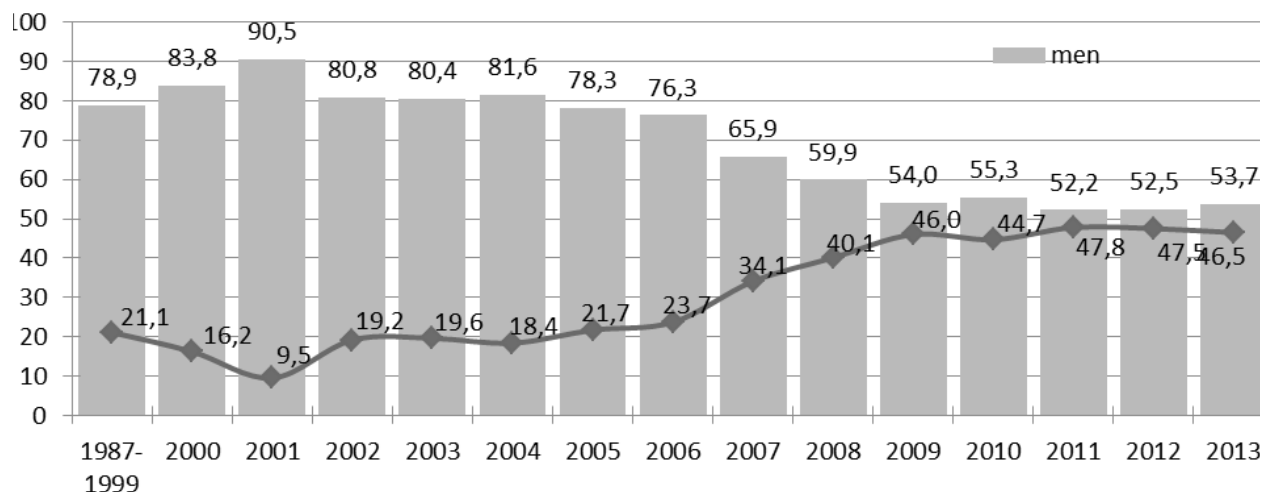

Figure 3. The number of tested for HIV infection and number of revealed men among them of HIV positive people in the republic in 2008–2013 (in absolute number and in%%)

Given this situation and in order to ascertain the true prevalence HIV infection among the population according to gender, we analyzed the detection of HIV infection in the population according to gender. As seen in Picture 3, in 2008, HIV infection been tested 394.0 thousand men and in 1569 established the presence of HIV infection. The detection was 0.4%. Despite the increase in the following years, the number of tested for HIV infection of men increased from 394.0 thousand to 864.5 thousand, detection in 2013,

compared with 2008 declined is almost 2-fold (from 0.4% to 0, 22%).

As seen in Picture 4, in republic from year to year also increases amount of tested for HIV infection for women. This phenomenon has also been associated with the implementation of the order of the Ministry of Health of the Republic of Uzbekistan (№ 74 of 18.03.2009) "About the Measures for the prevention of HIV transmission from mother to child in the maternity institutions system of the Ministry of Health".

If in 2008 for HIV infection been tested 401.5 thousand women (revealed 1323 HIV-infected, detectability totaled 0.33% to the total number of women surveyed) in 2013, amount of tested women was 1533.7 thousand and in 1967 established the presence of women HIV infection, detectability totaled 0.13%.
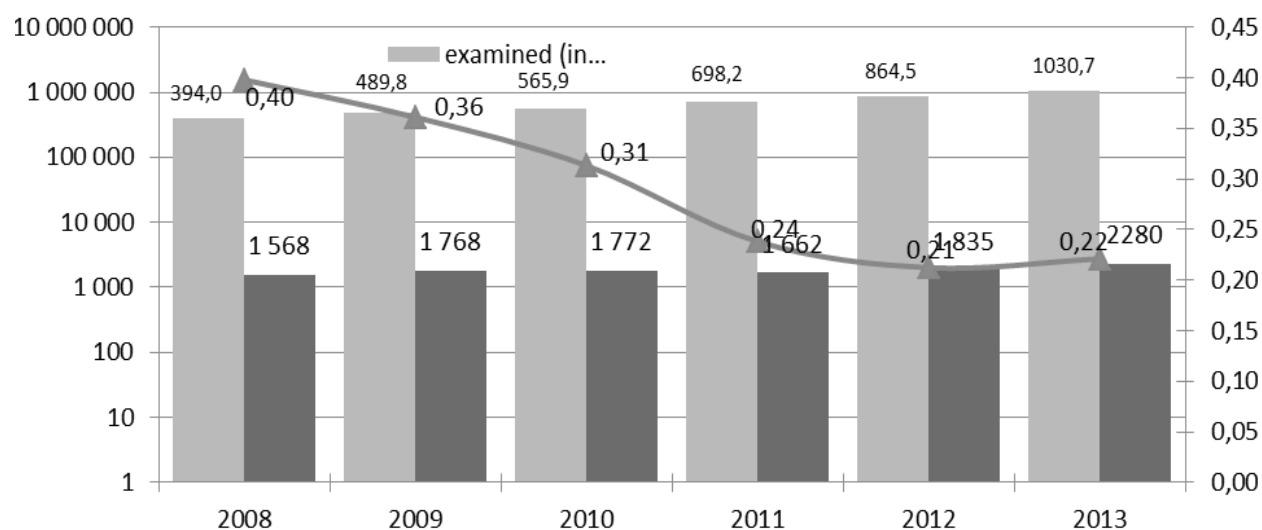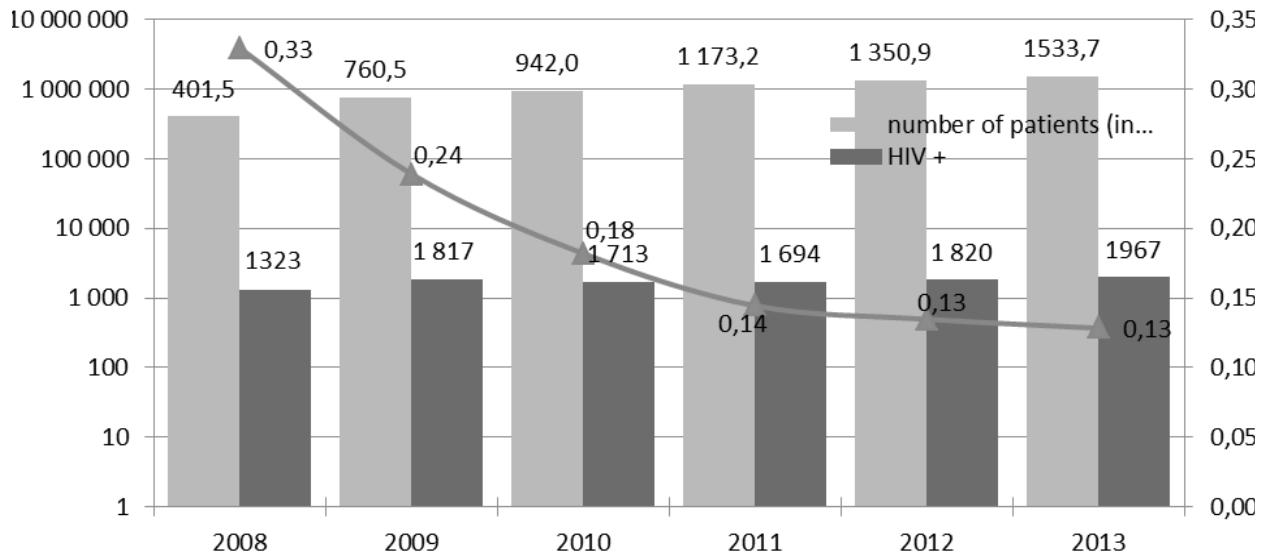

Figure 4. The number of tested for HIV infection and number of revealed woman among them of HIV positive people in the republic in 2008–2013 (in absolute number and in%%)

Thus, spite of 3.8 fold increase in amount of tested for HIV infection the women in 2013, compared to 2008, the rate of detection of HIV-infected women has decreased 2.5 times that shows a decline in the prevalence of HIV infection among women in the observed period.

The analysis of the data is also installed unequal detection of HIV infection in men and women, depending on the region. During the period analyzed detection indicators of HIV infection in men in the city of Tashkent, Andijan and Tashkent regions several greater than average the republican level detection of HIV infection among men. Indicators of detection of HIV infection among women in Tashkent city, Andijan, Tashkent, Syrdarya and Fergana regions several greater than average the republican level detection of HIV infection among women. In general, comparatively high detectability of HIV infection is observed among men than in women. All this testifies to a comparatively high prevalence of HIV infection in men than in women in the republic.

It should also note that the indicator of the detectability of HIV infection is also dependent on contingent surveyed persons. In this regard, one of the further tasks is the increase in among of tested for HIV infected of persons belonging to high-risk group.

Thus, may assume that revealed epidemiological features of HIV infection in of our republic requires the development and implementation of modern targeted and effective preventive measures in healthcare practice, taking into account the prevalence of HIV infection among the various segments of the population according to gender of tested for HIV persons and by region.

Necessary to consider that one of the most effective method of HIV infection is considered sanitary — explanatory work among the population for the prevention of this infection. In actions on counteraction epidemic spread of HIV infections should be involved not only state and official structures, but all of society and the people themselves are living with HIV, since they know their own experience the whole burden and problems associated with HIV infection. By joint efforts possible to provide a sharpen focus and efficiency response to the epidemic HIV infections.

Conclusions:

1. Under the conditions of the Republic of Uzbekistan of HIV infection are registered in all regions of the country. Spite of the increasing the number of detected HIV-infected persons, caused an increase in coverage tested on this infection persons since 2008 there is a perceptible decrease in detection of HIV infections, as the whole republic, and among men and women.

2. The epidemic of HIV infections in the republic is characterized by involvement in the epidemic process of all sectors of the population and unequal detectability of this infection among men and women, depending on the region.

3. The comparatively high detectability of HIV infections is observed in men than in women, suggesting a comparatively high prevalence their of HIV infection.

4. The revealed epidemiological features of HIV infections must be considered when organizing and conducting of preventive and anti-epidemic actions to fight this infection.

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The choice of surgery and principles of rehabilitation of aseptic necrosis of caput femori in children

Abstrart: The choice of surgical intervention method depends on the stage and severity of pathologic process. Rehabilitation of children with aseptic necrosis of caput femori is a complex process and it demands many-years clinical follow-up and therapy for its salvation.

Keywords: aseptic necrosis of caput femori, surgical therapy, children.

Aseptic necrosis of caput femori (ANCF) in children is one of severe pathologies leading to invalidity. Among all pathologies of skeletal apparatus aseptic necrosis of caput femori takes 3%, among orthopedic diseases of hip joints — up to 25%. Aseptic necrosis of hip joint is a serious problem of modern clinical medicine and it is the cause of children's invalidity high rate [1; 2]. Among adults 30–40% arthrosis of hip joint are resulting from incomplete therapy of diseases such as congenital hip displacement and Pertes disease in childhood [3; 5]. The disease proceeds for a long time, 20–25% of the children have explicit deformation of caput femori, and later deforming coccyx arthrosis [4; 6].

Therapy of that pathology in children is a complex pending problem. Various methods of conservative and surgical therapy applied in the majority of clinical follow-ups prevent the achievement of desirable results. Specificity of the therapy of that pathology is that it demands a child's confinement to bed for several years, and it prevents the child's complete physical development and communication with children of the same age. And pathogenetically unproved therapy often turns out to be ineffective. Recently we could observe a clear tendency to apply surgery for that pathology. Though, inadequate surgical tactics often induces high rate of non-satisfactory outcomes. For the achievement of the best results of the therapy in each certain case it is necessary to solve a very important question "What is an indication for surgical treatment?", but the problem of answering is conditioned by the fact that it is difficult to predict an outcome at the early stage of the disease [2; 3].

In case of late diagnostics pathologic reconstruction develops in the caput, neck of the femur and hip joint. In connection to that, rehabilitation of children with aseptic necrosis of caput femori still does not lose its actual significance. The problem is mostly linked with failure of tissues, both on the side of hip joint elements and surrounding tissues. The aims of the post-operational medical rehabilitation are prophylactics of caput femori deformation and arthrosis.

Materials and methods: We checked 146 patients with aseptic necrosis of caput femori with various genesis in the age group from 2 to 14 years old. All patients got clinical therapy in the children's orthopedic SRI of traumatology and orthopedics MHC RU for the last 6 years. Among one hundred and forty seven children (173 joints) ANCF was noted in 85 children (103 joints), osteochondropathy of caput femori — Pertes disease in 61 children (70 joints) after conservative therapy and surgery of congenital hip displacement. ANCF after the treatment of congenital hip displacement: 62 girls (72.9%), 23 boys (27.1%). ANCF after therapy of congenital hip displacement: lesions of the right hip joint were observed in 21 cases (24.7%), left-side one in 49 cases (57.6%), bilateral in 15 (17.6%). Among the patients with PD there were 16 girls (26.3%) and 45 boys (73.7%). Among them right side 20 (32.7%), left side 35 (57.3%), bilateral — 6 (9.8%). Children were also classified according to the stage of disease: the first stage of the disease was noted in 15 children

(10.2%), the second stage — impressive fracture in 47 children (32.2%), fragmentation stage in 58 children (39.73%), restoration stage in 20 children (13.6%), the fifth stage — in 4 children (2.7%).

For the definition of the general status of the patients and the study of the alteration in hip joint we used clinical, radiologic, Doppler, MR imaging and ultra-sound research methods. Radiologic checkings were performed on a low-dose digital roentgen apparatus Flexavision by Shimadzu (Japan), while sonographic test was performed with the help of MyLab 40 sonographic device by Esaote (Italy). Doppler checking was performed on Philips IU 22 made in Holland together with Germany, linear sensor with L 9–3 MHz frequency in B — M — 3D — 4D modes. In ultra sound checking we applied multi-frequency linear sensor with 3.5–7-12 mHz.

Results of the research. In the study of the children's general status we paid a special attention to complaints, anamnesis, age terms of the set diagnosis, previous therapy, motion volume in the joint, presence of lower limb shortening and deformation in hip joint$ we studied peculiarities of gait and Trendelenburg symptom. For the evaluation of the hip joint deformation variant we performed radiology of both hip joints in the direct projection. For the estimation of the areas of caput femori unreachable in the direct projection we performed Lawenstein radiology (with maximal abduction of both femoral bones). On a series of radiologic images we noted centralization of caput femori, stability of hip joint, antetortion angle, neck-diaphisis angle, caput femori covering degree and others.

Ultrasonographic signs of ANCF are exudation in the anterior part of joint lumen and neck, thickening of the cartilage of caput femori, thickening of synovial membrane, deformation, fragmentation of the caput femori ossification nuclear. The difference of thickness of joint cartilage between healthy and damaged sides exceeded 3mm in 80.5%. In 69% we detected transitory sinovitis, when the duration of pain and limitation of motions was 7–14 days. Echographically we detected exudation in the joint, but there was no above mentioned ultrasound signs.

In case of Pertes disease exudation in the joint preserved during the whole term of the disease and it was typical both for early and late stages of the disease, including fragmentation stage. ultrasound checking demonstrated the location of the caput femori lesion focus. In case of progradient progress of the disease in echogram we noted diminishing of the distance between anterior acetabular margin and metaphisis of femoral bone, deformation of caput femori with the loss of its height compared with the healthy side. In some cases there was absence or significant diminishing of the ossification nuclear. On ultrasonography after the therapy of congenital hip displacement besides the aforesaid symptoms there was immaturity of caput deformation, disorder of hip joint correlation and lateral position of the caput femori.

The main reason of aseptic necrosis of caput femori is disorder of blood supply in proximal part of femoral bone. Due

to that, for the definition of blood flow children underwent ultrasound Dopplerography of femoral arteries. In Dopplerography we detected the speed of blood flow and the resistance index of femoral arteries, and with the help of energetic Doppler mapping we estimated pathologic vessels in the area of hip joint. 112 (76.7%) children with radiologic signs of ANCF had decrease of peak speed of blood flow in the deep femoral artery and round femoral arteries.

For more complete and objective study of the structure, especially sub-cartilage area of the caput and neck of femur, form of deformation, dystrophic alterations of pelvic bones, status of growing areas in epiphisis and skewer major; for the notion of adjacent anatomy of all components of hip joint we applied MR imaging. In the comparative study of radiologic, ultrasound and MR imaging self-description in ANCF diagnostics in children we detected high self-descriptiveness of MRCT. That method provides conferment and exclusion of the pathology.

The treatment of children with aseptic necrosis of caput femori: conservative orthopedic methods in 102 children 69.8%; surgery — in 44 children 30.1%. Indication for surgery was little efficiency of conservative therapy and fast progress of the disease.

The aims of surgery were:

– centration of caput femori in acetabulum,

– normalization of joint surface correlation, improvement of blood supply processes and reparation in the damaged caput.

The following kinds of surgery were done dependently on the stage and severity of the disease:

– tunneling of the neck of femur with injection of auto transplants — 11 patients;

– varising intra-capital osteotomy of femoral bone — 14;

– transplantation of anterior inferior ost of ilium on vascular muscle peduncle — 13 children;

– decompression of hip joint with application of Ilizarov's apparatus — 3 patients.

The choice of surgery depended on the degree of pathologic alterations, detected by radiologic and MRCT imaging. At the first stage of the disease tunneling of neck of femoral bone, tunneling of neck with injection of auto transplants, decompression of hip joint using Ilizarov's apparatus were applied. At the second and third stages of the disease we performed varising intra-capital osteotomy of femoral bone. The aim of surgical interventions at the initial stages (I, II) of the disease were improvement of blood circulation and reparation of the damaged caput, and at the III and IV stages — centration of caput femori in acetabulum and normalization of joint surface correlation.

After operation a plaster cast was applied for 1 month. After removal of the plaster cast additional physiotherapeutic and pharmaceutical therapy were prescribed. During post-operational period control radiologic imaging was done in 3, 6, 9, 12 months for evaluation of surgery. It was possible to apply a complete load on the operated limb of the patients with ANCF in one year. After tunneling of hip joint improvement of blood supply in round femoral arteries was noted on Dopplerography. Extra-joint reconstructive-repair interventions promoted preserving of intact elements and acceleration of dynamic reparation of the damaged bone-cartilage elements of hip joint. It had favorable effect on the further development of the joint and promoted fast restoration of its function during post-operational period. There was diminishing of epiphisary deformation, improvement of caput femori centration and congruency of joint surfaces. It was clearly seen on radiologic and CT images during post-operational period. Restoration of physiologic congruency of the joint achieved by the osteotomy rotation component and exclusion of the areal load of aseptic necrosis of caput femori, it conditions the possibility of early restoration of support function of the limb. In the control radiologic image during post-operative period and at the stages of therapy there was no notable progression of the disease. The progress of the fragmentation period was shortened and the reparative processes passed more actively.

In post-operative period physiotherapy, TPT and pharmaceutical therapies were prescribed. The great attention was paid to the following of orthopedic routine, when it was possible to eliminate compression of proximal epiphisis and deformation of caput femori. Patients got abduct plaster casts and "boot" with derotator.

Massage with gymnastics, paraphine applications and electrophorrhesis swith various medicines for improvement of hip joint nutrition and osteo reparation of the proximal part of femoral bone were performed in 12–22 times per a course of therapy. Medicines such as vitamins of B group, C, PP, corpus vitreum, actovegin, Ca-D3-nikomed, rutin and pentoxifillin. Later children administered Ca and polyvitamins in ambulatory conditions.

The therapy was performed till complete restoration of the caput femori. Restoration of the shape of the caput femori and function of hip joint does not mean complete recovery. Patients should get rehabilitation therapy aiming adjustment of the joints in new and unusual conditions. Improvement of the conditions for hip joint functioning is linked with the process of adaptation and working of compensatory mechanisms. The complex of rehabilitation should involve physiotherapeutic specialists, Methodists of TPT, and others.

Thus, the choice of surgery method depends on the stage and severity of the pathologic process. Surgical interventions promote fast restoration of congruency and function, improvement of blood circulation and regeneration processes in hip joint.

Rehabilitation of the children with aseptic necrosis of caput femori is a complex process and it requires many years of clinical follow-up and therapy for its salvation.

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The role of self-assessment in evaluation of severity of premature ejaculation

Abstract: Ejaculatory control issues have been documented for more than 1,500 years. Today, PE is relevant and significant problem, and the most common male sexual disorder, affecting about 30–40% of sexually active men. The data about PE prevalence contradict each other; furthermore, there is different prevalence of PE in different regions, countries or climatic zones. Because of the variability in time required to ejaculate and in partners' desired duration of sex, exact prevalence rates of PE are difficult to determine. The etiopathogenesis of PE is poor understood as well. Development of diagnostic tools, guidelines and questionnaires for PE is an evolutionary process that continually reviews data and requires the best new researches. However, there is still no universal agreement on how to define or to diagnose PE. Development of any diagnostic tool and questionnaire for PE should be based on criteria of easily recognizable criteria of the disease. According to the analysed literature and recommendations of the ISSM, it is strongly recommended the diagnostic tools be updated and improved.

Keywords: premature ejaculation, diagnostic tools, criteria for premature ejaculation.

Introduction. Recently, knowledge of premature ejaculation (PE) has significantly advanced because of progress in understanding the physiology of ejaculation, clarifying the real prevalence of PE in population-based studies, reconceptualizing the definitions and diagnostic criterion of the disorder, assessing the psychosocial impact on patients and partners, designing validated diagnostic and outcome measures, proposing new pharmacological strategies and examining the efficacy, safety and satisfaction of these new and established therapies [1].

PE is the most common male sexual disorder, affecting 30–40% of sexually active men [2], and perhaps as many as 75% of men at some points in their lives [3]. Like erectile dysfunction (ED), PE also could impact a man's life in many aspects, such as self-esteem and relationship with the opposite sex [4]. About 10% of patients receive ineffective or unreasonable treatment. However, there is still no universal agreement on how to define or to diagnose PE.

Ejaculatory control issues have been documented for more than 1,500 years. The Kamasutra, the 4th century Indian sex handbook, declares: "Women love the man whose sexual energy lasts a long time, but they resent a man whose energy ends quickly because he stops before they reach a climax" [5].

PE occurs when a man experiences orgasm and expels semen soon after sexual activity and with minimal penile stimulation. It has also been called "early ejaculation", "rapid ejaculation", "rapid climax", "premature climax", and (historically) "ejaculation praecox". Sex researcher Alfred Kinsey did not consider rapid ejaculation a problem, but viewed it as a sign of "masculine vigor" [6]. http://en.wikipedia.org/wiki/Premature_ejaculation — cite_note-59There is no uniform cut-off defining "premature", but a consensus of experts at the International Society for Sexual Medicine (ISSM) endorsed a definition including "ejaculation which always or nearly always occurs prior to or within about one minute" [7]. The International Classification of Diseases (ICD-10) applies a cut-off of 15 seconds from the beginning of sexual intercourse [8].

Definition. In 2007, an expert committee of the International Society for Sexual Medicine (ISSM) concluded formulate a definition can only for the primary form of PE, arising at the moment of sexual debut. The ISSM defined PE as a male sexual dysfunction characterized by ejaculation that always or nearly always occurs prior to or within one minute

of vaginal penetration, and the inability to delay ejaculation on all or nearly all vaginal penetrations, and negative personal consequences, such as distress, bother, frustration and/or the avoidance of sexual intimacy [9]. This definition applies only to intravaginal sexual activity and does not define PE in the context of other sexual behaviors or men having sex with men. Therefore, this definition has insufficient information about PE in other groups. According to the recently edited recommendations of ISSM (2010) for the diagnosis and treatment of PE, these criteria may be relevant for the diagnosis of secondary (acquired) form of the disease [1]. Additionally, there are poor published objective data propose a new evidence-based definition of acquired PE, although it believed the proposed criterion for lifelong PE might be applied to acquire PE as well.

In 2007, the Russian experts conducted large-scale survey in RuNet among 1248 Russian-speaking respondents; final results of the study were analyzed in 2012. After temporal border, as well as a number of other diagnostic criteria had been determined, they formulated a new definition of the disease. According to that, PE is ejaculation that always or intermittently occurs without proper control over it prior to introduction of the penis into the vagina (ejaculatio ante portas), or within less than 2 minutes after introjection (ejaculatio praecox), and by male's negative consequences of the state of ejaculatory function, partner's sexual frustration and interpersonal conflicts [10]. PE has been defined according to five essential criteria: (1) continuous or periodical ejaculation prior to or within two minutes of vaginal penetration; (2) continuous or periodical loss of control over ejaculation; (3) psychological distress in man for ejaculatory dysfunction; (4) continuous or periodical inability to deliver sexual satisfaction of sexual partner; (5) the presence of conflicts between partners due to existing copulative disorders [10].

Epidemiology. In the Global Study of Sexual Attitudes and Behaviors (GSSAB), including 13 618 men from 29 countries, accelerated ejaculation was also marked on the average every third respondent. The highest prevalence of PE (30.5%) was registered in the countries of South-East Asia and the lowest (12.4%) in the countries of the Middle East [2].

According to a survey on the Premature Ejaculation Prevalence and Attitudes (PEPA), conducted in the U. S., Germany and Italy among 12 133 men aged from 18 to 70 years, the total prevalence of PE was close to 23% [11]. Thus, the number of PE patients in these countries was approximately the same and amounted to 24; 20.3 and 20%, respectively, which contradicts the results of GSSAB.

In Russia were noted 32.6% of men with PE. The overall incidence of primary and secondary forms of PE in the male Russian population surveyed corresponded to 20.1% and 7.6%, respectively; i. e., the total accelerated ejaculation frequency was 27.7%. In 15% of cases, according to history, was recorded ejaculatio ante portas, and in 85% of cases occurred ejaculatio praecox. Thus, the occurrence of these options of accelerated ejaculation in the population studied was 4.2% and 23.6%, respectively. Among the 251 surveyed with

primary form of PE ejaculatio ante portas and ejaculatio praecox were ascertained in 17.1% and 82.9% of men, respectively. In 95 respondents with secondary form of the disease and prepenetration intracoital options of ejaculatory disorders were observed in 9.5% and 90.5% of cases, respectively [10].

According to Kulchavenya Y. V. et al. (2010), who surveyed 543 men aged from 17 to 73 years living in the southern regions of Siberia and the Russian Federation, the prevalence of PE was 33.5% and 43.6%, respectively [10].

Montorsi F. (2005), who had conducted a meta-analysis of epidemiological data, concluded that the prevalence of PE significantly varies, depending on ethnic, demographic, and geographic origins of the respondents [2].

Etiopathogenesis. Many theories have been suggested, including that PE was the result of masturbating quickly during adolescence to avoid being caught by an adult, of performance anxiety, of an unresolved Oedipal conflict, of passive-aggressiveness, and having too little sex — but there is little evidence to support any of these theories [18]. Several physiological mechanisms have been hypothesized to contribute to causing premature ejaculation including serotonin receptors, a genetic predisposition, elevated penile sensitivity, and nerve conduction atypicalities [8]. The nucleus paragiganto-cellularis of the brain has been identified as involved in ejaculatory control [12]. http://en.wikipedia.org/wiki/Premature_ejaculation — cite_note-9 Scientists have long suspected a genetic link to certain forms of PE. In one study, 91% percent of men who have had PE for their entire lives also had a first-relative with lifelong PE. Other researchers have noted that men who have PE have a faster neurological response in the pelvic muscles. PE may be caused by prostatitishttp://en.wikipedia.org/wiki/Premature_ejaculation — cite_note-Althof2010–10 or as a drug side effect [1]. Along with that, Freudian theory postulated that rapid ejaculation was a symptom of underlying neurosis. It stated that the man suffers unconscious hostility toward women, so he ejaculates rapidly, which satisfies him but frustrates his lover, who is unlikely to experience orgasm that quickly [6].

Present-day theories of PE etiology focus on the combination and interaction of psychological and organic factors. Although, to date, no single etiological theory has universal acceptance, there is a general shift toward the acceptance of the condition as one in which psychologically mediated processes exacerbate an underlying organic component. The identification of a common cause of PE is nevertheless complicated by the fact that most researchers differentiate between two forms of PE: a primary (lifelong) and secondary (acquired) form, which may have distinct etiologies [2].

Classification. It is important for physician to distinguish PE as a "complaint" versus PE as a "syndrome" [13]. About 20 years ago, PE was classified into "lifelong PE" and "acquired PE". Recently, a new classification of PE was proposed based on controlled clinical and epidemiological stopwatch studies, http://en.wikipedia.org/wiki/Premature_ejaculation — cite_note-ReferenceA-19 and it included two other PE syn-

dromes: "natural variable PE" and "premature-like ejaculatory dysfunction" [15].

Diagnosis.

Recently, an updated proposal for PE definition and diagnosis has been provided after the second consultation on sexual dysfunctions [14]. PE has been defined according to three essential criteria: (i) brief ejaculatory latency; (ii) loss of control; and (iii) psychological distress in the patients and/or partner. Ejaculatory latency of 2 minutes or less may qualify a man for the diagnosis, which should include consistent inability to delay or control ejaculation, and marked distress about the condition [16].

Questionnaire measures or brief symptom scales are available for assessing PE; however, the majority are not well standardized to date. In 2004, Yuan et al. presented the Chinese Index of Premature Ejaculation (CIPE-5) and described it as a useful method for the evaluation of sexual function of patients with PE [17].

In the opinion of experts ISSM (2010), described "differences" can not be associated with objective epidemiological differences, and the diagnostic criteria that are used by researchers in detection of the disease. More precisely — with the lack of a unified system of diagnosis of PE. Therefore, the highest priority in similar activities is appropriate evaluation criteria discussed ejaculatory disorder codes definition of PE. In 2008, Patrick D. L. et al. developed profile "Profile of premature ejaculation" (PEP), which contains 4 questions. The authors of the questionnaire set the task to characterize patients 4 accelerated ejaculation recognized criteria listed in DSM–IV (the degree of control over ejaculation, sexual satisfaction, concern about the state of their male sexual function and the presence of interpersonal complications between the partners) [16]. Importantly, experts ISSM established a significant correlation between the total score and the duration of PEP coitus. However, due to the lack of clear boundaries rules applying this questionnaire in the diagnosis of primary rapid ejaculation considered unwise. Similar views on the PEP holds and the European Association of Urology (EAU). However, given the questionnaire, along with PEDT, recommended for the quantitative assessment of the impact of the original form of the treatment of PE. There are individual literary references to Arabic and Chinese indices rapid ejaculation (AIPE and CIPE), which indicates a lack of limited validity and diagnostic unit. There are literary references to Arabic and Chinese indices rapid ejaculation (AIPE and CIPE), which indicates a lack of limited validity and diagnostic sensitivity [1].

Patients expect clinicians to inquire about their sexual health. Often patients are too embarrassed, shy, inquiry into sexual health gives patients permission to discuss their sexual concerns and also screens for associated health risks (e. g., cardiovascular risk and ED) [1].

Recommended and optional questions to establish the diagnosis of PE and direct treatment (ISSM, 2010) [1]:

Recommended questions for diagnosis:

— What is the time between penetration and ejaculation?

— Can you delay ejaculation?

— Do you feel bothered, annoyed, and/or frustrated by your premature ejaculation?

Optional questions to differentiate lifelong and acquired PE:

— When did you first experience premature ejaculation?

— Have you experienced premature ejaculation since your first sexual experience on every/almost every attempt and with every partner?

Optional questions to assess erectile function:

— Is your erection hard enough to penetrate?

— Do you have difficulty in maintaining your erection until you ejaculate during intercourse?

— Do you ever rush intercourse to prevent loss of your erection?

— Optional questions to assess relationship impact:

— How upset is your partner with your premature ejaculation?

— Does your partner avoid sexual intercourse?

— Is your premature ejaculation affecting your overall relationship?

— Optional question for previous treatment

— Have you received any treatment for your premature ejaculation previously?

Optional questions for impact on quality of life:

— Do you avoid sexual intercourse because of embarrassment?

— Do you feel anxious, depressed, or embarrassed because of your premature ejaculation?

Since patient self-report is the determining factor in treatment seeking and satisfaction, it has been recommended that self-estimation by the patient and partner of ejaculatory latency be routinely assessed in clinical practice when PE is present. The PEP or IPE are currently the preferred questionnaire measures for assessing PE, particularly in the context of monitoring responsiveness to treatment.

For lifelong PE, a physical examination is highly advisable but not mandatory and should be conducted in most if not all patients. For acquired PE a targeted physical examination is mandatory to assess for associated/causal diseases such as ED, thyroid dysfunction, or prostatitis [1].

The Russian Criteria for premature ejaculation (CriPE), in which the term "ejaculation" means the release of seminal fluid (sperm) from the external opening of the urethra, accompanied by voluptuous sensations (orgasm), has the following questions describing sexual function for the last 4 weeks [10]:

1. Does your ejaculation occur intermittently or continuously until the introduction of the penis into the vagina or less than 2 minutes from the initiation of sexual intercourse?

2. Do you note persistent or periodical lack of control over ejaculation?

3. Do you feel anxious of your state of ejaculatory function?

4. Do you feel persistent or periodical inability to deliver sexual satisfaction for sexual partner?

5. Is your disturbed premature ejaculation affecting your relationship with sexual partner?

It should be noted that for a simplified assessment of treatment modalities have been successfully applied certain one-item questionnaires, including a question about the overall treatment satisfaction and characterization of impressions resulting from changes after therapy.

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Features of change of lipid spectrum of blood serum at prolonged pregnancy

Abstract: In women with prolonged post-term pregnancy and notes mixed form dislipoproteinemia characterized by hypertriglyceridemia, hypercholesterolemia, and increased levels of cholesterol in lipoproteins of very low

and low density, due to lower his level of HDL cholesterol, causing a high risk of atherogenic with a forecast for the development of placental insufficiency.

Keywords: Prolonged pregnancy, lipid metabolism, placental insufficiency.

Post-term pregnancy (PB) is a problem of great scientific and practical interest in obstetrics. The urgency is due to its large number of complications in childbirth, a high percentage of rodorazreshayuschih operations, high prenatal mortality rate [3; 4].

Prolonged pregnancy prep resents a significant threat to the fetus and is characterized by a high rate of complications for mother and newborn. Prenatal mortality in true Prolonged pregnancy and belated delivery is 3–4 times higher than that at timely delivery (3, 6). The frequency of complications in childbirth and neonatal period in children is directly proportional term Prolonged pregnancy. Many issues of this disease have not yet been resolved. All midwives recognize the need to prevent post-term birth, but their number remains high. These wide variations are explained by the lack of consensus about the beginning Prolonged pregnancy and the difficulty in determining the true duration of pregnancy [1, 6]. So far, there is not even a clear definition of the concept of prolonged pregnancy is not completely understood etiology, pathogenesis and diagnosis of this form of disease, there is no single point of view on the tactics of pregnancy and childbirth.

The reasons are numerous prolonged pregnancies. The main etiological factors leading to prolonged pregnancy are functional changes in the central nervous system (CNS), autonomic and endocrine disorders in pregnant [1; 3].

A certain role in this pathology play changes in the uterus (inflammatory, degenerative, and others.), Reducing its excitability and contractile activity.

The study of membrane pathology broader direction of modern obstetrics. Lipid biosloy, part of cell membranes, determine their mechanical and physical — chemical properties, simulates the activity of membrane receptors. Changing the qualitative and quantitative composition of phospholipids of biological membranes, undoubtedly affect the functional activity of the cells. Intensification of lipid peroxidation (LPO), disintegrating the structural integrity of the membrane structures in the cell, is influenced by a variety of damaging factors and is a universal mechanism of the reaction in the cell damaging effects.

There are numerous publications on the study of the processes of lipid per oxidation and antioxidant defense system during normal and pathological pregnancies occurring. However, Prolonged pregnancy these changes are not well understood. In this regard, taking into account not breaking the connection with the occurrence of pregnancy Prolonged pregnancy metabolic disorders in the homeostasis, lipid per oxidation process changes can be regarded as one of the links in the multi pathological process.

Objective: To study the changes of lipid metabolism during prolonged pregnancy.

Materials and methods:

The work in the clinic of obstetrics and gynecology of the Bukhara Medical Institute at the City Maternity Hospital № 1 and in the maternity ward of the city hospital of Bukhara.

There were examined 200 pregnant control group (I) consisted of 50 pregnant women with full-term period, with sustained 75 (II group) and 75 with post-term pregnancy (III group). We observed the women were aged 18 to 37 years old. The highest percentage of pregnant women and mothers were aged 18–25let; 28.3% puerperal control group, 26% — II group, 16,6% — III group.

The vast majority of pregnant women surveyed were female with the number of births 1–2, only 14.4% had 2 or more parity. In women with prolonged post-term pregnancy, and often identified extra genital diseases. So, if women with full-term pregnancy revealed only mild anemia 60% of the patients, when prolonged pregnancy anemia in addition to medium and mild identified obesity (26.7%), pathology of the hepato — biliary system (10.6%), endemic goiter (16%). When prolonged pregnancy rate increased even more extra genital diseases: obesity (29.3%), pathology, hepato-biliary system (17.3%), endemic goiter (50%) patients.

Consequently, pregnant women surveyed mainly detected metabolic disease, which undoubtedly affects the course of metabolic processes.

One of the manifestations of a dyslipidemia. According to the recommendations of the Russian [9] we measured serum total cholesterol (TC), cholesterol transport in its forms: LDL cholesterol (LDL) and high (HDL) density, triglycerides (TG) on the automated biochemical processor "Autohumolizer F1" ("Human", Germany) c using a special reagent kits. Based on these data, calculated atherogenic ratio (CA). (2).

Results and discussion.

We have all studied groups of pregnant women was defined triglycerides in the blood serum.

Studies in this regard studies have shown the development of hypertriglyceridemia (TG) for prolonged pregnancy. Contents TG in the serum of women with prolonged pregnancy increased to $1{,}61 \pm 0{,}11$ mmol/l, with post-term — up to $1{,}68 \pm 0{,}12$ mmol/l, at a value of this indicator in women with full-term pregnancy 1.37 0.05 mmol/l. From the data, if the level of triglycerides in the prolonged pregnancy has a tendency to increase, when it is prolonged pregnancy significantly increases by 1.23 (P <0.05) times. The obtained results are consistent with a high incidence of obesity and diseases of the hepatobiliary system, as well as diffuse goiter. For these pathologies characterized by the development of hypertriglyceridemia, however, it should be noted that for these types of pathologies characterized by 4–5 dyslipoproteinemia.

Therefore, in the future, we studied the levels of total cholesterol and its transport forms with calculation atherogenic

factor. Studies in this regard studies have shown a tendency to increase the level of total cholesterol and VLDL cholesterol in structure, whereas the LDL cholesterol was significantly increased by 1.3 (P <0.05) times. HDL cholesterol was significantly reduced by 1.36 (P <0.05) times the value of women with full-term pregnancy. Women with post-term pregnancy total cholesterol, VLDL cholesterol and LDL cholesterol were not significantly different from the values of the indicators of women with full-term pregnancy. Only in HDL cholesterol was significantly decreased in 1.63 (P <0.01) times. It must be said that if the content of total cholesterol in serum of women with prolonged term pregnancy and were not significantly different, the cholesterol in VLDL and LDL levels were slightly lower than those of women with prolonged pregnancy. Apparently, that was associated with an increased use of cholesterol for the synthesis of progesterone in women with post-term pregnancy. On the other hand, when perenashivanie notes increased use of cholesterol fruit.

The findings of our research have shown that as perenashivanie pregnancy progressively increase the risk of atherogenesis. Thus, the figure for women with prolonged and post-term pregnancy significantly increased from 3,29 ± 0,19 to 5,04 ± 0,33 and 6,07 ± 0,52, respectively. These rates exceed the regulatory value of 1.53 (P <0.05) and 1.84 (P <0.01) times, respectively, in prolonged and prolonged pregnancy. This was mainly due to the marked decrease in HDL cholesterol. Therefore, in women with post-term pregnancy, and prolonged notes mixed form dyslipoproteinemia characterized by hypertriglyceridemia, hypercholesterolemia, and increased levels of cholesterol and lipoproteins of very low and low density, due to lower his level of HDL cholesterol, causing a high risk of atherogenic.

The lipid metabolism disorders, great importance is attached to the peroxide modification of lipoproteins, primarily LDL, obviously, due to the peculiarities of their lipid composition. Peroxide-modified LP may influence the development of steroid hormone imbalances in several ways: by virtue of their cytotoxicity damaging endothelial cover of the arteries, stimulate monocyte chemotaxis into the intima, delay the migration of macrophages of the intima and stimulate the formation of leukotrienes macrophages. A combined contribution of these processes may play an important role in the development of placental insufficiency and disturbance of the reception process. Peroxidation undergoes modification as VLDL and HDL, which also increases their atherogenic properties by changing microhemodynamics in fetoplacental system.

Thus, women with prolonged post-term pregnancy, and notes mixed form dyslipoproteinemia characterized by hypertriglyceridemia; hypercholesterolemia and increased cholesterol in the lipoproteins are very low and low density, due to lower level of HDL cholesterol, causing a high risk of atherogenic forecast on the development of placental insufficiency.

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Assessment of fetoplacental system and its correction at term pregnancy

Abstract: Based on the results of US studies conducted before delivery, reducing the severity of the functional activity of the fetus, as well as the data monitoring BFN in integrated antenatal therapy to evaluate its effectiveness, it is possible to predict complications during childbirth, its outcome for the fetus and the basis on which to develop a rational obstetric tactics.

Keywords: Prolonged pregnancy, placental insufficiency, hofitol.

Prolonged pregnancy (PB) is a problem of great scientific and practical interest in obstetrics. The urgency is due to its large number of complications in childbirth, a high percentage of childbirth operations, high prenatal mortality [1; 2; 4; 6].

Some importance in the etiology of PB has a state of the placenta and fetus. A disturbance in the placental system is one of the reasons for the late emergence of labor and its anomalies. Placental insufficiency at Prolonged pregnancy occurs in one in three women and 70% of the fruit to endure chronic hypoxia [4; 6; 7; 8].

Pathology of the uterine-placental circulation is characterized by three important points: violation of blood flow in the intervillous space (IMP), obstruction of outflow of blood from him and changes of rheological and coagulation properties of the mother's blood. In parallel, there is a change in the circulation of the fruit of the placenta. Slow blood flow in utero-placental pool leads to a hypercoagulable state in microvascular chorionic due to increased blood flow entering the tissue thromboplastin and increased aggregation of blood cells resulting in growing ICE syndrome [2; 4; 6; 8].

So a number of studies found that when true Prolonged pregnancy placenta decrease in glycogen content of lipids, RNA, the activity of a number of redox enzymes, accumulation in some parts of acid mucopolysaccharides, activation of alkaline phosphates' (CHF) [6; 7; 8]. Reduction of lipids in the tissues of the placenta is accompanied by a simultaneous decrease in lipid peroxidation (LPO). Formed during lipid peroxidation toxic radicals have a damaging effect not only on lipids and proteins in the cell membrane, thereby contributing to the development of enzymatic and hormonal placental insufficiency. In addition, the violation of lipid and protein metabolism significantly alters the immune response, synthesis of hormones and prostaglandins.

Neonatal morbidity at PB reaches 29%, and prenatal mortality — 19‰, which is much higher than in full-term pregnancy. This is connected with low resistance to hypoxia fetus due to the greater maturity of the brain and with decreasing oxygen admission thereto due to morphological changes in the placenta in PB.

Objective: Evaluating the effectiveness of treatment of placental insufficiency in prolonged pregnancy.

Materials and methods

A total of 200 women studied. Group I consisted of 50 pregnant women with physiological pregnancy. Group II 75 patients with gestational age over 41 weeks and Group III 75 pregnancies of more than 42 weeks of gestation.

All pregnant women who were present before birth in the hospital conducted clinical and laboratory research. Assessment of fetoplacental complex (FPC) carried out on the basis of echo graphic research and unstressed test proposed IS Sidirovoy (2000), Which is a five-point scale of the studied traits. Total index of 5 points indicates the absence of signs of FPN. 4-points of a sign compensated FPI, 3 points — sub compensated, decompensate 2 points, 1 point — the presence of a critical form of FPN.

Results and discussion.

In determining the fetal biophysical profile, we paid attention to the following information:

— Feto metric;
— Fetal heart rate;
— Respiratory fetal movement;
— The motor activity of the fetus;
— The tone of the fetus;
— The volume of amniotic fluid.

Functional assessment of the FPS carried out in 150 pregnant women at 41–42 weeks of gestation or more. A marked increase of the relationship between gestational age and an increase in the number of observations with echo graphic signs of violations morph functional fetoplacental system. In the study of fetal biophysical profile was revealed significant violations of the status of the fetus at term pregnancy.

In the pathogenesis of disease in the FPC prolonged pregnancy and the development of labor is one of the leading unit's takes violations of the structural — functional properties of cell membranes, in particular, changes in the ratio of phospholipids and cholesterol. The accumulation of cholesterol in membranes, disrupting normal packing lipid bilipidnom layer promotes disruption of its permeability to calcium, which leads to an overload of cells and they play a role in the pathogenesis of placental insufficiency.

Very low density lipoproteins and low density, as atherogenic substances stimulate the excessive accumulation of lipids in the endothelium with the subsequent change in the lumen of blood vessels, tissue ischemia. HDL, on the contrary, has a vital role in the elimination of tissue cholesterol. The reduction of VLDL, belonging to the most active substrates to form lipid peroxides should reduce activity of lipid peroxidation. The results obtained in our studies of lipid metabolism changes, which had a direct correlation with the performance of the index tells of the final signs of varying severity FPN by ultrasound scanning, as criteria for targeted corrective therapy in pregnant women studied groups.

The drug of choice was hofitol that French laboratory developed Rosa-Phytopharma. Hofitol is a purified extract from the juice of fresh leaves of an artichoke field (Cynara geolymus). According to the chemical composition it is a mixture kafeolovoy and quinic acids, flavonoids, sekviterpenlaktona, inulin tsinarin and ascorbic acid, vitamin B1, and B12, carotene.

Pharmacologically-sided effects of the drug. Hofitol increases protein synthesis due to the normalization of the thiol-disulfide system and increasing the content of sulfhydryl groups. Due choleretic enhance elimination and reduction of cholesterol synthesis in the liver hofitol helps reduce cholesterol levels in the blood. Due to its unique chemical composition and high content of flavonoids, hofitol has cytoprotective effect, normalizes vascular permeability, is a powerful antioxidant and antihypoxant, and has a pronounced choler tic effect. These properties Chophytol formed the basis for research on the effectiveness of its application in the post-term pregnancy in order to correct placental insufficiency and improve perinatal outcome in this disease.

In addition to the complex metabolic therapy pregnant test groups received 2.5–5.0 mg of hofitol deaning solution a day for 3–4 days at 41 weeks gestation. In order to evaluate the effectiveness of therapy conducted control tests BFN after inclusion in a comprehensive ongoing drug therapy Chophytol were obtained reliable data indicators that point to improve the final assessment and, accordingly, the functional activity of the fetus. It increases the number of cases we obtain the final index score 5–4 from 60% to 88% in the second group, and in group 3, the figure rose from 17.3% to 41.2% compared against 28 and 23.9%, respectively.

Sub compensated FPI according to the final index was detected after treatment in group 2 at 8%, and in group 3 in 41.3% of pregnant women, asthma Form 4% in Q2 and 17.3% in group 3, respectively. We have identified the improvement of blood circulation in the mother-placenta-fetus under the influence of the therapy is undoubtedly a positive factor and is of fundamental importance in the choice of tactics of pregnancy.

Certainly, it affects the strategy of the timing of induction of labor and its outcome. Ultimate tactics of births to women in violation of the FPS is determined individually, taking into account the age of pregnant women during the previous delivery, the severity of obstetric and gynecological history, obstetric pathology, pregnancy and delivery parity, gestational age and obstetric situations arising during the pregnancy and compared with our results study.

Thus, the testimony to the determination of the functional state of fetoplacental complex using echo graphic study is the lack of spontaneous onset of labor at 41 weeks gestation or more, carrying out dynamic control over the ongoing changes of the functional state of the fetus during the treatment and evaluation of the effectiveness of the therapy.

The research allow to recommend for use in corrective therapy Chophytol patients with post-term pregnancy in identifying sub compensated and decompensate forms of placental insufficiency. Turning Hofitol improves the efficiency of treatment in violation of fetoplacental blood flow and utero- platsental and fetal hypoxia.

Based on the results of US studies conducted before delivery, reducing the severity of the functional activity of the fetus, as well as the data obtained in the course of monitoring BFN comprehensive antenatal care to assess its effectiveness, it is possible to predict complications during childbirth, its outcome for the fetus and the basis on which to develop rational obstetric tactics.

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Pathogenetic role of immune reactivity of neurotropic auto antibodies and neural mediators at symptomatic and idiopathic epilepsy

Abstract: We detected intensification of immune reactivity represented by a change of neurotropic antibodies level to proteins and receptors of neural mediators participating in epilepsy genesis and formation of aberrant plasticity in patients with symptomatic and idiopathic epilepsy.

Keywords: epilepsy, pathogenesis, immune reactivity.

Topicality. Recently formed notions of continuous unity of the functions main integrative systems of organism such central nerve system and immune one should serve to be a new impulse to the study of epilepsy immune pathogenesis. On the basis of the data about neural immune interaction new scientific disciplines were formed. These are neural immunology and neural immune pathology [2; 5].

In the modern time, due to researchers who studied immune neural endocrine regulation, it is known that many natural auto antibodies (AB) participate in the regulation of organism general homeostasis and they are reversibly interact with antigens (AG) of own organism. Natural auto antibodies are synthesized in organism of healthy people since fetal period and for the whole life [3, 8].

As a result healthy people of various age and sex have only minimal differences (immune fingerprints) in serum content of some AB. It is established that production, of AB with various specificities is regulated (according to the principle of feedback) by the amount of target-antigens [4]. That proves the presence of powerful mechanisms of physiologic (normal) level of production and secretion of various variants of AB [6]. Part of AB does not have certain organic aiming and interact with AG present everywhere (collagen, DNA, cytochromes, etc). Other part interacts with organ specific antigens (neural specific proteins, organ specific iso-enzymes, insulin, etc.) The aforesaid is relevant to AB interacting with proteins of nerve cells or neurotropic AB (NAAB).

Patients with diseases of nerve system often have alterations of serum content of NAAB. Researchers mostly pay attention to situations characterized by a growth of certain specific NAAB amount which is understood as a pathologic auto immune aggression. Though from the point of view of notions of AB regulatory functions, disorders of serum correlations for various kinds of NAAB can have great significance, and the rise of AB production can have not only pathologic, but also adaptive-compensatory importance [6].

Recently a great attention is paid to participation of common neural immunologic net in the genesis of many diseases [3; 7]. Immunologic aspects of epilepsy are widely discussed in modern literature [2; 8].

Pathogenetic role and diagnostic importance of AB to proteins of brain and receptors of neural mediators demand further study.

Aim of the research: is to study immune reactivity of neurotropic auto antibodies and neural mediators in case of symptomatic and idiopathic epilepsy.

Materials and methods of the research: the level of AAB to neurotropic proteins and neural mediators was determined in blood serum of 59 patients with epilepsy. For the performance of immunologic analysis we formed the following clinical groups: I group — 17 patients with idiopathic epilepsy; II group — 42 patients with symptomatic epilepsy.

16 clinically healthy people served to be the control.

All patients underwent a thorough preliminary anamnesis and clinical selection, which was performed by means of stratification randomization method using criteria of inclusion and exclusion. Criteria of patients' inclusion into study: adults, epileptic seizures at the moment of hospitalization or in anamnesis, idiopathic and symptomatic epilepsy. Criteria of exclusion: children, cryptogenic epilepsy, pseudo epileptic attacks, psychogenic reactions, conversion attacks (hysteria).

Quantitative definition of serum immune reactivity of antibodies to receptors of neural mediators (glutamate, GABA, dopamine, serotonin and cholin receptors) and neural specific proteins (NF200, Gfap, S100 and CBP) was performed with the help of solid-phase immune enzyme method ELI-N-Test and same name test-sets produced by MIS «Immuneculus» (Russia). AAB Immune reactivity value from 80 to 140 R. U. was considered to be normal, and immune reactivity index AB1/AIAB2 from 0.8 to 1.2 [9, 16].

Analysis of the achieved values was performed with the help of «SPSS for Windows» and «STATISTICA» Microsoft Excel with processing of variation statistic methods. Reliability of the achieved results was evaluated by pair method according to Student's t-criterion. Differences were considered to be reliable with $p < 0.05$.

Results of the research: Results of the performed researches demonstrated that clinically healthy people (control group) had natural AAB to the studied neurotropic proteins which in certain limited titers were normal components of

blood serum of almost healthy people. In relation to that, in compliance to the recommendations of test systems' manufacturers it was indicated as "an inner standard serum".

In the evaluation of the results of immunologic study it was detected that both groups of patients differed from the control group, both in the level and degree of immunologic values distribution.

For the revealing possible pathogenetic peculiarities we performed analysis of neural immune Interrelations in both groups in comparison with the control one. As a result it was determined, that in the group of patients with SE the levels of AAB to all neural specific proteins reliably exceed the values not only of "inner standard serum", but also analogue values of patients with IE. So, the highest AAB among the studied ones in both groups was AAB to S100, and in the patients with SE that value exceeded normal values 1.6 times (P<0.01), and in the patients with IE 1.9 times (P<0.05). At the same time there was reliable rise of AAB in the group with IE in comparison with the group with SE (150.3±11.8 r. u. versus 124.1±4.6 r. u. P<0.05). That kind of AAB rise to protein S100, which is Ca-conjugating protein, can prove the hypothesis that one of the parts of epileptic seizures pathogenesis is increase of neuron membrane permeability for Ca2+ ions with increase of its concentration in intercellular space.

Analysis of AAB level to protein NF200 also showed reliable rise of its titers in the patients of the both groups (average 1.7 times with SE and 1.3 times with IE correspondingly, P<0.05). At the same time there was notable reliable prevailing of AAB level to NF200 in the patients with SE (121.8±8.2 r. u. versus 97.6±8.9 r. u. P<0.05), indicating excessive plasticity, evidently promoting preserving of more stable pathologic links of epileptic system in the patients with SE.

The level of serum AAB to neural specific protein CBP also reliably exceeded the values of "Inner standard serum" in both groups (average 1.7 times in the patients with SE (P<0.01) and 1.3 times in the patients with IE correspondingly, (P<0.05)) with simultaneous exceed of these values in the patients with SE average 1.3 times in comparison with the patients with IE (102.4±8.0 r. u. versus 78.8±7.7 r. u., P<0.05).

The level of serum AAB to GFAP was approximately at the same level with AAB to CBP and in patients with SE it was 102.5±8.3 r. u., and in the patients with IE — 80.4±7.2 r. u., reliably exceeding the values of the control group average 1.8 (P<0.01) and 1.4 times (P<0.05) correspondingly. Comparative analysis between the groups also revealed statistically significant rise of AAB to CBP among the patients with SE in comparison with the patients with IE 1.3 times (P<0.05).

As a result of that analysis we revealed positive correlation link between the duration of epilepsy and the levels of AAB to all studied neurotropic proteins, the most expressed one in the patients with SE in comparison with the patients with IE. Similar direct link was determined between the level of AAB and the frequency of seizures in the checked patients. And that interrelation did not depend on etiologic factor of epilepsy.

Thus, clinical-immunologic analysis revealed accurate rule of antibodies content to neurotropic proteins dependently on the etiology, term and progress of SE and IE. The rule of detected rise of neurotropic AAB in close relationship with each other and frequency of seizures was a proof of deterioration of neural immune misregulation with the growing severity of clinical progress in the patients with epilepsy.

Disorder of permeability of brain immune barriers leads to formation of AAB to neurotropic proteins, intensifying the deficiency of trophic supply to brain and progressing of damaging processes. Differentiation of the achieved results dependently on the form of epilepsy revealed that the greatest sensitizing of immune competent cells to neural specific antigens NF200, GFAP and CBP was observed in cases of SE, and it, in its turn, was a reliable reflection of a destructive process and pathologic permeability of HEB in this group of the patients.

In the correlation of the values of the patients with IE and SE with the data of "inner standard serum" we detected reliable one-direction rise of an individual level of serum immune reactivity of AAB to the receptors of all studied neural mediators.

In our opinion, quite interesting data were achieved in the examined patients in relation to the level of AAB to cholin receptors. Particularly, in the group of patients with IE the AAB level to that neural mediator was 162.9±5.3 r. u., 4.8 times exceeding the values of "inner standard serum" (P<0.01), and 3.5 times the similar values in the patients with symptomatic epilepsy (46.7±4.9 r. u., P<0.05).

The further analysis of neural immune interrelations in the patients with epilepsy revealed a reliable high level of AAB to glutamate and voltage-dependent Ca channels among the other studied AAB. Thus, in the group of patients with SE these values were equal to 73.8±5.3 and 98.5±7.0 r. u. correspondingly, exceeding the values of "inner standard serum" average 1.3–2 times (P<0.05), and in the group with IE — 98.1±8.8 and 78.6±6.4 r. u. correspondingly, exceeding the normal values average 1.7–2 times (P<0.01). In the patients with IE we revealed a reliable rise of AAB to glutamate not only in relation to the control values, but also those of the patients with SE (98.1±8.8 and 73.8±5.3 r. u. correspondingly, P<0.05). That significant rise of AAB to glutamate among the patients of both groups proves actual disorders of excitement processes as a result of membrane neural-transmitter receptor and mechanisms of glutamate excite toxicity. At the same time the results of the performed immunologic studies prove, that more significant disorders of glutamate ergic system were noted in cases of IE. The achieved data were interpreted as a proof of significant misbalance in glutamate ergic system mostly in the patients with IE, and it was trigger moment for the start of neuronal sprouting process.

The levels of AAB to GABA, dopamine and serotonin in the examined groups also exceeded normal values and were approximately at the same level. And the reliable differences

from the "inner standard serum" in that case were detected only in the patients with IE (AAB GABA 71.8±4.7 r.u., P<0.05; AAB DA 74.4±4.2, P<0.01; AAB SER 76.9±3.4 r.u., P<0.05). Among the examined patients with SE reliable differences were detected only in relation to AAB to dopamine (62.6±5.0 r.u., P<0.05).

High level of auto antibodies to GABA is the proof of disorders in the work of GABA-ergic system, intensifying neurotoxic effect of glutamate on the one hand, and inhibiting structures of anti-epileptic system on the other (Gusev Y.I., Gekht A.B., 2009). In particular, reliable rise of AAB to this neurotransmitter in the patients with idiopathic epilepsy can prove deep misbalance in glutamate-ergic system and expressed exhaustion of GABA-ergic system in that group of the patients, and it serves to be a trigger for the processes of neuronal sprouting. The presence of high levels of AAB to dopamine and serotonin in the patients with IE and a reliable difference from the values of "inner standard serum" proves a close link of glutamate-ergic system with the system of biogenic amines, misregulation of which leads to destructive effect on neurons and has pro-epileptic effect. In that case that kind of correlation of AAB can be interpreted as a proof of expressed auto immune reaction from the side of nerve tissue, which, in its turn, promotes maintenance of pathologic epileptic system in the patients with IE.

Thus, the rise of AAB to ligand-binding site of neural mediators' receptors (Glu-R, GABA-R, Dop-R, Ser-R and Chol-R) indicates changes in the corresponding systems of neurons. The higher serum level of AAB to receptors of neural mediators can indicate the presence of various mechanisms of neural mediation and neural plasticity realization in the patients with IE and SE.

Conclusion. The total sum of the achieved data, relevant to immunologic aspect, testify that inadequate reaction of immune system can lead to formation of pathologic convulsive activity. In other words, immune pathologic mechanisms, including those which are manifested by abnormal alterations in the production and serum content of neurotropic AAB, are involved to epilepsy pathogenesis.

One of the leading mechanisms of pathogenesis of epilepsy is complex reconstruction of neural-immune interrelations, manifested by one-direction rise of the level of auto antibodies to neural specific proteins S100, GFAP, NF-200, CBP and neural mediators glutamate, GABA, dopamine, serotonin and voltage-dependent Ca channel. And the key part in the pathogenesis of idiopathic epilepsy is neural mediator misbalance, and in the pathogenesis of symptomatic one — rise of AAB level to GFAP and CBP.

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Prevention of polio, results and achievements

Abstract: Regularly by independent experts of the World Health Organization, evaluates the quality of immunization and surveillance for acute flaccid paralysis in the Republic of Uzbekistan.

Due to the high level of immunization coverage against polio, as well as the absence of polio cases during at the appropriate level of surveillance for acute flaccid paralysis, the Republic of Uzbekistan for 12 years, retains the status of a "territory free of wild polio."

Thus, all of the foregoing proves that in Uzbekistan due to proper management of immunization policy managed to eradicate the disease polio.

Keywords: OPV — oral polio vaccine, IPV — inactivated poliovirus vaccine, AFP — acute flaccid paralysis, VAP — vaccine-associated polio, NID — national immunization days, SUB. NDI — up campaign in a particular area.

OPV — oral polio vaccine, IPV — nactivated poliovirus vaccine, AFP — acute flaccid paralysis, VAP — vaccine-associated polio, NID — national immunization days, SUB. NDI- up campaign in a particular area

In the world there are countries in which year after year is maintained circulation of wild poliovirus. Among them there are Afghanistan, Pakistan and Nigeria. In addition, in 2013, after years of epidemic wellbeing became identified cases of polio in Syria, Cameroon, Ethiopia, Somalia, and Kenya. In 2014 to these countries were joined Equatorial Guinea and Iraq. In 2014 in the world laboratory confirmed 358 cases of polio. The main share of these diseases occurs in Pakistan (305 cases). On the second place by incidence is Afghanistan, where laboratory confirmed 28 cases. In third place — Nigeria, where revealed 6 cases. Also on the 5 cases in Somalia, Cameroon and Equatorial Guinea, 2 cases — in Iraq and in one case — in Syria and Ethiopia. As for the new cases, in January 2015 have revealed 8 and laboratory-confirmed 7 cases of polio in Pakistan. The latter case is identified in 17.01.2015. Since 2013, all cases were caused by polio virus type I.

The Republic of Uzbekistan with a population over 30 million people, of whom 2.9 million forms children under 5 years old, bordering states such as Afghanistan, where constantly from year to year are recorded cases of polio, Turkmenistan, Kazakhstan, Tajikistan, where in 2010 there have also been cases of wild poliovirus detection. Therefore, special attention is given to activities in the country to prevent the introduction and spread of the disease in the country.

The main directions of measures to prevent the introduction and spread of polio in Uzbekistan are the constant maintenance of a high level of coverage against polio. This is achieved by carrying out routine (according to the calendar of preventive vaccination) and additional (epidemic indications) immunization, as well as maintaining a high level of surveillance for acute flaccid paralysis (AFP), with mandatory laboratory testing of each patient.

Immunization policy in Uzbekistan is based on the Constitution, the Law of the Republic of Uzbekistan "On protection of republic health", which guaranteed access to free vaccination in the national calendar of preventive vaccinations, as well as epidemic indications.

Results and their discussions

Global polio eradication program in the world goes on, and Uzbekistan has been actively involved in the program of the World Health Organization (WHO) to eradicate polio. Before the start of mass vaccination against polio, in the world sick every year 500 000 children, of whom tens of thousands children have been disabled.

The last outbreak of polio was registered in Uzbekistan in 1993 and 1994, when it was revealed 68 and 117 cases against the background of low routine immunization coverage (46% in 1993), due to poor availability of vaccines. As a result of the implementation of national programs and increase immunization coverage outbreak was over, the last case occurred in 1195 [1, p. 17].

By virtue of started in 1988 on the initiative of WHO mass polio vaccination using the "MECACAR" in 1994 in the country conducted a mass campaigns against polio — National Immunization Days (NDIs) in all regions of the country and Sub-national Immunization Days (SubNDI) in the border 8 regions of the country among children aged 0 to 5 years.

As a result of immunization since 1996 in the Republic there were no cases of diseases caused by wild poliovirus stains.
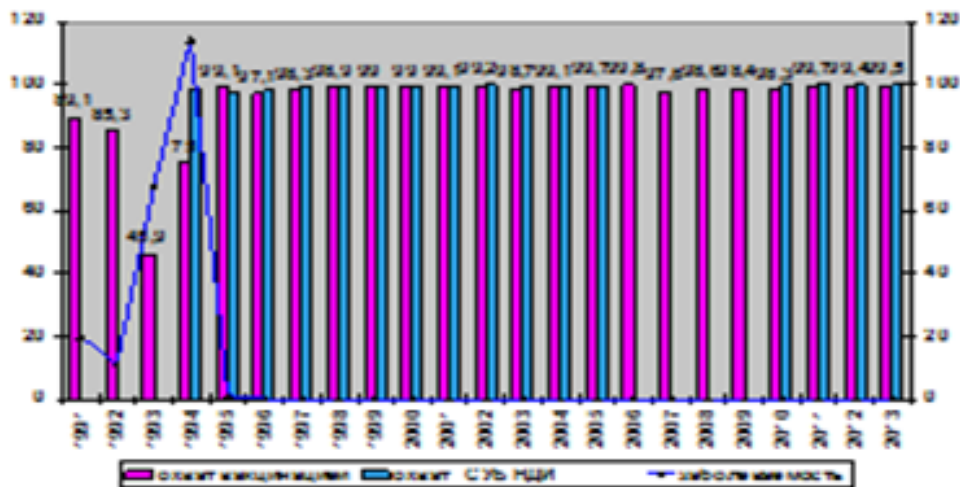

Figure 1. Disease incidence of polio and prophylaxis vaccination coverage
against polio of children in Republic of Uzbekistan in 1991–2003

In 2002, the World Health Organization declared the European Region free from polio. This status has received 51 states, including the Republic of Uzbekistan, which for many years held the status of the territory of the free circulation of wild poliovirus, thanks to systematic efforts to ensure the immunization of children in the national immunization program and functioning of the system of surveillance for acute flaccid paralysis (AFP) [2, p.5].

Given the progress on the 2011–2020 WHO has developed the concept of the Decade of Vaccines, the objectives of which proclaimed:

— Aspiring to free the world from polio.

— Achievements global and regional targets for elimination of diseases.

— Achievements targets for immunization coverage in each region, country and community.

— Development and implementation of new and improved vaccines and technologies.

— Outreaching planned target millennium reduces infant mortality [10, p. 10].

In the Republic of preventive vaccination under the National calendar financed from the state budget. In order to provide a centralized supply of vaccines for the expanded program on immunization in 2004, the Ministry of Finance of the State Budget opened the account number 01841 and from 2006 carried out a centralized allocation of funds; If in 2004, on the on the resources of the state were purchased 54.1% of the vaccines, then from 2011 to the present day, this figure increased to 100.0%.

In connection with insufficient arrival of the vaccination in republic in 1992–1995 was registered outbreak of the poliomyelitis with most amount of diseased in 1994– 114 people.

Table 1. Considering complication of the epidemic situation since 1995 to 2006, in 2010–2013 in republic were conducted NDI and Sub-NDI against poliomyelitis among children under 5 years old.

Years	NDI			SubNDI		
	Subject to	vaccinated	%	Subject to	vaccinated	%
1994	2.566050	2.524226	98,4	–	–	–
1995	3.185818	3.091198	97,0	–	–	–
1996	2.487657	2.443436	98,2	–	–	–
1997	2.469203	2.453749	99,3	–	–	–
1998	2.370345	2.349795	99,1	–	–	–
1999	2.259447	2.251211	99,6	–	–	–
2000	2.157181	2.146142	99,4	443885	442354	99,7
2001	2.056240	2.045442	99,5	447178	445811	99,6
2002	2.011287	2.000831	99,4	455191	454378	99,8
2003	–	–	–	744770	739549	99,3
2004	–	–	–	1.262553	1.257388	99,5
2005	–	–	–	1.118574	1.115508	99,7
2006	–	–	–	–	–	–
2007	–	–	–	–	–	–
2008	–	–	–	–	–	–
2009	–	–	–	–	–	–
2010:0–5 years	2.896447	2.910685	100,5	–	–	–
0–15 years	9.266279	9.283307	100,2			
Surh.0–25years	425086	394787	92,9			
2011	3.096401	3.100614	100,1			
2012	–	–	–	1.942898	1.939347	99,8
2013	–	–	–	1.937809	1.937710	99,9

Polio vaccination convincingly demonstrated its outstanding performance and efficiency. However, epidemiological welfare achieved if immunized at least 95% of children during the first 2 years of life.

If the long-term aim of mass vaccination was to reduce the incidence of childhood infections and mortality, it is now the main task is to maintain that well-being and progress of the epidemic spread it to all new infection. And it is necessary to take into account identified in recent decade's phenomenon of vaccine dependence, which is controlled by the return of infections after the cessation of mass vaccination against the background of zero or sporadic incidence. It has been repeatedly demonstrated in practice: termination of vaccination or even a temporary reduction in their coverage leads to the development of epidemics.

Can be imported wild polioviruses in an area free from polio exists as long as anywhere else in the world, these viruses are circulating. To prevent the spread of infection is necessary to maintain a high level of vaccination coverage against polio, as well as providing high-quality surveillance for polio and AFP.

According to V. B. Seybilya and L. P. Malyshkina [9, pp. 41–44], we can not talk about polio eradication, and about

the elimination of the disease or reduce it to the minimum possible size and the maintenance of this state by continuing mass vaccination of the population.

In an era when there were no vaccines, the disease was of epidemic, leaving children with disabilities. There is reason to believe that defects in the organization of vaccination which resulted in a large number of children are not vaccinated, are a major cause some increase in the incidence of polio, noted in 1961 in the Tashkent city [3, p. 9].

With the introduction of vaccination incidence decreased to some isolated cases. Therefore, it is important to continue to vaccinate the entire child population.

Worldwide polio vaccinations care carried out using two types of vaccines — oral polio vaccine (OPV) and inactivated polio vaccine (IPV). In the 50 years of the last century, scientists have been proposed, these two types of vaccines. Sabin offered live oral polio vaccine (OPV), later named after — Sabin vaccine. In the parallel with him Solk was developed vaccine from a killed virus — called inactivated polio vaccine (IPV). Both vaccines contain the three basis types of polio virus, thus they are both protected from the infection of all variants.

Total calendar child receive 6 doses of polio vaccine (neonatal period 2–5 day from the moment of birth — 1 dose, up to 1 year — 3 doses, 1–2 years — 1 dose and 7 years — 1 dose). It is used polio oral trivalent vaccine composed of attenuated Sabin strains of polio virus 1, 2, 3 types. Manufacturers: "Glazko Smith Kline", Belgium and "Sanofi Pasteur", France.

OPV — oral polio vaccine (OPV) (Sabin's vaccine).

A characteristic feature — if vaccination is created "collective", cascading immunity, that is, the vaccine virus from vaccinated child in the body multiplies, released into the environment and into other children, causing them to "vaccinate" and "revaccinate". This allows creating a large stratum of children with sufficient immunity to polio. The vaccine is of little value and can be used anywhere, so recommended by WHO for mass immunization for polio eradication in the world.

By virtue of mass immunization with the vaccine achieved wide coverage with inoculation and eradicate polio occasion. OPV have another unexpected pleasant property — it able to stimulate the synthesis of interferon in the body (an antiviral agent). Therefore indirectly such vaccination may protect against influenza and other viral respiratory infections. Drip vaccine using a special plastic dropper. It is usually 2 or 4 drops, according to the instructions of the vaccine, and if the child vomits, performs the procedure again. The child is not recommended to feed and water after instillation of a vaccine for about an hour. Total spends 6 cycles instillation, as established immunity to protect against disease. If the intervals between doses were highly elongated, just need to complete the necessary administration according to plan.

Local or general reaction to the introduction of the drug is usually absent, rarely can slightly raise the temperature (up to 37.5 degrees C) for about 5–14 days after vaccination in young children. Usually up to two years may experience a slight dilution of the stool, but it is not a complication after vaccination.

OPV is contraindicated in children with identified severe immunodeficiency, AIDS, or children whom have relatives in the immediate vicinity with similar problems.

Vaccine efficacy is very sensitive to storage conditions, it should be at –20 degrees C and even inaccurate dosing due to the peculiarities of small patients — part of the vaccine is lost in the feces, spit up, and digested in the stomach if swallowed. Due to the fact that children receiving OPV, isolated environment vaccine viruses, it prevents end polio (small mutation probability polio vaccine viruses to pathogenic saved always). A child having severe problems with immunity or health in general, after improper administration of vaccine, or if he has received the vaccine virus by contact from other kids, very rarely, but it may develop a severe complication — vaccine-associated poliomyelitis (VAP), which is very rarely, occurs as the present, with paralysis of the limbs. This condition can develop on the introduction of the first, at least — the second dose of OPV, more often in children with AIDS and severe combined immunodeficiency, also susceptible to the development of VAP and children with malformations of the gastrointestinal tract. In healthy children do not develop this complication. But if there is a risk, it is necessary to minimize it. This is possible with the introduction of the first dose of inactivated vaccine (IPV injection), and the other to inculcate OPV. Then by the time of the introduction of the child will already be sufficient to prevent the development of vaccine-associated polio.

Experience in other countries has shown that the transition to the use of inactivated polio vaccine (IPV) is the best choice. The transition to the use of IPV is logical enough to prevent the circulation of the modified vaccine viruses.

42. Today IPV included in the calendar of vaccinations most European countries, mainly also to eliminate of vaccine-associated poliomyelitis (VAP). The cost of IPV is about ten times higher than OPV.

IPV — inactivated polio vaccine (by Solk).

This is a special individual-dose syringe with clear liquid 0.5 ml, is introduced it is usually up to one and a half years in the thigh, and the older children — in the shoulder. Immediately after the injection, children can eat and drink — restrictions are not available. It is advisable not to rub the injection site, do not expose it to direct sunlight about two days. Bathe your child to walk with him is possible and even necessary. Just avoid crowded places, so as not to catch ARVI and other infections.

The action of the vaccine is as follows — at the site of IPV at the kid body begins to form antibodies that enter the blood and form a common defense. In the application of this vaccine there is no any vaccine-associated polio and it can safely be administered even to children with HIV or other immune deficiencies. Normal reaction is considered to be a local

reaction in the form of swelling and redness, which should not exceed a size of 8 cm, even more rarely there may be a common reaction — short-term and low temperature rise (up to 38 degrees C), the child may be restless at first and second day after vaccination. Rare side effects may be an allergic rash. Any other reactions (nausea, diarrhea, vomiting, fever above 38 degrees C, runny nose, cough, etc.) to vaccination against poliomyelitis have no relationship.

IPV has a many of advantages over the oral polio vaccine. It is safer than OPV, because it does not contain live viruses that could cause VAP. IPV cannot cause adverse reactions in the intestine in the form of intestinal disorders and loose stool, it does not compete with the normal intestinal microflora of the child and does not reduce the resistance of the wall to intestinal infections. Inactivated vaccine is more convenient in practice. It is available in individual sterile packaging, each dose for one child, does not contain preservatives based on salts of mercury — thimerosal. For the formation of sufficient immunity requires the introduction of a 4-dose baby up to two years, instead of five with OPV, which reduces the stress of the child from going to the children's clinic. And most importantly — effective IPV then OPV because more precisely dosed, because the vaccine is given by injection, and drop the child can swallow or vomit. Keep IPV easier. It does not require such demanding conditions, sufficient of a conventional refrigerator, as well as for storage of other vaccines. In practice, the rate of IPV vaccination produces immunity virtually all properly vaccinated children, and after a full course of OPV unformed immunity against certain types of polioviruses remain up to one third of children.

In order to prevent and avoid registration of vaccine-associated polio among children in the country in 2015 plans to introduce the first dose immunization with inactivated polio vaccine in 4 months.

Calendar immunization.

Adopted in 1980, the National Calendar, its revision in 2002 and 2007 and 2013, completed an important phase of modernization vaccination business in Uzbekistan. Laid down in the provisions of these documents conform to WHO recommendations, as set by the vaccine, and in the methods and timing of their introduction. New rules for vaccination and reduction contraindications have significantly improved immunization coverage of children without increasing the incidence of complications. Since the introduction of the new calendar in our country and mass immunization campaigns (NIDs and sub NIDs) against polio in the country made significant progress in the control of vaccine-preventable diseases. Since 1995, the country has not recorded polio caused by wild strain of the virus.

National Immunization Calendar regularly reviewed in light of the introduction of new vaccines and recommendations of the World Health Organization (WHO), focus on continuous improvement of the national immunization schedule based on international best practices, the introduction of new vaccines.

Table 2. – Calendar of preventive vaccinations (SanPin "Immunoprophylaxis of infectious diseases in the Republic of Uzbekistan", 2013, Supplement 2)

Age	Name of vaccinations
1 day	HBV-1
2–5 day	OPV-0 + BCG-1
2 month	OPV-1, Rota-1, penta-1 (DTP Vaccine-1, HBV-2, HIB-1)
3 month	OPV-2, Rota-2, penta-2 (DTP Vaccine-2, HBV-3, HIB-2)
4 month	OPV-3, пента –3 (DTP Vaccine-3, HBV-4, HIB-3)
12 months	MMR-1
16 months	OPV-4, DTP Vaccine-4
6–7 years	MMR-2, OPV-5, DTV-M-5
16 years	DTV-M-6

Table 3. – Calendar of preventive vaccinations (SanPin "Immunoprophylaxis of infectious diseases in the Republic of Uzbekistan", with the changes introduced in 2015)

Age	Name of vaccinations
1 day	HBV-1
2–5 day	BCG-1
2 month	OPV-1, Rota-1, penta-1 (DTP Vaccine-1, HBV-2, HIB-1)+pneumococcus-1
3 month	OPV-2, Rota-2, penta-2 (DTP Vaccine-2, HBV-3, HIB-2)+pneumococcus-2
4 month	OPV-3, penta-3 (DTP Vaccine-3, HBV-4, HIB-3) + IPV
12 months	MMR-1 + pneumococcus-3
16 months	OPV-4, DTP Vaccine-4
6–7 years	MMR-2, OPV-5, DTV-M-5
13 years (girls)	HPV
16 years	DTV-M-6

It should also be noted that, in general, vaccination is highly effective in the economic action plan. Immunization coverage against polio doses 6th 1995 and the country is 98–99%. Deadlines repeatedly carried out vaccination and revaccination is a prerequisite for the eradication of polio in the country. [6, p. 10]. In the Republic of preventive immunization services are provided in the 4075 vaccination points at children, family, multidisciplinary clinics, and maternity facilities.

An important issue is the proper storage of vaccines. To this end, in the Republic of organized system of inventory control, forecasting, improving refrigeration equipment and training of personnel responsible for the storage of vaccines.

Over the past decade, with the support of international organizations, it was improved equipment with new modern refrigeration equipment, refrigeration bags for transporting vaccines and icepacks. At the appropriate level to date and refrigeration capacity at the national, regional and district warehouses. Patient clinics are also fully equipped with refrigeration equipment.

At the final stage of the global polio eradication particularly it is becoming important to control the state of immunity [8, p. 31–39], as the dynamic tracking of the voltage level of immunity to polioviruses in children allows to establish epidemiological signs of trouble.

Over the past 3 years in the regions studied indicators of immunity to polio in 6534 people. Percentage of people with antibodies to the appropriate type poliovirus was 98.4% of seronegative individuals — 1.6%. The obtained results allow reading that the state of immunity to polio in the population surveyed regions good — high rates of immunity. This clearly explains why the presence of registered cases of poliomyelitis in 2010 in neighboring Tajikistan, in our country has not been a single case. These data clearly show the need to continue conducting mass polio vaccine prevention of quality, despite the absence of disease in the country.

The system of surveillance for polio serological monitoring the state of immunity plays an important role and is essential for the assessment of individual and collective immunity in a particular area, the actual level of protection against infection in some age groups, as well as for assessing the quality of routine immunization services [10, p.51–52].

Epidemiological surveillance for acute flaccid paralysis (AFP).

Since 1992, T recommended to carry out surveillance of OPV among children under the age of 5 years. In February, the Global Commission for the Certification of Poliomyelitis stated that the standard for certification purposes must be AFP surveillance among children under the age of 15 years [4, p. 9].

To perform this task in the country since 1997, there is an ongoing surveillance for acute flaccid paralysis (AFP).

The purpose of surveillance of AFP with the mandatory laboratory testing every patient — do not miss polio. The quality of surveillance is defined by absence or minimization of AFP cases without laboratory examination.

Every year in Uzbekistan it was detected more than 1 case per 100,000 children under 15 years, and since 01.01.2011 AFP surveillance index, according to WHO recommendations approved within the meaning of at least 2 per 100 000 children under 15 years.

Virus isolation is a fundamental aspect of how cases of diagnostic and epidemiological studies. Determining the type of poliovirus vaccine and differentiation of these viruses' wild viruses are necessary to determine the characteristics of the outbreak [5, p. 9].

Based on this, each patient with the syndrome AFP laboratory examined polio accredited virology laboratory of the National Center for State Sanitary and Epidemiological Surveillance Ministry of Health of the Republic of Uzbekistan. From 2000 to 2013 was examined by the Republic of Uzbekistan in 1900 patients with the syndrome of AFP single patient wild polio virus has not been found.

As part of surveillance for acute flaccid paralysis, each patient with the syndrome AFP after 60 days of onset of paralysis passes re examination by a neurologist for the presence of residual effects, as in poliomyelitis in 100% of cases irreversible paralysis, and in the case of paralysis for other reasons motor functions often within 2 months restored.

In each case, the AFP National Expert Committee to review the epidemiological, clinical and laboratory data and gives the conclusion on the absence or presence of the disease polio.

Conclusions:

Regularly by independent experts of the World Health Organization, evaluates the quality of immunization and surveillance for acute flaccid paralysis in the Republic of Uzbekistan.

Due to the high level of immunization coverage against polio, as well as the absence of polio cases during at the appropriate level of surveillance for acute flaccid paralysis, the Republic of Uzbekistan for 12 years, retains the status of a "territory free of wild polio."

Thus, all of the foregoing proves that in Uzbekistan due to proper management of immunization policy managed to eradicate the disease polio.

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Characteristics of the functional state of the liver in postpartum women undergoing preeclampsia

Abstract: The study of liver function in women undergoing preeclampsia. A clinical and laboratory study. The study included 60 patients in the postpartum period. Of these, the main group consisted of 40 women had undergone preeclampsia varying severity. In the history of viral and autoimmune liver disease were excluded. In biochemical studies revealed liver cell deficiency syndrome. In women who have had varying degrees of severity of PE, noticed violations of the functional activity of the liver, manifested cytolysis, hepatocellular failure, lipid and protein metabolism, the severity of which corresponded to the severity of the disease. Change indicators promoted early onset, duration of preeclampsia.

Keywords: Preeclampsia, liver, cytolysis, biliary tract duskiness.

Preeclampsia (PE) — a disease of the whole organism, therefore, by its very nature it always has many faces [1; 4; 7; 11]. Preeclampsia often atypical (erased), and is complicated by deep disorders of the most important organs and systems [2; 5; 6; 9].

The frequency of preeclampsia according to different authors from 9 to 17% of all pregnant women; in hospitals of high risk, it is 30% or more [4; 6; 7; 10]. Currently, 70% of PE occurs in pregnant women with extra genital pathology.

During pregnancy, there is a substantial restructuring of the functions of a number of bodies, including the liver [3; 5; 7; 9]. Liver, depleting their reserve capabilities as pregnancy progresses, it becomes more vulnerable [2; 4; 5; 8]. Therefore, special attention should be necessary to pay in the development of PE. The liver is the organ with the developed capillary system in one degree or another always gets involved in a deep microcirculatory disorders and chronic tissue hypoxia [5; 6; 9; 11].

Objective: The study of the functional state of the liver in women undergoing preeclampsia.

Materials and methods

The study involved 60 patients in the postpartum period. Of these, the main group consisted of 40 women have undergone varying degrees of severity of preeclampsia. The control group consisted of 20 patients with physiological pregnancy.

In the study group surveyed identified 2 groups: 1st subgroup consisted of 20 patients who underwent mild PE, 2nd of 20 women who had undergone severe PE severity.

All the surveyed women were nulliparous. The average age of patients was 20,3 ± 2,5 years. The history of viral and autoimmune liver disease were excluded. Investigations were carried out on 5–8 th day of the postpartum period; biochemical, ultrasound examinations of the hepatobiliary system.

Results and discussion.

In the studied group of patients did not differ in age — from 18 to 36 years. Compared group were women of a similar age, fertility, and historical data.

In the study of history it noted that 36 patients of the main group had extra genital pathology. Most identified anemia: 80% — in the 2nd subgroup and 65% — in the 1 st subgroup: Metabolic syndrome: in 40.2% of women of the 1st subgroup, 2nd subgroups –60.3%; biliary tract duskiness (4.3% of cases in the 2nd subgroup and 2.1% — in the 1st subgroup).

The analysis showed the appearance of pregnancy clinic PE with 28–30 weeks in the 2nd group in the 1 st subgroup — 34 weeks or more.

Preeclampsia with the presence of a triad of symptoms (edema, proteinuria, hypertension) was noted in 38% of women, mainly in severe disease severity. PE with two all matching simptomami- hypertension and swelling — at 28.3%; hypertension and proteinuria — 23.3%; swelling and proteinuriya- 10.4%. The symptoms of preeclampsia postpartum continued until 3–4 days, mostly in patients 2nd subgroup. Patients complaints on the part of the hepatobiliary system did not show and clinical manifestations of liver disease were not.

When biochemical study revealed hepatic cell deficiency syndrome, reflecting changes in the basic functional tests of liver excretory absorptive, metabolized and synthetic functions. Hypoproteinemia was especially pronounced in the I-st and the II-th subgroup ($56,4 \pm 2,8$ and $61,3 \pm 4,0$g/l) in comparison with the control group ($p < 0.05$); hypoalbuminemia in 1st $31,9 \pm 4,2$g/l and in the 2nd subgroup of $31,2 \pm 2,4$g/l ($p < 0.05$). The results made cytolysis markers; alanine amino transaminase (ALT) in I subgroup — $26,4 \pm 14,7$ U/L are close to the values in the control group ($23,9 \pm 5,4$ U/l) in the 2nd subgroup $59,1 \pm 16,9$ U/L, ($p < 0.05$).

Thus, cytolysis syndrome is more pronounced in the subgroup II due permeabilised organelles and hepatocytes, which led to the isolation of an integral part of cells into the intercellular space and blood.

An increasing amino transaminase activity, demonstrating the genesis of hepatic hyperenzymemia, the level of which increases the severity of preeclampsia, respectively.

Lipid results were generally consistent with changes in indicators of hepatic markers. Total cholesterol in patients 1st subgroups ($6,16 \pm 1,12$ mmol/l), considerable disturbances in virtually all patients 2nd subgroup ($6,25 \pm 0,67$ mmol/l) compared to the control group ($566 \pm 0,8$ mmol/l), ($p < 0.05$). The level of low density lipoprotein was high in the 2nd subgroup compared to the 1 st sub-groups and the control group $5,09 \pm 3,09$ mmol/l ($p < 0.05$). These changes are taking place against a background of significant reduction in high density lipoprotein in the studied subgroups ($p < 0.05$).

The concentration of urea in the 2nd subgroup constituted, $6,8 \pm 1,3$ mmol/l was at the upper limit ($p < 0.05$) compared with the control group, ie detoxification of the liver has been broken.

Thus, women who have had varying degrees of severity of PE, there is a violation of the functional activity of the liver, manifested cytolysis, hepatocellular failure, lipid, protein metabolism, the severity of which corresponds to the severity of the disease. Change indices contribute early start, long duration of pre-eclampsia.

Changes in clinical and laboratory studies describing the functions of the body, make it possible to diagnose disorders in the early stages of the disease during the postpartum period and contribute to the timely implementation of corrective therapy aimed at restoring liver function.

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Effects of flow period preeclampsia the outcome of pregnancy and childbirth

Abstract: The dependence of outcomes of pregnancy and childbirth for mother and fetus from the start time and duration and the severity of preeclampsia. We have the research, the outcome of pregnancy and delivery in 100 pregnant women with varying degrees of severity of PE, of which Group 1 consisted of 50 patients with early onset of PE (up to 30 weeks of pregnancy), the 2nd group of 50 pregnant women — with the beginning of PE after 34 weeks. Prolonged PE for creates the most unfavorable conditions for the development of the fetus, reducing its adaptive capabilities increases the frequency of low birth weight, prenatal pathology increases. Pregnant with the beginning of PE to 30 weeks and the duration of its passage must be under strict supervision of an obstetrician-gynecologist and reanimatologist

Keywords: preeclampsia, liver, nocturia, left ventricular myocardial mass

Despite advances in diagnosis and treatment of preeclampsia (PE), this pathology remains the leading cause of maternal and prenatal morbidity and mortality. In recent years, the trend towards the predominance oligosymptomatic forms with the erased clinical picture, which in practice often leads to an underestimation of the severity of the disease, insufficient volume of therapeutic measures [2; 5; 6; 7].

Long-term observations carried out in our clinic showed that most adversely flowing with early-onset preeclampsia at 26–30 weeks. In rare cases, the development of this complication of pregnancy can occur even earlier — in 20 weeks, but the number of such women does not exceed 1–2% of the total number of pregnant women with early-onset PE.

When combined with new-onset proteinuria, high numbers diastolic blood pressure delayed fetal development should be diagnosed as severe preeclampsia. To assess the severity and extent of PE currently used different scales [1; 4; 5; 8].

Given the variety of offers clinicians scales and methodologies, we decided to identify the most reliable criteria for assessing the severity of PE, because of the assessment of the severity of PE depends on the choice of treatment and delivery [1; 6; 7; 8].

Objective: study the dependence of outcomes of pregnancy and childbirth for mother and fetus from the start time and duration and the severity of preeclampsia.

Materials and methods

We performed a comparative analysis of anamnesis data, the results of clinical, laboratory and instrumental methods of research, the outcome of pregnancy and delivery in 100 pregnant women with varying degrees of severity of PE, of which Group 1 consisted of 50 patients with early onset of PE (up to 30 weeks of pregnancy), 2 th group of 50 pregnant women — with the beginning of PE after 34 weeks. Age of the women surveyed ranged from 18 to 38 years on average 24,5 ± 2,1 g in the first group, 25,8 ± 3,2 in group 2. In both groups dominated nulliparous women (65% and 58% in the 1 st th and groups). However, 35% of patients with early-onset PE were nulliparous older than 26 years, in the second group of patients was only 18.5%.

Results and discussion.

Analysis of the dependence of PE from extra genital confirm that PE is more common in women with hypertension, kidney disease, disorders of lipid metabolism. In group I, 1.5 times more frequent chronic hypertension cardio psychoneurosis of hypertensive type (58% and 25.8%, respectively, in the 1st and 2nd group); 2 times — disorders of lipid metabolism 50% and 25.3%, 1.5 times more kidney disease (24.3% and 12.8%). Data analysis obstetric — gynecological history led to the conclusion that 55% of the development of early PE contributed to chronic inflammatory diseases of the uterus and appendages, 15% — infertility. Also, patients in Group 1 had a complicated obstetric history: 38% — medical abortion at 28.2% spontaneous abortions (in the 2nd group — 21% and 9.5%). When analyzing the current II trimester, we observed that women in Group 1 almost 3 times more likely to pregnancy in these terms difficult threatened abortion. In the III trimester of pregnancy in patients in Group 1 noted more frequent development of placental insufficiency, hypamnion.

A comparative analysis of clinical and laboratory data allowed to clarify the features of preeclampsia in early his early (before 30 weeks) and long duration in comparison with the later development of PE.

In group 1, 70% of the most early symptoms of hypertension and PE were protenuriya. In the 2nd group received some other data: protenuriya hypertension as the most early symptoms was 42% and 68% PE started with abnormal weight gain and edema, which proves easier for PE in the group.

Analysis of laboratory data confirmed the heavier for the duration of PE. No significant differences between the levels

of hemoglobin, red blood cell count in the 1st and 2nd group we have not found.

In addition, one group of pregnant women with long-term current PE activation of blood coagulation was more pronounced:

• Prothrombin index was higher in the 1st — group on average 104.8% compared to the normal in group 2 (95.5)

• Fibrinogen concentration was also slightly higher in Group 1 — the average,. 5.5 g/l (4,1g/l in the 2nd group).

About infringements in the homeostatic system is also evidenced by reduction in the number of platelets in patients of both groups, more pronounced in the long course of PE — up to $146 \times 106/L$ compared to $217 \times 106/l$ in the 2 nd — group. Assessment of liver function in a group of pregnant women with a long history of PE in all patients noted hypoproteinemia — the average level of total protein in the blood was 57.4 g/l. Liver enzymes in average in both groups were normal. Only at 4.5% in the 1st group marked rise in AST and ALT, which corresponds to the most severe course of PE.

In the analysis of the concentration of kidney function in almost 58% of pregnant women in Group 1 was set nocturnal. In the second group nocturnal were recorded in 25%. When analyzing the data obtained Doppler. We studied left ventricular myocardial mass (LVM). In the II trimester of average values of the actual LVM and LVMI of patients with long-standing severe PE significantly exceeds the same index of women with mild PE which has acceded to the term 34 or more weeks. The average value of LVM patients with mild PE was significantly lower than in women with severe PE — 145 (128–150) and 155 (116–172), respectively. Using criteria developed by JD Kobalava et al. (2003) with respect to the coefficient of disproportionally (KD) is calculated as the ratio of the actual due to LVM LVM and multiplied by 100%, we have found that a disproportionate LVM is the prerogative of pregnant women with long-standing severe PE. Thus, the disproportionate LVM with severe PE marker appears inadequate cardio — vascular reconstruction.

The progressive increase in LV myocardial mass is determined not only significantly greater amount CD in pregnant women with severe preeclampsia Thus, the disproportionate LVM with severe PE marker appears inadequate cardio — vascular reconstruction.

The progressive increase in LV myocardial mass is determined not only significantly greater amount CD in pregnant women with severe preeclampsia, but also accompanied by changes in the geometry of the left ventricle with the formation of concentric hypertrophy and concentric remodeling, leading to dysfunction and poor prognostic risk factor for long-term and severe preeclampsia, but also accompanied by changes in the geometry of the left ventricle with the formation of concentric hypertrophy and concentric remodeling, leading to dysfunction and poor prognostic risk factor for long-term and severe preeclampsia.

Analysis of complications in childbirth as evidence of long-term adverse effects on the mechanisms of the current PE prepare the body for childbirth, during labor process and its outcome for mother and fetus.

After examining all the long-term complications of the current PE, the following data: the long-term course of this disease development impending eclampsia with a clear neurological symptoms observed in 2 times more likely to eclampsia is 4 times more likely to premature detachment of normally situated placenta — 5 times more bleeding — in 3 times more likely to fetal malnutrition — 6 times more often. Long for PE has an extremely adverse effect on prenatal outcomes. Our data show that fetal hypotrophy, as stated above, occurred in 43.3% in Group 1 and 6.9% in the 2nd group. The average weight of newborns in group 1 amounted to 2800,0 ± 400 g in the 2nd — 3480 ± 385 g in chronic hypoxia group 1 60.3% of infants were born. In the 2nd group were born in a state of hypoxia 18.2% of newborns.

So long for PE affects changes -laboratory clinical data generated DIC — syndrome as a reflection of nonspecific reaction of the homeostasis system, disrupted the balance between coagulation and anticoagulation mechanisms contribute to the development of coagulopathic syndrome and massive obstetric hemorrhage. Long PE for creating the most unfavorable conditions for the development of the fetus, reducing its adaptive capabilities increases the frequency of low birth weight, prenatal pathology increases. Pregnant with the beginning of PE to 30 weeks and the duration of its passage must be under strict supervision of an obstetrician-gynecologist and resuscitation.

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The role of immunological mechanisms in the progression of disease in patients with chronic ischemia of the brain against the background of hypertension and atherosclerosis

Abstract: The study of chronic brain ischemia pathogenesis showed that in cases of CBI of hypertonic genesis the levels of proinflammatory cytokines were significantly increased, particularly IL-6.

Keywords: chronic brain ischemia, proinflammatory cytokines, atherosclerotic and hypertonic genesis.

In our days the brain vascular diseases remain to be the focus of attention of the society due to highly alarming epidemiological situation in relation to morbidity rate of stroke in Uzbekistan as well as due to catastrophic consequences of various forms of cerebrovascular pathology for physical and psychical health of nation [1]. The multiple large-scaled investigations showed that arterial hypertension (AH) and atherosclerosis of the cerebral vessels appeared to be the main cause and the most important factor of chronic brain ischemia (CBI) [3; 8; 9]. They occupy the key role in the vascular dementia [1; 5; 7]. Many examinations indicated about participation of inflammation in the atherogenesis and development of chronic brain ischemia [4; 9]. Even at the relative functional preservation in the patients with CBI the autoimmunization develops to the structural components of the nervous tissue which depends both on the antigens released out of hemato-encephalic barrier and on damaged complex regulation of the nenuroimmune system, determining immune homeostasis [6; 10]. However, the role of immune connecting inflammatory process as potential universal ingredient of the CBI pathogenesis of various genesis seems to be unspecified.

Purpose. To study proinflammatory cytokines IL-1β, TNF-α and IL-6 in the peripheral blood serum of the patients with CBI with regard to its genesis (hypertonic and atherosclerotic), as well as to AH stage and duration.

Materials and methods. We have studied some proinflammatory cytokines, that is, IL-1β, TNF-α and IL-6 in the serum of peripheral blood from 84 patients with CBI according to its genesis (hypertonic and atherosclerotic). All studied patients were divided into 2 groups in relation to pathogenesis of CBI. Group 1 included 53 (63,1%) patients with CBI, developing predominantly at the basis of AH. According to the classification of arterial hypertension by the level of AP and to the Guidelines of the Russian Society on arterial hypertension and All-Russian Scientific Society of Cardiologists (the 3 revision,

2008) [2] we divided patients of group 1 into 3 subgroups: 21 patients with AH Stage 1,22 patients with AH stage II and 10 patients with AH stage III. The arterial hypertension was divided according to the duration: AH stage I — to 5 years of duration in 10 patients, more than 5 years — 11 patients; AH stage II with duration to 5 years — 12 patients, more than 5 years — 10 patients. Group 2 comprised of 31 (36,9%) patients with CBI developing predominantly associated with atherosclerosis. Control group consisted of 29 practically healthy donors with purpose to compare the immunological characteristics. Measurements of the contents of cytokines (IL-1β, TNF-α and IL-6) in the serum of peripheral blood were performed with method IFA — assays with commercial test-systems (Vector-Best), Novosibirsk, RF, 2013. Statistic processing was made on the PC "Pentium-4.

Results and discussion. Comparative analysis of the level of proinflammatory cytokines in the patients with CBI in the both groups revealed presence of reliable difference with parameters of control group. The content of IL-1β in the blood serum of patients with CBI was reliably increased by 1,51 times (P<0,05) and 1,28 (P<0,05) times, in comparison with practically healthy persons, respectively, in group 1 and 2. It being interested that high content of IL-1β was diagnosed in the patients of group I: increased by 1,18 (P<0,05) times in comparison with characteristics of the patients with CBI of atherosclerotic genesis: in group I the content of IL-1β accounted for 14,9±0,86 pg/ml, while in group 2–12,71±0,58 pg/ml.

According to the literature data IL-1β is multifunctional cytokine with wide spectrum of effects, plays key role in the development and regulation of non-specific body defensive system and specific immunity, one of the firsts is included into the body defensive response during exposure to pathogenic factors. The macrophages and monocytes as well as lymphocytes and fibroblasts are the main producers of IL-1β. The

target cells, such as immunocompetent, endothelial, epithelial cells, fibroblasts and others. IL-1β initiates and regulates inflammatory, immune processes, activates neutrophils, T- and B-lymphocytes, stimulates synthesis of the acute phase proteins, cytokines (IL-2, —3, —6, TNF-α), molecules of adhesion (E-selectines), procoagulants, prostaglandins. It increases hemotaxis, phagocytosis, hemopoiesis, vascular wall permeability, cytotoxic and bactericide activity, provides pyrogenic effect and others. Endothelial cells of the human vessels under effect of IL–Iα and β secrete polypeptides similar to thrombocytary growth factor. These polypeptides stimulate cellular migration and proliferation and induce releasing of vascular mediators of inflammation that in significant increase of these cytokines may result in disseminated vascular blood coagulation. The observed increase in level of IL-1β in the our studied patients, evidently, is connected with stimulation with use of ligand CD40, processing of pre-IL-β and releasing of biologically active cytokine in the endothelial cells and cells of arteries, consequently showing both on the mechanism of ICE-activation in the inflammatory process at atherogenesis and other pathological states and on the new mechanism of activation of IL-1β in the vascular cells.

It is established that Th1-cells produce powerful cytokines having proinflammatory effect such as IL-β, TNF-α and others [6; 8]. Th2-cells secrete proinflammatory cytokines, such as IL-4, which stimulate predominantly humoral chain of immunity. Disturbance of the balance in the production of cytokines Th1/Th2 has the important significance in the immunopathogenesis of the development of CBI and its progressing. On the basis of above-said we studied the content of cytokine IL-6 in the blood serum of the patients with chronic brain ischemia.

Analysis of the IL-6 content in the serum of peripheral blood in the patients with CBI allowed to reveal reliable increase in all studied groups in comparison with control. Thus, in group 1 the level of IL-6 increased 2,65 times (P<0,001), in group 2–2,02 times (P<0,001), in comparison with control, accounting for 9,06±0,54 pg/ml and 6,94±0,34 pg/ml, respectively. As it may be seen from the data presented, in CBI of hypertensive genesis the changes at the IL-6 level are more marked and reliably increase parameters of the patients with CBI of atherosclerotic genesis 1,31 times (P<0,01).

It should be noted that IL-6 induces synthesis of the acute phase proteins, in this connection (as IL-1β and TNF-α) IL-6 may be concerned to the cytokines of inflammation. According to the literature data IL-6 induces significant increase in level of mRNK c-sis gene (β-chain) in the cultivated human endothelial cells, that may be good reason for inflammatory vascular effects.

TNF-α is another cytokine responsible for development of the inflammatory processes. Measurement of its level in the patients with CBI of different genesis showed reliable increase in all patients. Thus, it is established that the serum level of TNF-α in the group of patients from group 1 an 2 was increased 2,56 times (P<0,001) and 1,76 (P<0,001),

respectively, in relation to values in control group, according for 11,70±0,64 pg/ml and 8,04±0,36 pg/ml in group 1 and 2, respectively, at control values 4,58±0,81 pg/ml. We revealed significant increase in levels of NTF-α in groups of patients with CBI on the background of AH, in group 1 of patients the level of TNF-α was increased 1,45 times in comparison with parameters from group 2. Consequently, we revealed considerable increase of serum TNF-α in the both groups of patients with CBI, that may be served as criterion for presence of inflammatory process in CBI.

It should be noted that in group of factors of tumor necrosis TNF-α and β (lymphotoxin) are included. TNF-α is a product of monocytes/macrophages, endothelial, mast and myeloid cells, LAC, neuroglia cells, and in some cases –activated T-lymphocytes. The latter are main producers of TNF-β, which is produced later (2–3dat after activation), than TNF-α, under the effect of antigens and mytogens on the T-lymphocytes. There are three main directions of TNF: cytotoxic, directed to the cells of tumor or cells damaged by viruses; immunomodelling and anti-inflammatory, induced by activation by macrophages, neuttophils, eosinophils and endothelial cells; besides effect on metabolism, leading to hyperglycemia, bone resorption and increase in myogenic glycogenolysis, that is, cachexia, observed in some parasitic infections.

The TNF releasing results in capillary permeability, lesion of the vascular endothelium and occurrence of the development of intravascular thrombosis. Especially TNF-α plays important role in the development of vascular inflammatory lesions. The excessive contents of proinflammatory cytokines, such as TNF-α, IL-1β and IL-6, promotes to maintenance of the inflammatory process in the body on whole and may intensify the blood coagulation.

We showed that from studied proinflammatory cytokines the highest level was determined in IL-6, in relation to control. However the intensification of these changes was different.

As it may be seen from the Fig.1, the most increase was characteristic for IL-6 and TNF-α. Thus, in patients with chronic brain ischemia of hypertonic genesis the level of these cytokines exceed values of IL-1β and TNF- α 1,76 (P<0,01) and 2 (P<0,001) times, respectively. In the patients with CBI of atherosclerotic genesis this increase accounted for 1,59 (P<0,01) and 1,37 (P<0,05) times, respectively, in comparison with cytokines IL-6 and TNF- α. On our opinion, this is connected with development of inflammatory vascular effects under influence of IL-6 and TNF-α: increase in capillary permeability, endothelium impairment and development of intravascular thrombosis.

Then we studied the state of proinflammatory cytokines in relation to stage of AH in patients with CBI of hypertonic genesis. It was established, that the serum level of IL-1β in the patients with stage 1 AH was 11,39±1,17 pg/ml, stage II AH — 15,95±0,98 pg/ml (P<0,01). Stage III AH — 20,27±2,26 pg/ml (P<0,01). It is interesting that the contents of IL-1β in stage 1 AH had only tendency to the rise, while during hypertension intensification, the changes gain statistically significant

character, increase by 1,61 (P<0,01) times in stage II AH and by 2,04 (P<0,001) times in stage III AH in comparison with controls. The difference between groups showed that the level of IL-1β was increase by 1,4 (P<0,01) times in patients with stage II AH and by 1,78 (P<0,01) times in the patients with stage III AH in relation to group stage I AH.

In comparison with parameters of IL-1β the content of IL-6 increased more markedly in the serum of peripheral blood of the patients. Thus, in the patients with stage I AH the level of IL-6 increased statistically significant by 2,1 (P<0,001) times and 2,85 (P<0,001) times — in stage II AH and by 3,54 (P<0,001) — in Stage III AH in relation to controls. At the same time IL-6 in group of patients with stage I AH accounted for 6,89±0,82 pg/ml, with stage II AH — 9,75±0,61 pg/ml, while in group of stage III AH — 12,12±1,29 pg/ml. In comparison with parameters of patients with stage I AH, in the patients with stage II AH the level of IL-6 increased by 1,42 (P<0,01), and in patients with stage III AH this rise was 1,76 (P<0,01). The data presented showed that the contents of IL-6 increased progressively during deepening of the pathological process.

Analysis of the level NTF-α in the blood serum of patients with AH showed its progressive rising. Thus, in the patients with AH I, AH II, and AH III stages the level of this cytokine was increased by 1,98 (P<0,001); 2,76 (P<0,001) and 3,32 (P<0,001) times, respectively, in relation to values in the control group. We found significant increase in the level of TNF-α in group of patients with stage III AH. In comparison with parameters of group of patients with stage I AH, the parameters of TNF-α increased by 1,4 (P<0,05) times in group of patients with stage II AH and by 1,7 (P<0,01) times — in the patients with stage III AH.

Thus, the investigations performed showed progressive increase in contents of studied cytokines during increase in stage of AH. The most changes are characteristic for stage III AH, particularly IL-6 and TNF-α.

Then we studied contents of the proinflammatory cytokines in relation to duration of AH in patients of group 1. Comparative analysis showed that serum level of IL-1β in the patients with stage I AH to 5 years was 6,26±0,62 pg/ml and 7,59±1,60 pg/ml, exceeding norm values by 1,83 (P<0,001) and by 2,2 (P<0,001) times, respectively. Differences between groups were statistically insignificant. The level of TNF-α in group of patients with stage I AH to 5 years and more 5 years was 8,15±0,71 pg/ml and 10,08±1,86 pg/ml, respectively, exceeding norm values by 1,78 (P<0,01) times and 2,2 times, respectively, in relation to control. Differences between groups were statistically insignificant.

The data obtained showed that differences in the contents of proinflammatory cytokines in relation to duration of hypertension were insignificant and not reliable.

The level of IL-1β in group of patients with stage II AH to 5 years accounted 14,7±1,36 pg/ml, and in group with stage II AH more than 5 years — 17,15±1,38 pg/ml, exceeding norm parameters by 1,48 (P<0,05) and 1,73 (P<0,01) times. Differ-

ences between groups have statistically insignificant character. The content of IL-6 in group of patients with stage II AH to 5 years was 9,36±0,81 pg/ml, and in group with stage II AH was more than 5 years — 10,15±0,94 pg/ml. These findings exceed statistically significantly the parameters of practically healthy persons by 2,74 (P<0,001) and 2,97 (P<0,001) times. However, differences in the parameters between groups with regard to duration of disease we did not reveal. The content of TNF-α in group of patients with stage II AH to 5 years was 11,89±1,07 pg/ml, and in group with stage II AH more 5 years — 13,36±1,23 pg/ml. These parameters statistically significantly exceed parameters of practically healthy persons by 2,6 (P<0,001) and 2,92 (P<0,001) times. However, differences in the parameters between groups in relation to duration of disease we did not reveal.

Consequently, in the patients with stage II AH changes of parameters of all studied cytokines did not depend on the duration of hypertension.

Thus, intensity of changes in the content of proinflammatory cytokines in the patients with CBI of hypertonic genesis in relation to duration of disease was not noted.

The established in our work increase in levels of IL-1β, IL-6 and TNF-α in the patients with CBI on the background of arterial hypertension convincingly reflects dynamics of the immunopathological process, correlating with clinical picture and revealed more marked reduction of the parameters of cognitive sphere in this group of patients. The development of cerebrovascular insufficiency is determined in many respects by formation of micro- and macroangiopathies leading to formation of metabolic and hemodynamic disturbances. Diffusive damage of small arteries observed in CBI of hypertonic genesis is accompanied by wide spectrum of changes in the brain. The damage of brain is characterized by gradual accumulation of ischemic and repeated degenerative changes in the brain, due to repeating ischemic episodes in the various vascular basins, first of all, in zones of blood supplying of small penetrating cerebral arteries and arterioles.

It is known that cerebral ischemia results in accumulation of cytotoxic substances which, in turn, leads to activation of microglia, which begins to produce actively cytokines. We suggest that our results obtained confirm established increased levels of proinflammatory cytokines in our research. Besides, the significant increase in production of IL-6 appeared to be marker of activation of the pathological process in atherosclerotic genesis of CBI because it is known, that IL-6 is the mediate cytokine, long activation of which is expressed clinically by body chronization and autoimmunization.

Conclusion. Chronic brain ischemia is characterized by increase in level of proinflammatory cytokines, particularly IL-6. The most changes are noted in the patients with CBI of hypertonic genesis and dynamics of the level changes is under the direct dependence on the stage of AH. The intensity of changes in the content of proinflammatory cytokines in the patients with CBI of hypertonic genesis in relation to duration of disease.

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Surgical treatment by method ligamentotaksisa for fractures of metacarpal bones of the hand

Abstract: Purpose: to improve the results of treatment of fractures of metacarpal bones surgically using the method ligamentotaksisa.

Method: The results of treatment were studied in 36 patients with fractures of the metacarpal bones of the hand between the ages of 18 to 74 years. All patients received surgical treatment method ligamentotaksisa.

Results: The results of treatment were studied in long-term period of 1 year to 4 years. The results of treatment were assessed by an 8-point scale, which takes into account the consolidation of the fracture, the range of motion in the joints, the presence of pain, return to work. Good results are ascertained in 30 (83.3%) patients, satisfactory in 4 (11.1%), poor in 2 (5.6%).The results of treatment is also dependent on the residual displacement of bone fragments. Our results showed that the mixture should not exceed 20°.

Conclusion: Our method of surgical treatment of fractures of the metacarpals with ligamentotaksisa shows for all kinds of intra-articular fractures of the distal end of the metacarpal bones, helps shorten hospital stays and total disability in 2 times.

Keywords: metacarpal bone, the device, surgery, ligamentotaksis.

Introduction: The metacarpal fractures accounts 2.5% of all bone fractures, from them fractures of distal part of metacarpal occurs in 74%. According to different authors, closed fractures of metacarpal I meet from 5 to 40%; Metacarpal II — from 7 to 20%; Metacarpal III — from 5 to 12%; Metacarpal IV — from 8 to 30% and Metacarpal V — from 17 to 56% of all fractures. According fractures localization, closed fractures of metacarpal bones are distributed as follows: in the shaft — in 30–50% of patients, in the base — at 12–20%, in the head — from 4 to 6%. In 36,5–42,0% of patients occurred subcapital fractures of II–V metacarpal bones in the so-called metacarpal neck [1; 2,]. Treatment of brush injuries is a complex and important section of hand surgery. So far, there is no consensus on the choice of treatment for different types of metacarpal fractures. According to many authors [1; 11] it is become to need

of individual approach in treatment of metacarpal fractures, with a glance their specific features.

Although up to present time developed a number of new systems and constructions for the treatment of hand bones injuries, the complications rate remains high and reaches 11,2–31,9% (Tonkikh SL et al., 2002; Obukhov IA, 2002; Fusetti C. et al., 2004). As a result of inadequate treatment there are arise not only pain and deformations at injured side, but also brush function is disrupts, which leads to a decrease in patient disability and even disabling. The using of compression-distraction device (CDD) at metacarpal fractures is finds a wide recognition in hand surgery, and opens a new possibilities for improving the treatment effectiveness of injuries and deformities of this functionally important organ. The experience gained by domestic and foreign authors and based on the development and implementation of their own facilities and devices, contributes to a significant expansion of its application in hand surgery [6; 7; 8; 12; 13].

Mini devices using for metacarpal distal end fractures according to reduction mechanism conventionally divided into 2 groups:

1. Directly reducing devices.

2. Indirectly reducing devices.

Directly reducing devices: we know that at isolated metacarpal fractures, the bone fragments consist of two parts: the distal and proximal. In the application of the first group of devices pins are conducted through the distal and proximal bone fragments. At the same time under the ICT due to the correction of the bone fragments reposition is achieve by conducting pins. The disadvantage of this method is that the plural and comminuted fractures of the distal end the conduction pins through bone fragments causes technical difficulties. In addition, directly reducing devices cannot be used at the distal fractures of the metacarpal's head and neck.

Indirectly reducing devices: and this group of devices the proximal bone fragment fixed by pins, but through the distal end the pin is not carried out. Pin is conducted through the diaphysis proximal phalanx of damaged metacarpal bone, the device is assembled and carried distraction. Here reduction is carried out at the expense of tension of the capsule, ligaments and soft tissues of the joint. In scientific terms, this is called "Ligamentotaxis." The Ligamentotaxis idea in first was proposed in 1977 by Vidal et al. and its essence is the fragments alignment achieves by traction on segment's axis at the expense of intact soft tissue. Unfortunately just a few "ligamentotaxis" methods is developed.

The Purpose of the research: improvement result treatments fracture metacarpal bones by surgical way with using the method "ligamentotaxis".

The Material and methods of the study. Under observation were found 36 patient with fracture metacarpal bones of the brush.

Patients were portioned on categorizations JC (the table 1). Here with we did not take into account the diaphysial fractures (A-1, A-2, A-3), since designed by us device was intended for treatment metaphysial and intraarticular fracture metacarpal bones. Necessary to note that amongst patient prevailed the fractures II and V metacarpal bones of the brush.

Table 1. – Distribution patients with fracture metacarpal bones of the brush on JC

Metacarpal bones of the brush	B-metaphysical fracture:			C- intraarticular fracture:		
	B1 – simple;	B2 – with intermediate fragment;	B3 – multisplintered.	C1 – incomplete;	C2 – complete simple;	C3 – complete multisplintered fracture with pression.
I	–	–	1	–	–	1
II	1	3	2	1	4	3
III	–	1	1	–	–	1
IV	–	1	1	–	–	3
V	1	4	3	1	1	3
Total	2	9	7	2	5	11

We are in the treatment of patients with fractures of the metacarpals enjoyed working complex treatment program, which highlighted six major periods of treatment:

1) preparation — included a general clinical-laboratory and radiological methods of research;

2) surgical intervention; When surgical treatment of us developed an apparatus for osteosynthesis and received a patent for «Apparatus for the development and treatment of injuries knuckles»/№ FAP 00523 24.02.2010.

The surgical procedure: Using an electric drill through the holes in the bracket was held K-wire through the main phalanx. Then, through the holes on both sides of the rods from the brackets had been four intercrossing K-wire. Spokes have been strengthened nuts on both sides of the bracket. For further stabilization of the two arcs through the middle and fastened rod.

After installation of the device the patient can independently develop interphalangeal joints.

After applying apparatus is mild distraction (0.5–1.0 mm distracter turnover every day). The complex of therapeutic measures is important functional treatment after surgery, which requires a gentle load on the damaged organ. From the 2nd day after the surgery the patient is allowed to perform light active-passive movements in the interphalangeal joints of the fingers.
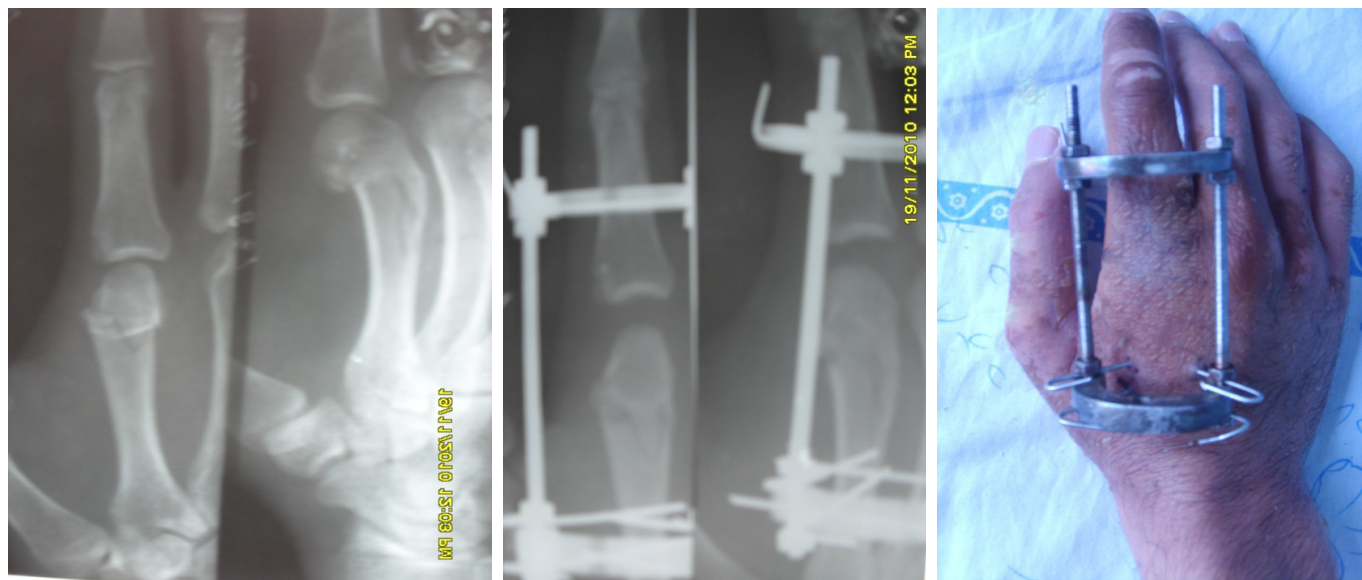
Figure 1. Before and after operation condition

3. Adaptation — patients by indications prescribed painkillers and carried hypothermia. Creating a functional rest in this period is especially necessary when fresh injuries in terms of increasing swelling, pain, lack of adaptation of the patient to the unit.

4. Correction of the position of fragments — were carried out in the first 3–4 days after surgery using the device, which lasted for 5–6 days, followed by an x-ray control;

5. stabilizing the voltage between the fragments — are monitored for fixing the spokes and the strength of the device. For the duration usually corresponds to the period of consolidation. The unit is dismantled in 4–5 weeks.

6. After removing the device begins a period functional treatment and social rehabilitation-seeing in most cases, against the background of a moderate restriction of movement in the joints of the damaged segment and adjacent phalanges. The average length of it is $9{,}5 \pm 1{,}04$ days with fresh fractures and $15{,}5 \pm 1{,}03$ in the chronic injury.

Results and discussion:

Most authors believe that the fractures with an angular displacement IV and V metacarpal bones do not need an accurate repositioning as a normal range of motion is compensated by their high mobility. Fractures angularly offset II and III metacarpal bones need accurate repositioning, because otherwise the angular deformity will interfere with normal hand function. Some authors believe that at the turn of V metacarpal bone, the normal range of motion, which is $15–25°$, the permissible angular deformation to $30–40°$, not interfering with normal function. At the turn of IV metacarpal bone permissible angular deformation of up to $20°$ without disrupting normal function. However, the angular distortion is absolutely inadmissible for fractures II and III metacarpal bone to restore the normal function of which require accurate anatomical repositioning.

In the presence of the angular displacement of fragments, many authors offer or do not produce reduction and immobilization [3; 4; 10] or not to eliminate the offset at

an angle of $40–70°$. It is emphasized that in any case achieved an excellent functional result. We can not fully agree with these statements, because we had to operate on patients (capsulotomy, corrective osteotomy), who had expressed nail-formed strain hyperextension contracture in the metacarpophalangeal joints (PPS), because of what the victims could not squeeze your fingers into a fist and to fully implement the various types of capture. If the axis of the metacarpal bone is restored, then the next trauma patient has a good chance to get re-fracture. All investigators have tried to eliminate all cases the angular offset. If we do not manage it, then like other authors [5; 9] considered acceptable residual offset at an angle of not more than $25–30°$ for IV and V metacarpal bones. According to our results, the mixing should not exceed 20.

Criteria for assessing the results.

The main goal that we pursued by applying this methodology, is to prevent displacement of bone fragments after closed reduction in patients with a stale fractures metacarpal neck (fresh 24 hours after injury failed fracture reduction). Therefore, when evaluating the results focuses on the ability of the device to securely hold the rod fragments to full fusion.

Before and after the operation determined by the angle of displacement of bone fragments in the oblique radiographs. Pivoting measured between the contours of the dorsal cortical both metacarpal bone fragments. Before surgery, the rate ranged from 50 to $20°$ (an average of $35°$), and before removal of the device from 0 to $20°$ (average of $5°$).

Long-term results of treatment in a period of 1 year to 4 years, were studied in 36 patients. The evaluation was conducted on the 8-point system were taken into account the consolidation of the fracture, the range of motion in the joints, the presence of pain, return to work. Good results are ascertained in 30 (83.3%) patients, satisfactory in 4 (11.1%), poor in 2 (5.6%).

Conclusions.

1. In the transverse and oblique fractures, as well as all types of intraarticular fractures of the distal end of the

metacarpal bone distraction device shown imposition developed clinic.

2. The use of MLC can achieve solid fixation of bone fragments during the treatment period, sufficient for the early development of movement in the adjacent joints and contributes to a significant reduction in terms of hospitalization and total disability. Use of BWW will shorten patient treatment for all kinds of damage in 2 times and total disability period of 4–5 days.

3. Surgical interventions carried out at the turn of the distal end of the metacarpal bones, must be accompanied by a complex post-operative rehabilitation.

4. The application of distraction apparatus for treatment of fractures of the metacarpal bones of the hand, allows you to get excellent and good outcomes in 83.1% of patients, which gives reason to recommend it for widespread use in the practice of medical institutions.

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Epidemiological and etiological aspects of genesis of periampulary tumors

Abstract: Purpose: Statistical data of tumors of a periampullary zone are presented in article. Among tumors of this localization the head of the pancreas (62–69.7%) is surprised most. Among the etiologic factors smoking can be taken for granted the factor twice increasing risk of a disease. The share of hereditary factors and the germinogen of mutations is found in 5–10% of patients. Direct influence of consumption of coffee and alcohol isn't considered

proved, and the previous diseases as pancreatitis and diabetes, make only a small contribution (4%) to risk of development of this heavy illness.

Keywords: periampullary tumors, epidemiology, prevalence, incidence frequency, mortality.

Periampulary tumors (PAT) in the last decade has become the leading cancer in the most industrialized countries, including Uzbekistan [1; 6].

Thus, according to Dolgushin B. I. (2008), Patyutko Y. I. (2013) PAT is 15% of all malignant neoplasms of the gastrointestinal tract, and tends to increase [35; 36; 45], and in the past 30 years the mortality has increased by 10–12 [4; 60; 69].

More than ten thousand people die from this disease in Western Europe every year, the same pattern is observed in Japan [22; 55; 56].

Among PAT tumors of the pancreatic head have the most incidence and explicit 62–69.7% of tumors of the periampulary zone (PAZ). Cancer of major duodenal papilla rank as the second incident and found in 12,7–30% cases, the cancer of the terminal part of choledoch observed in 12,8–15,1%. Duodenum have rare tumor affect5, accounting 2.4–3% of all the PAT [5; 13; 23].

The mean value rate of incidence pancreatic cancer (PC) in the world compound 10.4 per 100 thousand of population for males and 7.1 per 100 thousand in females [11; 34; 37], and the incidence of pancreatic cancer in the world is uneven. For example, among Afro-Americans the incidence is higher than in other population. Perhaps this is due to a genetic inability to inactivate carcinogens foods [2]. On the other hand, the fact of low incidence of pancreatic cancer in the African continent remains obscure. A possible answer to this phenomenon lies in the study of environmental factors. Overall, the incidence is higher in developed industrialized countries than in developing countries [62].

Among pancreatic localization over 60% of tumors are the tumors of the head. Cancer of the pancreatic head (CPH) often affects people of elder group, men 1.3–1.5 times more likely than women. The medial age of men compound 63.6 years and women — 66.5, according to by Siriwarden A. K. (2014) [54; 68].

According to the American Society of Surgeons, 37,170 of new CPH cases registered in 2013, with almost the same number among men and women (18830 and 18340 respectively) [25; 66; 67; 76].

In Japan and England, the rate of incidence in 2013 was 16 per 100 thousand of population [39], in Southern Europe this figure was 2.2 patients, in Asia-Pacific region — 6 patients, and in Nordic Europe — 11–12.5 cases per 100 thousand of population [42; 64].

The statistical data over the past years shows a steady increase in mortality from CPH, with 9th rank among all tumors, and 4th place among tumors of the gastrointestinal tract, and less in gastric cancer, colon and rectum [7; 26; 39]. Most sources devoted to the study of epidemiology of CPH highlights the sad fact is that almost equals the incidence of mortality. Such a ratio is not described for other tumors [9].

In the USA and Japan among the causes of death takes 4–5 of CPH place after lung cancer, colon cancer, breast cancer and prostate cancer [70; 73].

In Europe, as there is a high mortality rate: 10.8 for men and 5–7 women per 100 thousand of population [32]. In Russia from CPH every year die more than 13 thousand people, among the men attain 10 deaths per 100 thousand of population, ranking 6th among women, the figure 8.1 per 100 thousand of population, taking 8th place in the statistics of malignant neoplasms [3; 10; 34].

Cancer of the major duodenal papilla (cancer of Vater's papilla) in the structure of cancer incidence compound 0.5–3% of all malignant diseases of the gastrointestinal tract. Among PAT cancer of Vater's papilla found in 12.7–30% [19; 41; 49]. Morbidity with cancer of Vater's papilla compound 0.34 per 100 thousand of male population and 0.25 per 100 thousand of female population [63]. Cancer of Vater's papilla in men of working age are 2–3 times more often than women [65].

Cancer of the terminal part of choledoch (CTPCh) compound 2,8–4,6% of all malignancies and 15,3–16% of malignant tumors of PAZ [31]. According to foreign authors, the standardized incidence rate for cancer TPCh compound 0.67 per 100 thousand for men and 0.45 per 100 thousand for women [25; 30; 38]. According to Espinoza E., Hassani A., Vaishampayan U. (2014), the incidence of cancer of this localization of both men and women is the same [29]. There is no statistical data obtained for the TPCh cancer in Uzbekistan.

Primary **cancer of duodenum (CD)** is extremely rare (according to different authors — 0,6–6,1% of tumors of PAZ) and compound 0.3% of all tumors of gastrointestinal tract [8; 33; 52]. According to Edge S. B. (2010), Terada T (2012) CD comprise 0.04–0.5% of all the tumors of the gastrointestinal tract, 3.1% of intestine tumors and 25.4–50% of all tumors of the small intestine, equally frequent in men and women older than 50 years and almost not detectable at a young age [56].

It should be noted that the PAT is a cancer disease with severe course. Resectability often do not exceed 20%, hospital mortality among radical surgery 10–15%, and five-year survival rate — 25–30% [21].

Etiological background of development of the periampulary tumors. Genetic predisposition is one of the main causes of PAT [1; 7; 61]. PAT are more often in the elderly, in connection with the observed growth in frequency with the trend to increase the life expectancy in developed countries [18].

Thus, according by De La Cruz MS (2014), risk factors for CPH include the family history, smoking, chronic pancreatitis, obesity, diabetes, alcohol abuse, as well as possible dietary factors [25].

Moreover, some authors proved the correlation between endoscopic papillosphincterotomy (EPST) and development of CTPCh [14; 24; 57]. The reason for this is stasis and reflux of duodenal juice and pancreatic in the TPCh that possible lead to the formation of intestinal metaplasia of the epithelium and the development of adenocarcinoma [50; 72]. To confirm this Sharifiev S. Z. (2010) was described cases of carcinoid TPCh in patients after orthotopic liver transplantation for primary sclerosis cholangitis and multiple strictures of the bile ducts [12; 61].

Molecular and genetic studies carried out in the world prove different frequency of occurrence PAT depending on the population. Thus, patients in China are likely to have distinct expression of other K-ras and p53 genes [22; 27; 48]. Differences in the expression of these genes may be different survival rates and morbidity in Afro-Americans. In Japan, the mortality rate among men from CPH in 2012 was 1.7 times higher than in women [58]. These data may indicate that hormonal factors may be involved in the development and aggressiveness of CPH.

International Agency for Research on Cancer (IARC) has classified smoking cigarettes as a proven carcinogen pancreatic cancer (IARC, 1986). Under the auspices of IARC multicenter study using a case-control techniques in 5 regions of the world to illustrate the effect of smoking on the risk of pancreatic cancer [36]. This integrated study was conducted in centers in Australia, Canada, Netherlands and Poland. All centers used a common protocol and questionnaire and performed it so that it became possible to carry out a joint analysis. The study included 823 cases of smoking and 1,679 cases of population control. Cigarette consumption was established by a detailed questionnaire, which included all of the information about the frequency of smoking in each time period [62].

All centers showed a clear increase in the risk of disease of PAT depending on the number of cigarettes smoked and the pooled analysis of all data revealed statistically highly significant dose-dependent effect of smoking on the PAT. In the most severe smokers (more than 318 600 cigarettes in their lifetime), the relative risk was 2.7 (95% CI 1,95–3,74). These studies also showed that only smoking for 15 years or more increases the risk of cancer [44; 53; 74]. Extensive propaganda against smoking reduced the incidence of PAT in the USA population at the beginning of the 20th century.

Numerous association studies of diet and risk of PAT were indicated worldwide. Presumably, the 20% of the cases were associated with dietary factor. Presumably, the greater the total calorie intake, the higher is the risk of PAT. Increased nitrate content in food leads to the formation of nitrosamines. The use of vitamins and antioxidants should theoretically reduce the risk of cancer. However, the study [40; 59; 76] is not set a protective action of α-tocopherol and b-carotene on

the development of PAT for a 5–8-year period for the group observed. Also, do not set the relationship between folic acid and cancer of the pancreas. Possibly, a protective effect of vitamins and antioxidants significantly more evident with other types of malignancies and for longer use.

Endocrine system plays an important role in ensuring adequate immunological reactivity to tumor growth. A number of hormones is one of the most important parts of regulation of the immune reactivity of the organism and can cause both immunosuppression and stimulation of tumor tissue growth and its suppression. In modern experimental oncology no effective information models that reflect the maximum possible range of multidirectional interactions of the immune and endocrine systems in the dynamics of tumor growth.

However, most studies on the effects of vitamins and food consumption of fruit [46; 51; 74; 76], citrus fruits, vitamin C has a protective effect. Particularly interesting is the fact that natural citrus identified agents that are inhibitors of K-ras oncogene [15; 28].

Thus, the influence of dietary factors on the development of PAT attracts attention. It is known that the carcinogenic effects of many foods and eating habits may manifest themselves in several decades [75; 141].

The proportion of hereditary factors in the development of PAT is about 5–10% of all cases. To date, found that the gene BRCA2, one of the genes responsible for hereditary breast cancer is associated with the development and PAT and CPH. BRCA2 gene is considered to be a tumor suppressor, responsible for DNA repair. Mutation of this gene was found in both sporadic and hereditary CPH [20; 47].

Currently underway are numerous studies on genetic polymorphism on the development of cancer varying etiology. In particular, the role of the genes responsible for detoxification of carcinogens in products of smoking. The presence of an individual «favorable» genes may play a protective role. In this context, we investigated a genetic polymorphism of cytochrome P-450, N-acetyltransferases, glutathione-S-transferase, uridine-5-diphosphate glucuronyl. Noteworthy reports of the effect of acetylsalicylic acid and cyclooxygenase 2 in the risk of developing prostate cancer and PAT [16; 17; 43; 71].

Thus, speaking of Epidemiology of PAT, we can say the following: a clear correlation of risk factors and the development of PAT is found in certain parts of the diseased. Smoking can be considered proven factor doubles the risk of disease. The proportion of hereditary factors and germ cell mutation is found in 5–10% of patients. The direct influence of alcohol and coffee consumption is contested. Such prior diseases such as diabetes and pancreatitis, makes only a small contribution (4%) to the risk of PAT.

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Clinical characteristics and principles of treatment of patients with enteric infections caused by clostridium difficile

Abstract: The risk factors and the development of diarrheal and intoxication syndrome in patients with intestinal infections caused by Clostridium difficile is an early irrational use of antibiotics, prolonged hospital stay as a source of nosocomial infections, as well as age.

Keywords: Intestinal infections, intoxication syndrome, diarrhea.

At the present stage the problem of microbial ecology associated with the effect of antibiotics on individual normal microflora of the human body is quite acute. With violation of the microecology due to extensive and occasionally unreasonable use of antibiotics is associated widespread caused by Clostridium difficile, clinical spectrum of symptoms that varies widely — from the carrier state and the very short-term passing of diarrhea until development of pseudomembranous colitis [1; 2; 5].

It was found that the toxins produced by these bacteria are involved in the pathogenesis of antibiotic-associated diarrhea and is currently considered as the most probable cause of colitis and diarrhea in children. All patients with diarrhea associated with antibiotics flowing with intoxication and leukocytosis, the occurrence of acute diarrhea should be associated with C.difficile. In samples of stool C.difficile cells remain viable at 5 °C to 10 days at 25 °C up to 4 days.

One of the features of C.difficile is the production of heat labile complex exotoxin consisting of a cytotoxin (toxin B) and enterotoxin (toxin A) with said complex binds toxic pathological changes in intestinal mucosa of the patient: ulcer formation and false-membranous colitis.

Clostridium difficile causes of pseudomembranous colitis in 100% of cases. Clostridium difficile intestinal infection occurs in approximately 50% of newborns. A pathogenic property of the pathogen does not occur until the end of the first year of life due to lack of or underdeveloped intestinal receptors for the toxins produced by them. At the same time, asymptomatic carriage of Clostridium difficile detected in a certain part of the adult population — 1–3% in Europe and 15% in Japan. In our country, a number of reasons, and primarily due to the lack of appropriate laboratory facilities, diagnosis of infections caused by Clostridium difficile is absent and its frequency may be judged only on the basis of individual publications.

Purposes. The purpose is study of clinical features of intestinal infections in children caused by Clostridium difficile.

Materials and methods. Our systematic study of the etiology of acute intestinal infections in children for the period of 2005–2012 years based on studies of 225 sick children aged 2 months to 3 years. The material for the study were samples of faeces. The study was conducted using the polymerase chain reaction (PCR) and bacteriological methods. Diagnosis by PCR analysis was installed in all cases. Of these, 14 (38.8%) children were diagnosed on the basis of bacteriological tests and 32 (88.8%) children on the basis of serological (ELISA).

The criteria for assessment of the severity of the disease were: the acuteness of infection, the severity of toxicity and exsicosis, duration of temperature reaction and gastrointestinal disorders, the degree of involvement in the pathological process of the cardiovascular and central nervous system, blood counts and coprogram. Given these criteria of 36 examined patients were diagnosed with moderate form in 24 (76.6%) and heavy in 12 (33,4%).

To determine the causative agents of acute intestinal infection in this work first time we have used PCR.

Observed patients before admission to hospital had been treated with antibiotics, bacterial preparations received on the set in the history of various degrees and kinds of intestinal dysbiosis. These children have been carried out paraclinical methods of examination, including the study of intestinal microflora.

Results and discussion.

According to the results of research Clostridium difficile is found in 16% of cases of children with acute intestinal infections. The average age of patients caused by Clostridium difficile was 13,7±1,35. Thus, in the age group 1–2 years among identified an acute intestinal infection predominated clostridial diarrhea. In this group of patients Clostridium difficile is the leading causative agent of an acute intestinal infection causing about half of all diagnosed cases of etiologically undiagnosed intestinal infections.

Our results showed that the infection is significantly more common in children younger than 2 years (P>0,05) (Table 1).

Table 1. – Comparative assessment of the severity of dyspeptic symptoms

Diarrheal syndrome	Clostri dium%	Salmo nellosis%	Acute dysentery %	Collie infection %	AII UE%
The body temperature to 38 °C	25	31,7	40,5	34,4	10,9
The body temperature to 38 °C	62,5	63,3	40,5	43,8	69,5
Duration of t°					
Up to 2 days	0	25,0	21,4	31,3	30,4
Duration t° from 2 to 3 days	37,5	43,3	42,9	37,5	32,6
Duration t°C 7 days	50,0	26,7	16,7	9,4	17,4

Thus, in the development of the role of acute intestinal infections Clostridium difficile is higher than the child's age below. The study of epidemiological history revealed that the factors contributing to the emergence of pseudomembranous colitis are also crowding of patients in the wards, lack of staff, the violation of the sanitary regime and the irrational use of antibiotics. All children on the background of antibiotics and 30% of cases as "nosocomial infection" noted varying degrees of severity diarrheal syndrome and fever. More than half of children constituted the newly admitted to the hospital. In the study of comorbidity in all our children have been identified varying degrees of anemia (P>0,.05), a rachitis (p>0,001), fermentopathy and dysbacterioses bowel from childbirth, perinatal encephalopathy (P> 0.05) more often with hypertensive syndrome.

With the acute onset of the disease in the hospital received 80,6% of children and the temperature was within normal limits in 3 (8.3%), in 22 (61,1%) patients was rising to 37–38 °C, in 11 (30 6%) — above the temperature was 38 °C. Duration of the temperature in days was 16,0±4,7. The disease occurs in moderate and severe form. In 1/3 of the patients were found mixed infection "clostridium salmonellosis +".

Clostridial infection in all patients manifest in dry and pale skin and mucous membranes, weakness and lethargy. In 97.2% of patients noted a violation of appetite, at 58.4% — a sleep disorder.

Dyspeptic symptoms like abdominal pain met — at 88.9%, with a duration of 6,5 ± 0,72 days, bloating — 61.1% –66.7% rumbling intestines, sigmoid pain — 30,6% tenesmus and its equivalents — 25%, single vomiting episode in — 50,0%. In 27 (75,0%) patients experienced children diarrhea with mucus and 25% — streaked with blood, with more than half of the patients stool frequency was noted more than 8–10 times a day. The duration of diarrhea in days was –12,4±1,62. As well it was characteristic of generalization of infection, sepsis especially in "mixed" infection.

An objective examination, 83,3% of patients found hepatomegaly, at 38,9% — splenomegaly, at 61.1% — abnormal noise at the top of the heart and the lungs rhonchuses (table 2).

Table 2. – Comparative assessment of the severity of diarrhea syndrome

Diarrheal syndrome	Clostri dium%	Salmo nellosis%	Acute dysentery%	Collie infection %	AII UE%
Duration abdominal migraine					
Duration from 4 days	61,1	21,7	38,1	40,6	39,0
Duration t° from 4 to 7 days	66,7	50,0	42,9	25,0	37,0
Duration from 7 days	37,5	21,7	9,5	9,4	8,7
Other symptoms					
Incompletely closed anus	62,5	78,3	76,2	65,3	71,7
Vomiting single	62,5	61,7	47,6	53,1	60,9
Manifold single;	12,5	13,3	7,1	37,6	8,7
Frequency duration t° from 2 to 3 days 5–8 раз	62,5	55	57,1	43,8	60,9
Frequency 10 and more	37,5	38,3	23,8	0	10,9
Bloating	61,1	61,7	57,1	40,6	69,6
Teinesmos	25	13,3	40,5	15,6	17,5
Borborygmus	37,5	71,7	38,1	53,1	56,5

Due to the fact that the violations of stool persisted after resolution of the inflammatory process and the discontinuation of antibiotic therapy for all children was conducted microbiological studies of feces. Conducted analysis of the microflora of the colon revealed that children were studied pronounced shifts in the gut microbiota, namely, 61.1% of children have no bifidobacteria in 66,7% — lactobacilli, while E.coli deficit was observed in 38 8% of patients. Strains of E.coli with hemolysing activity were identified in 22% of children. In some of the children in the relevant credits were sown fungi of the genus Candida, Klebsiella and Proteus.

Questions to treat diarrhea caused by Clostridium difficile hitherto not fully developed. List of antibacterial drugs used in the treatment of intestinal infections caused by Clostridium difficile, including metronidazole, vancomycin, Bactrim, rifampicin and fluoroquinolones. Currently, the most promising direction in the treatment of this infection is the use of probiotics. In the treatment of moderate forms of the disease, we used metronidazole tablets in age dosage in the treatment of severe diseases include therapy metrogil i/v and rifampicin injections. To correct the identified dysbiotic shifts all children were assigned -immunobifidum. The control groups of 10 children were treated for 20 days standard bifidumbakterin (10 doses per day).

Domestic drug "Immunobifidum" manufactured by the original technology of "Orom-biological product" (Tashkent), consists of a complex of probiotic "Bifidobacterium bifidum" and extract fetal "immunoaktivina" does not contain artificial colors or preservatives. 1 tablet contains 10 doses of viable bifidumbacterin. The drug was administered to children under 1 year 1 tablet and aged 1 to 3 years 2 tablets before going to bed. The course of therapy was 20 days.

Upon completion of the full course of therapy normalization of stool, the disappearance of signs of inflammation in the intestines scatological study and microbiological improvement was observed for all the children of the main group. After the event frequency of dysbiosis of III degree decreased by 3 times (68,0% –26,6%) and II degree — 2 times (28% –14.3%). The positive effect was observed in 62,5% of children.

Thus, clinical analysis showed that intestinal infections caused by Clostridium difficile is also characteristic symptoms of diarrhea and intoxication syndrome. The risk factors and the development of the disease is the early irrational use of antibiotics, prolonged hospital stay as a source of nosocomial infections, as well as age of the children.

Qualitative and quantitative changes in intestinal microflora are considered as one of the mechanisms that support and aggravating for the main disease

Conclusions:

1. The presented data give reason to treat an intestinal infection caused by Clostridium difficile as a serious problem that requires a specific approach to the diagnosis and the corresponding complex treatment

2. The obtained results allowed us to draw a reasonable conclusion about the usefulness of the drug "Immunobifidum" in the treatment of intestinal infection caused by Clostridium difficile.

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Efficiency estimation of multi-modal approach to anesthetic management of long-term, abdominal operative interventions

Abstract: 86 patients has been examined and divided into 3 groups depending on the method of anesthesia have been investigated. Patients of 1st and 2nd groups were made traditional general anesthesia. Patients of 3rd group were made general anesthesia on the principle of multi-modal anesthesia.

Multi-modal approach to anesthetic management with the force to all parts of pain pathogenesis promotes the stability of hemodynamic indications in post-operative period, to minimum tension of homeostasis, less expressed reaction of sympathoadrenal system due to good neurovegetative protection.

Keywords: multi-modal analgesia, epidural analgesia, pain

Introduction

Multy-modal analgesia foresees the simaltenious usage of 2 or more analgesics having different acting mechanisms and allowing to reach the adequate narcosis at minimum side-

effects typical for the big doses of one analgesic in the mono-therapy regimen [6; 9].

The background of narcosis is traditionally meant the system dosing of opiod analgesics. The opiod componet is the base of pain protection on the central (segmental and over-segmental) level. The medications of this group activate the endogenous anti-nociceptive system (central analgesia), but they cannot supply the full anesthetic protection. Opioid analgesics do not influence on peripheral and segmental non-opioid mechanisms of nociception and do not prevent the central sencitization and hyperalgia. That is why the general anesthetics in combination with the most powerful analgesics are not able to fully protect the patient from pain at the operating trauma. So, it should be the impact on the non-opiod mechanisms of pain development. [1; 4; 11].

The process of the central sencitization is connected with stimulating effect of neuro-transmitters (amino acids of aspartate and glutamate) on receptors and it leads to the fixing of hyperalgia. The general anesthetic ketamine in small doses is the antagonist of these neuro-transmitters receptors. The applying of the multy-modal central analgesia as the combination of opioid and ketamine in small doses allows to stop the process of the central sencitization. [6; 10; 12].

One of the key-moments of multy-modal central analgesia is the choice of the anesthesia's method during the operation. It is determined on the base of modern clinical and experimental investigations that the general anesthesias disposing the perception of pain do not supply the blockade of passing nociceptive impulses even on supra-segmental level let alone the spinal level. The general dosage of opioid analgesics inputting into the system bloodstream do not supply the enough blockade of opiate receptors of back horns of spinal corde. Weakly anesthetized spinal cord is exposed to the strong struck by damaging stimules and it provokes above mentioned plastic changes of the central nervous system. So, the adequacy level of anesthesia is determined by the quality of the spinal cord protection. That is why the regional anesthesia with the full blockade of afferent nociceptive impulsation in this or that type must be the obligatory and main component of intra-operative protection [14; 16].

Aim

The aim of our investigation is the collation of the anesthesia course in patients with using multi-modal approach to anesthetic management and to traditional general anesthesia at long-term operative interventions.

Materials and methods

86 patients has been examined and divided into 3 groups depending on anesthesia and postoperative pain relief ways. There were no differences on age, gender and types of operations and concomitant pathology among patients of three groups (tables 1; 2; 3). The presence of concomitant pathology did not limit the using of multimodal anesthesia at the condition of elimination of hypovolemia and anemia correction.

Table 1. – Distribution of patients by sex, abs %

Sex	1st group	2nd group	3rd group	Totally
Females	9 (34,5)	8 (30,7)	10 (29,4)	27 (31,4)
Males	17 (65,3)	18 (69,3)	24 (70,6)	59 (68,6)
Totally/average age	26 (100)/51,6±	26 (100)/46,2±	34 (100)/55±	86 (100)

Ways of premedication, anesthesia and post-operative pain-relief are given in Table 4.

Table 2. – Distribution of patients in groups due to performed operations, abs%

Operations	1st group	2nd group	3rd group	Totally
Gastrectomy	8 (30,8)	8 (30,8)	14 (41,2)	30 (34,8)
Subtotal stomach resection	14 (53,8)	15 (57,7)	11 (32,4)	40 (46,5)
Extirpation of gullet with following pactics	3 (11,6)	2 (7,7)	4 (11,7)	9 (10,5)
Pancreatoduodenal resection	1 (3,8)	1 (3,8)	5 (14,7)	7 (8,2)
Totally	26 (100)	26 (100)	34 (100)	86 (100)

Table 3. Distribution of patients by nature of concomitant pathology at abdominal operations, abs%

Concomitant pathology	1st group (26)	2nd group (26)	3rd group (34)	Totally (86)
Hypertensive disease	6 (23)	7 (27)	14 (41,4)	27 (31,3)
Diabetes	3 (11,5)	1 (3,7)	2 (5,8)	6 (7)
Anaemia	9 (35)	8 (30,7)	8 (23,5)	25 (29)
Cachexia	5 (19,2)	5 (19,4)	5 (14,7)	15 (17,5)
Chronic bronchitis	1 (3,7)	1 (3,7)	2 (5,8)	4 (4,6)
HD+D+ CB	2 (7,6)	4 (15,5)	3 (8,8)	9 (10,6)

Such type of patients admitted to hospital with emergency pathology connected with surgical problem (hemorrhage, 3rd level dysphagy, cachexia and etc.) and was operated after correction of general condition medicamentous or endo-

scopic hemostasis, hypovolemia, water-electrolytic violations elimination. According to condition and revealed nature of

disorders patients refered to II–III E class by ASA.

Table 4. – Ways of premedication, anesthesia and post-operative
pain-relief in patients with abdominal operations (n=86)

Level	1st group	2nd group	3rd group
Premedication	promedol 20 mg, dimedrol 10 mg, atropine 0,5 mg. H_2 blocker nevofam 20 mg i\m (4,4± 0,2 h)	promedol 20 mg, dimedrol 10 mg, atropine 0,5 mg. H_2 blocker nevofam 20 mg i\m (4,3± 0,3 h)	promedol 20 mg, dimedrol 10 mg, atropine 0,5 mg. H_2 blocker nevofam 20 mg, ketonal 100 mg i\m (4,5± 0,4 h)
Anesthesia maintenance	combined general anesthesia with use of fentanil 5–8 mkg/kg/hour, ketamin 1,5–2 mg/kg/hour	combined general anesthesia with use of izofluran 1,5–2 v\% and fentanil 5–8 mkg\kg\hour	Izofluran 0,8–1 v\%, ketamin 0,8 mg\kg — block of NMDA receptors, analgetic component EDA + bolus dosing of fentanil in traumatic moments of operation by 0,1mg i\v.
Post-operative pain relief	morphine 30–50 mg\a day i\m	morphine 30–50 mg\a day i\m	NSAID ketonal 300mg; EDA bupivacaine 0,25%-50mg each 5–6 hours (or lidokain 1%-200 mg each 3–4 hours); morphine 10 mg i\m at necessity

Ways of investigation:

• ECG for estimation of data of central hemodynamics (Hitachi –500);

• Average blood pressure (ABP), general peripheral vascular resistance (GPVR), left ventricular work index (LVWI), cardiac index (CI) were counted by calculating methods;

• ABP monitoring, heart rate frequency (HRF), ECG, saturation (SpO_2) with Nikon-Kohden (Japan) monitor.

• Blood analysis:
    — glucosae level, stress hormone level (cortisol);
• Kidney secretory function:
    — minute diuresis (MD);
    — glomerular filtration (GF);
    — tubular reabsorption (TR);
• Temperature gradient
• Extubation time;

Results. At initial level of intra-operative period there were no differences in hemodynamics, glucose and cortisol indications between groups. Investigations of acid-base balance of blood at all levels did not reveal disorders. Reliable differences between groups were determined in pH and BE indexes.

At the 2nd level investigation in the 2nd and 3rd groups there were pointed reliable differences in hemodynamics indexes in compare with the 1st one. Decreasing of ABP on 13% in the 3rd group in compare with the 1st one was pointed. LVWI index was reliably higher in the 1st group for 21% in compare with the 3rd one. There was revealed a reliable difference of LVWI on 13,1% at comparing of groups 2 and 3 (pict.1).

Glucose index at comparing of groups 1 and 3 was higher on 17,2% in 1st group and at comparing groups 2 and 3 there was revealed reliable difference equal 15,5%. Cortisol index did not have reliable differences in all groups.

At a comparative estimation of the main parameters of hemodynamics at traumatic moment of operation (3rd level) between groups 1 and 2 was pointed that HRF in patients of 1st group was 13% higher in compare with 2nd group patients. Correspondingly to HR changes there was a reliable difference in LVWI index which was 19,6% higher in 1st group than in the 2nd one. Humoral indexes of stress — cortisol and glucose were also measured according to hemodynamic indexes (pict.2,3) and were 24% higher in 1st group than in the 2nd one. Comparing groups 1 and 3 we revealed that ABP index was higher in group 1 for 19,6%, HRF was higher for 34%. Patients from group 1 had EF lower for 10,2%, LVWI was higher for 45,2%, and index CI reliably increased for 21,8%. Glucose index in group 1 was higher for 56% and cortisol — was higher for 81%.

The comparison of patients from groups 2 and 3 at traumatic part of operative intervention was interesting. In spite of extra use of inhalation anesthetics in group 2 there was a difference in hemodynamic and humoral indexes in compare with the patients of group 3. ABP in group 2 was higher for 14,8%, HRF — for 24,9%. CI and EF did not have reliable differences. LVWI increased in patients of group 2 for 21,4% in compare with group 3. Cortisol index in group 2 was higher for 45,2% and glucose index was 56% higher in compare with group 3.

Only by the end of operation hemodynamics indexes approached to normodynamia and did not have reliable differences between groups. Comparing groups 1 and 2 it was revealed that glucose index was 22% higher in group 1and cortisol index was normal. Comparing groups 1 and we revealed reliable increasing of cortisol index in group 1 34,4% and glucose — for 59,6%. Comparing groups 2 and 3 we revealed reliable increasing of glucose for 30% in group and cortisol — for 26% in group 2.
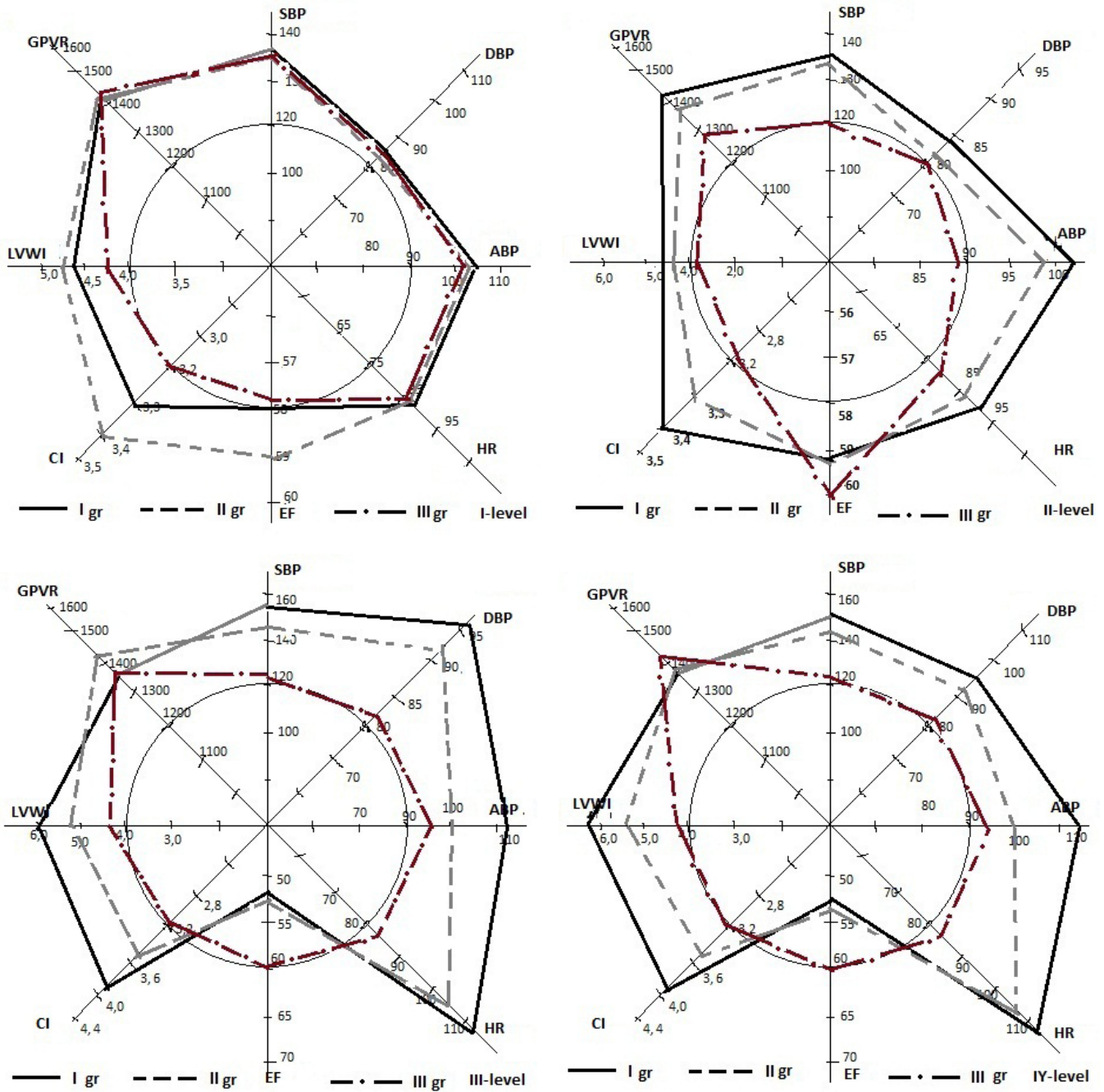
Figure 1. – Hemodynamics indexes in intra-operative period in compare
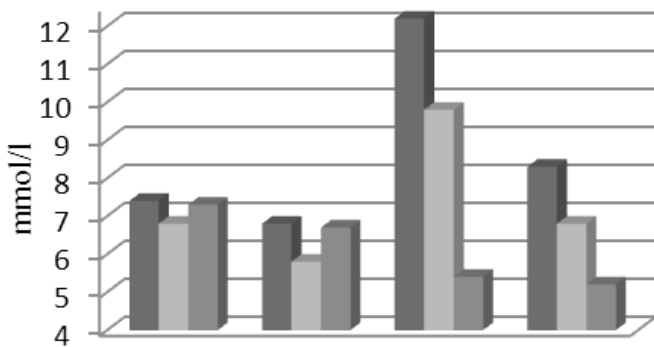between groups at abdominal operative intervention
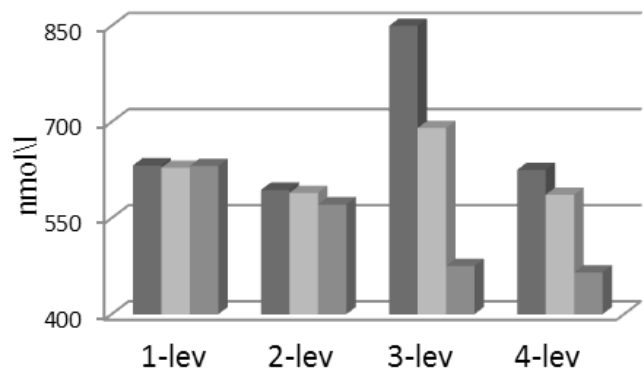
Figure 2. – Glucosae indexes

Figure 3. – Cortisol indexes

Investigation of kidney excretory function (table 5) detected following: in group 3 with the use of multimodal analgesia minute dieresis remained normal. In 1st group this index was 26,8% lower and in group 2 was 22,3% lower than in group 3. GF index in 1st group decreased 17,4% than in group 3 and in a 2nd group this index was decreased on 19,6% than in group 3.

Table 5. – Kidney excretory function at long traumatic operations in intra-operative period

Indexes	Group	1st stage	2nd stage	3rd stage	4th stage
MD, ml\min	1	1,03±0,02	0,92±0,04	0,82±0,01 [a]	0,76±0,01 [a]
	2	1,12±0,08	0,93±0,01	0,87±0,02 [b]	0,77±0,03 [b]
	3	1,13±0,09	1,04±0,08	1,12±0,01	1,14±0,09
GF, ml\min	1	97,5±2,5	90,3±2,4	84,5±2,5 [a]	80,3±2,4 [a]
	2	98,2±3,2	91,4±2,3	82,2±3,2 [b]	81,2±2,2 [b]
	3	106,1±4,2	104,4±5,3	102,3±4,2	104,2±4,2
TR,%	1	98,9±0,2	98,3±1,4	99,0±1,3	99,0±1,3
	2	98,8±1,1	98,6±1,2	98,2±1,4	99,1±1,4
	3	98,6±1,4	98,4±1,3	98,6±1,1	98,5±1,2

Note. p<0,05: a- comparison groups 1 and 3; b- comparison groups 2 and 3.

Comparing temperature gradient index (table 6) between groups we detected that temperature gradient in the group with multimodal analgesia was 65,2% lower in compare with group 1 and was 62,2% lower in compare with group 2.

Table 6. – Temperature index in intra-operative period at long traumatic operative interventions

Indexes	Group	1st stage	2nd stage	3rd stage	4th stage
t cutaneous, ˚C	1	36,62±0,12	36,73±0,08	36,12±0,14	36,02±0,15
	2	36,71±0,11	36,63±0,07	36,13±0,13	36,03±0,14
	3	36,63±0,09	36,74±0,05	36,82±0,09	36,81±0,05
t rectal, ˚C	1	37,12±0,13	37,31±0,16	37,32±0,13	37,24±0,14
	2	37,21±0,14	37,21±0,11	37,23±0,16	37,31±0,13
	3	37,13±0,12	37,23±0,17	37,21±0,12	37,23±0,11
Temperature gradient, ˚C	1	0,51±0,05	0,63±0,07	1,21±0,04 [ab]	1,22±0,01 [b]
	2	0,53±0,04	0,64±0,03	1,12±0,01 [a]	1,31±0,05
	3	0,52±0,03	0,51±0,06	0,42±0,04 [c]	0,43±0,06 [c]

Note. p<0,05: a — comparison groups 1 and 2; b — comparison groups 1 and 3; c — comparison groups 2 and 3.

Use of inhalation anesthetics in scheme of general anesthesia in group 2 allowed to reduce consumption of narcotic analgetics for 35% in compare with 1st patients group. Combined use of general anesthesia and EDA in intra-operative period in patients of group 3 allowed to reduce reliably fentanyl consumption to 60,8% in compare with the 1st one. Comparing groups 2 and 3 revealed reducing fentanyl in group with the use of multimodal anesthesia on 40%.

Paying attention on duration and traumacity of operation patients of three groups were performed prolonged artificial lung ventilation (PALV). Extubation period of patients from group 1 was 31% higher than in the 2nd one. In group 3 extubation period was 52,3% lower than in group 2 and 67% lower than in group 1.

Conclusion

1. At emergency traumatic long abdominal operative interventions use of perioperative multimodal anesthesia promotes stability of central and peripheral hemodynamics indexes, temperature gradient, sympato-adrenal system, ABB, kidney secretory function in compare with traditional analgesia.

2. Use of multimodal analgesia at volumetric abdominal operations promotes reducing of narcotic analgetics consumption in intraoperative period to 60,8% in compare with traditional one.

3. It is recommended to use the following protocol of multimodal anesthesia and postoperative pain relief with the aim of increasing the quality of anesthesia at emergency, long-termed, traumatic, abdominal operative interventions:

Premedication	NSAID -ketonal 100 mg (principle of preemptive analgesia), promedol 20 mg, dimedrol 10 mg, atropine 0,5 mg, nevofam 20 mg i\m.
Type of regional block	Puncture and catheterization of epidural area at the level Th7–Th8, catheter is conducted cranially at 5–6 sm, test-dose — lydocaine 2%-40 mg. Main dose — 0,5% bupivacaine 50–60 mg + fentanyl 0,05 mg (or lydocaine 2% –200 mg + fentanyl 0,05 mg).

Induction into anesthesia	dormicum 0,15–0,2 mg\kg, fentanyl 3 mkg\kg, ketamin 0,8–1mg\kg with the aime of NMDA receptors block. Myoplegia — arcuronium 0,08–0,1 mg\kg, dithylin 1–1,5 mg\kg.
Anesthesia maintenance	Hypnotic component- isophluran approx. 0,8–1 o6%; Analgetic component EDA (bupivacaine 0,5% 15–25 mg or lydocaine 2%- 80 mg) + bolus dosing of fentanyl into traumatic periods of operation 0,1 mg. i\v. Myoplegia — arcuronium 0,025 mg\kg\h
Postoperative period	NSAID ketonal 300 mg i\m; EDA bupivacaine 0,25%-50 mg each 5–6 hours (or lydocaine 1%-100 mg each 3–4 hours); Morphine 10 mg i\m at necessity

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Transcultural aspects of opium addiction in the Republic of Uzbekistan

Abstract: Ethno-cultural and socio-economic factors have an effect both on the prevalence of the disease in question across given territory and on peculiarities of its clinical dynamics. Many studies demonstrated direct relationship between various ethnic and socio-cultural characteristics, clinical structure, and dynamics of mental disorders. The work was initiated to study transcultural characteristics of opium addicts among Uzbek indigenous inhabitants and Slavs born and residing in Uzbekistan.

Keywords: ethno-cultural peculiarities, opium addiction, transcultural aspects

1. Introduction

Opium addiction is a potentially life-threatening condition (UNODC, World Drug Report, 2010) bringing about adverse social consequences, such as an addict's low social integration, economic dependence, and criminal activity. On the one hand, globalization of economic and public relations characterizes the present stage of humanity's development; on the other hand, cultural diversity and ethnic heterogeneity of population can be seen in many countries.

Up-to-datedness of transcultural aspects of addiction is corroborated by the necessity to understand mechanisms of addictive attraction and its essential characteristics. Findings from considerable number of studies addressing various aspects of drug addiction demonstrated that its epidemiological and clinical peculiarities are determined by a number of factors. Ethno-cultural and socio-economic factors have an effect both on the prevalence of the disease in question across given territory, and on peculiarities of its clinical dynamics

(Malakhov, 2004; Dech, Ndtei & Machleidt, 2003; Ingman, Ollendick & Akande, 1999; Maramba & Hall, 2002). Ethnic background of an individual is an extremely significant factor for transcultural addiction medicine, as it anchors definite characteristics of a microenvironment for a personality to form. It is a key to conceptualization of ethno-psychiatry and ethnic addiction medicine (Sayed M. A., 2003).

Today, the cases when medical teamwork is based upon procedures and approaches marginally meeting a patient's ethno-cultural needs are quite frequent. In this context, it is intriguing to use literature data to study peculiarities of medical teamwork in the ambiguous context of cultural situation influencing its productivity.

Geographic and geopolitical position of Uzbekistan as well as economic, social, natural, climatic, and ethnic peculiarities of its different regions produce an effect on spread of non-medical use of substances and drug addiction. They have impact on clinical picture and dynamics of the latter, willingness of drug addicts to seek medical care, and, eventually, on its efficacy. To a large extent, socio-psychological relations in each of these communities are determined by cultural stereotypes and traditions taking shape throughout history.

Formation of Uzbek ethnic group dates back as far as XI century. Islam plays a great role in both social and family life of Uzbeks.

Religion determined and still determines family and everyday life, a person's world outlook; its impact on political processes, the art, and the way of life is extremely strong.

There is a strict hierarchy in an extended Uzbek family members of which belong to different generations but live together. Unhesitating obedience to a head of the family and respect to the seniors is the basis to form relationships in this family. A woman's role in Uzbek family is dual: she is mother and a family head's wife, on the one hand, but a subordinate to her husband, her husband's father or mother, on the other. This is not discrimination but a century-old tradition based on experience of living in local challenging conditions. The Slav ethnic group started forming in Uzbekistan within the period from 1904 to 1924. This ethnic group includes Russians, Ukrainians and Byelorussians who confess Eastern Orthodox Christianity.

Many studies demonstrated a direct relationship between various ethnic and socio-cultural characteristics, clinical structure, and dynamics of mental disorders. This relationship is a precondition for development of differential approaches to diagnosis and treatment of these disorders with ethno-cultural factors taken into account (Comas-Diaz & Jakobsen, 1987; Hall, 2001; Triandis, 1989). The purpose of the current study was to study transcultural characteristics of opium addicts among Uzbek indigenous inhabitants, and Slavs born and residing in Uzbekistan.

2. Materials and methods

The study was conducted at the Tertiary Detox Center, Public Health Ministry, Republic of Uzbekistan (Tashkent) within the period from February 3, 2010 to June 24, 2013. We examined 112 patients aged over 17 years matching criteria of DSM–IV (American Association: Diagnostic and Statistical Manual of Mental Diseases, 2000) who underwent detoxification at the Center within the period not longer than 20 days and abused no substances within ≤ 7 days.

The patients who sought treatment voluntarily and had any significant other, such as a parent or a relative to make up an objective medical history were included. Patients with endogenic mental derangements complicated with drug addiction, those unattainable for a follow-up, and persons combining drugs or replacing other psychoactive substances with heroin were excluded. The study which neither impaired trial subjects' rights nor threaten their health was performed in compliance with biomedical ethics requirements, as stated by World Medical Association Declaration of Helsinki. All patients signed written informed consent to take part in the study.

The patients were divided into two groups. The first group included sixty one Uzbek indigenous inhabitants, 39 (63.9%) men and 22 (36.1%) women among them who were selected on the basis of data from nationality information field in a passport, and appropriate information from relatives about nationality of the patient's parents. Fifty one Slavs born and residing in Uzbekistan, 19 (37.3%) men and 32 (62.7%) women among them who were selected according to the above procedure were included into the second group.

The patients were examined after arrest of clinical manifestations of acute intoxication and withdrawal syndrome. A set of socio-demographic and ethno-cultural data for each patient was included into a form for clinical-epidemiological and ethno-cultural study (Reference Data Collection Form). Also, the form included a set of general and drug dependence data as well as clinical-dynamic characteristics of drug dependence syndrome as per ICD 10 (International Statistical Classification of Diseases and Related Health Problems) and DSM–IV-TR. Formal data and information from the patient's relatives was added. Protocol of the study was developed by the author in cooperation with specialists in addiction medicine, such as physicians, psychologists, and social workers.

All data were processed by means of a Microsoft Excel, STATISTICA 6 and BIOSTAT software packet. Logistic regression was used to calculate odds ratio (OR) and 95% confidence interval (CI). Statistical significance of differences between parameters was assessed by means of non-parametric $\chi 2$ test (Pearson's criterion). Quantitative parameters are presented as M ± SD, Median (Me) and 25th and 75th percentiles (IQR, Inter Quartile Range). Intergroup differences were considered significant at $p < 0.05$.

3. Results

One hundred sixty seven patients were invited to participate, 112 of them signed the informed consent form.

Patients in the first group were confidently older (mean age 35.3 ± 7.38; Me 35.0 years; IQR 31.0–40.0) than those in the second one (mean age 32.4 ± 6.62; Me 33.0 years; IQR

28.5–36.0; P=0.03). Patients in the second group started abusing heroin earlier than those in the first one (23.2 ± 5.91 years; *Me* 22.0 years; IQR 19.0–27.0 versus 26.0 ± 7.28 years; *Me* 25.0 years; IQR 20.0–31.0: P=0.03) (Table).

Table 1. – Clinical-demographic characteristics of opium addicts

	1st group, n=61		2-nd group, n=51	
	Men	Women	Men	Women
Age, years	35.9 ± 6.39	34.5 ± 8.97 $P_1 = 0.48$	34.6 ± 4.76 $P_{1m} = 0.44$	31.0 ± 7.25 $P_2 = 0.06$ $P_{1w} = 0.12$
Me; IQR	36.0; 31.0–40.0	33.0; 28.5–40.5	36.0; 32.0–38.0	30.5; 27.0–34,3
Disease duration, years	35.9 ± 6.39	35.9 ± 6.39 $P_1 = 0.06$	35.9 ± 6.39 $P_1 = 0.85$	35.9 ± 6.39 $P_2 = 0.08$ $P_{1w} = 0.59$
Me; IQR	10.0; 7.5–13.0	8.0; 4.3–9.8	11.0; 6.0–15.0	8.5; 3.8–12.0
Age of abuse onset, years	25.4 ± 6.37	27.0 ± 8.72 $P_1 = 0.41$	23.9 ± 5.29 $P_{1m} = 0.38$	22.8 ± 6.99 $P_2 = 0.56$ $P_{1w} = 0.06$
Me; IQR	25.0; 20.0–29.0	25.0; 20.0–31.8	22.0; 20.0–28.0	21.0; 18.0–25.5
Education University/college Secondary school No education	9 (23.1%)/ 23 (59.0%) 7 (17.9%)	3 (13.6%)/ 12 (54.5%) 7 (31.8%)	3 (15.8%)/ 8 (42.1%) 8 (42.1%)	2 (6.3%)/ 22 (68.8%) 7 (21.9%) 1 (3.1%)

Note: P_1 — men to women relation, P_{1m} — in relation to men in the 1st group, P_2 — in relation to men in the 2nd group, P_{1w} — in relation to women in the 1st group

In general, hereditary alcoholic or drug abuse burden was observed in 8.2% of Uzbeks versus 17.7% of Slavs (OR 2.40; 95%CI 0.75–7.69; P=0.22). In the Slav women it was observed more frequently though insignificantly (25.0% versus 18.2%; OR 1.50; 95%CI 0.39–5.77; P=0.80). High proportion of patients with hereditary alcoholic and drug abuse burden is the evidence for the role of negative home environment associated with alcohol or drug abuse of parents, and initiation of drug abuse in the family.

The proportion of patients with excitable accentuation of personality traits manifested by typical discontent, anger, and exasperation followed by rage, excessive exigency to the others, fault-finding, and straightforwardness was high in both groups (51.3% of Uzbeks versus 31.6% of Slavs; OR 2.28; 95%CI 0.72–7.23; P=0.26). Among Uzbek women number of patients with hysteric accentuation of personality traits was greater than among Slav women (50.0% versus 31.3%; OR 2.20; 95%CI 0.72–6.75; P=0.27). Hysteric accentuation of personality traits was more typical of Uzbek women than of Uzbek men (50.0% versus 10.3% OR 8.75; 95%CI 2.31–33.1; P=0.002); the tendency was absent in the Slavs (31.3% of women versus 10.5% of men; OR 3.86; 95%CI 0.75–20.0; P=0.18). Egocentrism, wish to gain in any situation at the expense of the others one way or another (mostly when obtaining money for a "fix"), ostentation, deceitfulness, and melodrama were among typical manifestations. Prone to objection, the patients overacted in response to criticism. The findings highlight significant role of premorbid hereditary burden and accentuation of personality traits in formation of drug addiction. As adverse social environment aggravated by alcohol abuse of parents facilitates accentuation of personal traits, to our mind, these clinical-dynamic parameters should be considered as the interrelated ones.

Forty one (70.7%) men were raised in the two-parent family, 36 Uzbeks (87.8%) and 5 Slavs (12.2%) among them. A male teenager often starts his way towards drug addiction due to abandonment in the family with his falling under the influence of a so-called gang lord. Number of women raised in the two-parent family was almost half as much as men (70.7% versus 37.0%; OR 4.10: 95%CI 1.86–9.04; P<0.0001); there were almost three times more Uzbek women raised in the two-parent family than Slav ones (59.1% versus 21.9%, OR 5.16; 95%CI 1.56–17.0). 34 (63.0%) women were raised in the single-parent family; number of Uzbek women in this category was significantly less (n=9, 26.5%) than Slav ones (n=25, 73.5%) (OR 0.13; 95%CI 0.04–0.38; P<0.0001).

Among causes of the single-parent Uzbek family death of female patient's father or mother in her infancy or adolescence was the foremost one (n=6, 17.6%) followed by the divorce (n=3, 8.8%). In the Slav group the divorce came the first (n=14, 41.2%) followed by death of a female patient's father or mother in her infancy or adolescence (n=4, 11.8%). Seven Slav women were raised by single mother in complete ignorance of father.

Uzbek patients started abusing drugs later (at 17–18 years, in the average) than Slav ones (at 14–15 years, in the average). When seeking medical care, contrary to Slav patients, the Uzbek ones turned to the state-run detox settings less frequently (36.1% versus 64.6%; OR 0.31; 95%CI 0.14–0.68; P=0.006). They usually sought treatment by folk healers ("tabibs" in

Uzbek) and preferred to be treated by folk medicine methods. Given the influence of folk medicine and religious methods of treatment in some regions, this is an ethno-cultural peculiarity commonly found in the indigenous inhabitants.

Most patients were wholly dependent of their relatives and led parasitic mode of life. There were no significant intergroup differences by the parameter. As to marital status, the number of married Uzbek men was greater than the number of Slav ones, though insignificantly (71.8% versus 52.6%, OR 0.95; 95%CI 0.32–2.84; P= 0.85). Half of Uzbek female drug addicts (n=11, 50.0%) were married; a substance abusing husband was an incentive for them to start substance abusing themselves. Five (22.7%) Uzbek women were divorced; 6 (27.3%) were single; 13 (59.1%) cohabited with an addict. In the Slav group seven (21.9%) women were married (OR 0.28; 95%CI 0.09–0.91; P=0.06); 12 (37.5%) women were divorced (OR 2.04; 95%CI 0.60–6.96; P=0.40); 13 (40.6%) patients were single (OR 1.82; 95%CI 0.56–5.90; P=0.47), and 17 (53.1%) cohabited with an addict (OR 0.78; 95%CI 0.26–2.35; P=0.88).

Confessing Islam, the traditional faith, all Uzbek patients keep up religious views and traditions. 64% of the Slav patients identified themselves as believers acknowledging Eastern Orthodox Christianity but they did not observe traditions or ceremonies appropriate to their belief.

Seeking medical care the Uzbek female drug addicts, as a rule, visited the detox setting accompanied by either father or elder brother (n=15, 68.2%), mother (n=4, 18.2%), a help-mate, or a friend (n=3, 13.6%). A help-mate (n=18, 56.3%), a cohabiter (n=11, 34.4%), either mother or sister (n=3, 9.4%) usually accompanied the Slav females.

4. Discussion

The findings from our study suggest that it is the integrated effect of an individual's socio-psychological and biological peculiarities in combination with ethno- and trans-cultural factors that underlies formation of drug dependence with its clinical-dynamic characteristics.

As a rule, after sudden death of a parent orphaned children of minority age in Uzbek families are patronized by full-aged able-bodied brothers and sisters, grandmothers and grandfathers, or any other relatives. In addition, an Uzbek family is built upon traditional patriarchal relations inferring juniors-to-seniors and woman- to- man submission as well as on strict division of duties by age and sex. All above are Uzbek population's ethno-cultural peculiarities vital for prevention of the youngsters' deviant behavior patterns and formation of social key points. Positive social influence confirms significant role of the community dominant personalities, parents, wives and the clergy in prevention and spread of drug addiction as well as in treatment and medical-social rehabilitation of drug addicts.

Predomination of married persons among Uzbeks is another ethno-cultural peculiarity. It is typical of Uzbeks to start a family at a young age, to have responsibility both before society and near relatives. As we have already mentioned, seeking medical care significantly greater proportion of the Uzbek female drug addicts visited the detox setting accompanied by relatives (68.3% versus 13.6%). This fact reflects ethno-cultural peculiarity of the Uzbek woman to recognize father's or elder's domination.

It should be noted that, irrespective of ethnicity, a substance using husband or cohabiter was an incentive for women to start using substance herself (59.1% and 53.1% of Uzbek and Slav females, respectively). It is extremely important to consider the fact for development of rehabilitation measures and prevention of drug addiction.

The findings of our study suggest that national heritages, adherence to traditional religion, and cultural valuables as well as well-established patterns of family life feature potent factor for formation of counter-narcotic resistance.

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Section 9. Pedagogy

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Mental development in the upbringing system
of the Abkhazian national pedagogy

Abstract: Interpretation of peculiarities of the upbringing system of the Abkhazian national pedagogy in the point of view of intellectual development of younger generations is examined in the article. The author is sure that it is possible to raise quality of training of younger generations on the level of modern requirements only by the critical analysis and creative development of the best educational models and upbringing experience of the Abkhazians. That is why there is an urgent need of use for student teaching, along with innovations, the educational and upbringing practice of Abkhazians imprinted in the accumulated and concentrated principles of the Abkhazian national pedagogy. In this regard the school has to make use actively and skillfully of this experience in the activity for improvement of all educational process.

Keywords: Abkhazia, the Republic of Abkhazia, Abkhazians, Abkhazian people, Abkhazian national pedagogy, intellectual upbringing, mental development, principles of upbringing.

Abkhazia is the country having difficult centuries-old history. The peculiarities of socio-economic, political and historical conditions of its development, lifestyle, and culture determined the formation of typical traits, and features of social, national and psychological temper of representatives of the nation. This fact had a considerable impact on the Abkhazian national pedagogy.

"It is quite obvious that national educational systems … have accurately expressed peculiarities determined by distinctions in culture, mental features, its national interests, values, an ethnic self-assessment and consciousness of identity with the ethnos" [8, 134]. Ethnic consciousness of the people grows from day to day and substantial increase of interest in native heritage is presently noted. In this regard, purposeful familiarizing of younger generation with cultural and spiritual values becomes one of the priority directions. Today development support of national cultures and ethnic educational models are recognized actual at world level. Use of traditional forms of education and training is implemented on the basis of their adaptation to modern realities. National cultures are integrated into uniform cultural and civilization space. Any school teacher has to head this process; however, he is not prepared for it. That is why today in pedagogical educational institutions it is necessary to assign a worthy place for studying of national pedagogical legacy by future teachers. For this purpose it is necessary to organize studying of special courses like "Ethnopedagogy of the Abkhazians", "Pedagogical culture of the Abkhazians", etc. Besides the question of intellectual upbringing in the Abkhazian national pedagogy must be included as the separate section.

It is possible to raise quality of training and upbringing of younger generations on the level of modern requirements only by the critical analysis and creative development of the best educational models and upbringing experience of the Abkhazians. That is why there is an urgent need of use for student teaching, along with innovations, the educational and upbringing practice of Abkhazians imprinted in the accumulated and concentrated principles of the Abkhazian national pedagogy. In this regard the school has to make use actively and skillfully of this experience in the activity for improvement of all educational process.

The idea of intellectual upbringing and training of the Abkhazian national pedagogy is its fundamental principle. It is aimed at comprehensive and harmonious preparation of children for life and labour and occupies one of the leading places in the Abkhazian pedagogy. Here the learning process is considered to be the way of enrichment by useful knowledge, and intelligence to be the erudition tool.

Representatives of the republic understood that the education defines, eventually, position of the person in society. It was considered that all acts and deeds of a man are connected with his knowledge or ignorance of life, his awareness (or incomprehension) of himself and surrounding world.

Popular wisdom considered the process of learning as continuous act of intellectual enrichment and abilities gaining, while the wit itself was perceived as the tool of knowledge and transformation of surrounding reality.

The analysis of the Abkhazian pedagogical culture sources affords ground for concluding that the content of intellectual education of younger generation included knowledge acquisi-

tion of the native language, history data of the people, geography, natural sciences, mathematics, astronomy. In the course of obtaining information the youth developed memory and observation skills, thinking, became inured to constant mental activity.

For intellectual upbringing the people used the following methods: conversation, story, explanation, examples and testing. Personal experience of children was highly motivated in knowledge assimilation. Adults tried to develop their inner-directedness, abilities to make proper conclusions and use the acquired material practically, to solve dubious situations.

Practice and drills taking into consideration salience and age features of children figure prominently in the Abkhazian national pedagogy as an effective method of intellectual training. Tongue twisters, riddles were widely used for development of the speech. Children independently and under the control of adults competed in inventing and guessing of riddles, in speed of a pronunciation of tongue twisters, etc.

In intellectual upbringing the national pedagogy aimed to develop children's observation. The people considered that the person has to be able to observe life independently and to obtain knowledge from this supervision. The considerable place in the Abkhazian folklore is taken also by such a method as examination of knowledge and abilities. The illustrative example of this can be the fairy tale "Judge and Poor's Daughter" [1, 245–247]. National teachers considered that knowledge control promotes consolidation of skills and development of mental capacities.

The Abkhazians in intellectual education attached great importance to the conditions stimulating informative activity of the person. In works of folklore problematic situations are described, where need of the solution of the arisen vital tasks forces heroes to look for knowledge, to address for a clever council.

It is important to mention personal experience in intellectual education and role of mentors as conductors of social influence on the younger generation. In the Abkhazian society mental qualities were obtained in a family and promoted in public places under the leadership of old people, grown wise by long experience of life. Therefore the idea about a role of mentors and teachers is expressed in national creativity through the relation to wisdom, mind and carriers of these skills — to clever people. In all statements (and there is a lot of them in materials of the Abkhazian pedagogy) it is emphasized that a human being is the imitating creature, therefore good tutors and parents teach their pupils examples, suggest to watch their work.

Research of materials on the Abkhazian pedagogy showed that the most effective means of intellectual education is the national folklore. It was passed in centuries from father to son. Therefore the most successful according to the content and form methods of mental training were recorded in it. The figurative, rhymed, easily memorable texts, finger-type games were well-known and with pleasure were performed by both adults, and children.

Since birth a child listened to lullabies tunes. "A baby that could not understand the speech yet already reacted to a quiet voice and tender singing of its mother. "This was encouraged by perceiving of quiet lull rhythms, melodies and traditional intonation" [5, 35–40]. Therefore it is clear that maternal caress and tenderness in combination with the melody became the most effective method of intellectual and esthetic education of children during the infantile period.

In Abkhazian lullabies songs a mother expresses the ideal vision of her child's future. The pedagogical value of songs consists in training for gradual knowledge of environment. They awakened children's interest in careful attitude to the nature, people and animals [7, 489–490]. Song caress fascinated children, helped them to perceive better mother's voice, the native language and surrounding world in general. They developed need for communication and knowledge, to show thus activity. Mother encouraged her kid with words about his luck, about his cleverness. It inspired confidence that when he becomes grownup he will be able to resolve all difficulties and life tasks.

Along with songs, fairy tales played an important role in the Abkhazian national pedagogy. They promoted intellectual development of children. Listening to stories of old men, children passed a peculiar home education, acquired heritage of national creativity, got acquainted with history and family genealogy, tribe [2, 57].

The Abkhazian fauna is rich and therefore its representatives often become heroes of national fairy tales. The wolf most often acts as a predatory being, resourceful, angry and silly. Weak animals, thanks to the mind, cunning, resourcefulness easily deceive it. The important place is given to the image of a fox. It is one of the most careful and crafty animals. The fairy fox is endowed with poetically exaggerated lines of finesse and wins a victory over eternal enemies of man, i. e. a wolf, a bear and others.

Proceeding from the above-stated, it is possible to tell that fairy tales and legends, being the most important means of intellectual, moral upbringing formed a positive outlook of youth, expanded and deepened its attitude, cultivated feelings and beliefs. By means of Abkhazian fairy tales any person had a unique opportunity to compare biographies of heroes with life and behavior of common people.

In intellectual education of children legends, one of main types of folklore, play an important role. Unlike the legendry in the basis of legends is the "miracle" narrating about the past, and sometimes and about the present [6, 25].

In Abkhazia there exist different types of folklore legends. They are cosmogonic, toponymic, religious, historical and others. Cosmogonic ones usually tell about changes in the Universe and various heavenly phenomena. Toponymic legends are devoted to an origin of names of districts, mountains, lakes, rivers and so on. As characteristic for this cycle the history of tragic love, connected with the certain district which received the name on behalf of the main characters. The example of this can be the town in the Republic of Abkhazia named Gudauta.

Legends, as well as legendaries, have historical and informative educational value. Universal and moral qualities are reflected in them: truthfulness, dedication, devotion to the people. In legends are condemned: avidity, perfidy, deception, treason, greed, self-interest and other negative qualities of people.

In the parables, defined as an educational and allegorical genre of literature, the narration is under construction on any moral didactic problem. The pedagogical importance of this genre for intellectual education is that national teachers or storytellers by disclosure of the content of negative and positive categories seek to inspire in the interlocutor importance of certain ethical standards of behavior [3, 83].

Thus, fairy tales, legends and parables bear important semantic intellectual value. They incorporated wisdom of the people and therefore give rich material for development children's ability to analyze, compare the vital and surrounding facts.

Proverbs and sayings occupy one of the main places in the Abkhazian pedagogy and in mind development in particular. It should be noted that for intellectual upbringing they are irreplaceable because in a short form express all shades of intellectual development and a technique of its training. Proverbs and sayings of Abkhazians give answers to the questions arising for centuries and bear in themselves, as well as fairy tales, functions of mental and labour education.

But proverbs and sayings did not remain invariable, once and for all frozen. They transformed by time along with the development of the nation and were filled with a new sense because reflected in all variety the life of the Abkhazians. In them, as well as possible, flexibility and depth of national mind was shown. This proves the necessity of modern school to adopt it.

In the national folklore also an important place was allotted for riddles. National teachers knew that a source of puzzles is the diverse world surrounding the person. Both answers and the text of riddles differ in big concreteness and entertaining, which includes the pedagogical importance of their impact on development of children.

The value of riddles is also contained in the task set to understand and reach an essence of subjects, the phenomena, having mobilized own ingenuity, the saved-up stock of knowledge. Not incidentally, practice of asking riddles did not lose the value both presently and widely occurs in the national environment.

The pedagogical purpose of riddles consists in development of logical thinking, in enrichment knowledge with subjects and phenomena of the visual world, in acquaintance with human life and activity. Children not only used them, but also composed new ones, stirring up the cerebration, expanding the representations and knowledge of surrounding world. Therefore if in proverbs ingenious mind of the people was shown, in riddles purposeful exercise of mind is concluded. If proverbs and sayings sought to generalize all life, socio-historical experience of the working people, puzzles were limited to learning of the main external signs of subjects and phenomena.

Thus, riddles and proverbs, national songs and fairy tales, supplementing each other at intellectual development, made system of verbal educational tools of younger generation. In the absence of school training they had great informative value, served as important means of intellectual education.

Verbal means of intellectual education gained the further development and fixing in games. The national pedagogy attached huge significance to childish sports in which were closely connected a word, a melody and action. An important role of child's play consists in development of dexterity, sharpness and resourcefulness. By means of games the respect for the existing order of things, folk traditions were accomplished, its accustoming to rules of conduct was carried out. National teachers knew that games for children represent the serious occupations. They are some kind of lessons preparing for labour and adulthood [4, 34].

The national pedagogy used the fact that game is directly connected with intellectual development as it is surprisingly various and rich field of children's activity. Game, along with songs, fairy tales, riddles, tongue twisters, recitatives and other types of national creativity, is a tool of intellectual education.

Thus, thanks to means of the Abkhazian pedagogy, namely folklore, national creativity and games, intellectual education of the younger generation was carried out. Abkhazians considered it base for comprehensive preparation the young to life. By means of folklore older generations inspired youth with respect for knowledge. The love to brainwork was instilled. Parents formed children's skills which were applied in everyday life: in games, work, and communication with nature. Children under the leadership of adults became proficient in a certain system of applied knowledge: in agriculture, cattle breeding, processing of agricultural production, in the seasonal phenomena, etc.

Representations of people are accurately reflected in works of national creativity that intellectual upbringing is carried out in unity with labor, moral, art, physical ones. Teaching children, telling them fairy tales, asking riddles, singing songs, participating in childish sports, parents, national tutors cared of development of mental capacities, diligence, art tastes, physical force, love to the nature, the native land, its historical past. Thus, mastering knowledge, familiarizing with spiritual culture of the people promoted development of interest in culture, traditions of other people, and it, in turn, strengthened trust of the people to each other, pulled together them, consolidated the nation.

The knowledge connected to national traditions and moral experience promoted formation at children, along with elements of moral education, elements of the intellectual education occupying one of the leading places in national pedagogy. At the same time, as modern experience of education testifies, it traditions in the field of intellectual development are considerably lost. Elimination of these gaps in education is one of the tasks of modern school.

The carried-out analysis serves as the bright proof of the educational heritage of the Abkhazian people. It includes unconditional pedagogical opportunities for intellectual potential growth of modern younger generation of the Republic of Abkhazia.

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Childhood and children in preliterate societies according to archeology

Abstract: The article offers a reconstruction of elements of the upbringing of children of different age groups according to archaeological studies in the southern Urals and in the Volga region.

Keywords: education, age group children, archaeological culture of the bronze age, Sarmatians and Scythians, the results of archaeological research, South Urals and the Volga region.

The situation of children in ancient societies is of great interest, both from the point of view of archaeology and history, and from the point of view of the history of pedagogy. Archaeology, studying the material culture of antiquity, at the present time and can provide factual material for the reconstruction of the age stratification of children, relationship with parents and come from, as well as certain specific "classes" within the family.

Based on available data, children under the age of 7–8 years (Inf.) were a particular age group. The children of this group of tribal timber Carcass and Alakul cultures of the bronze age of the southern Urals, Middle and Lower Volga region were buried either in the same grave with an older woman (mother?), or separately, when baby burial form the outer circle of graves, on the perimeter of the mound [1, c. 17; 6, fig.15; 6, fig.26; 6, fig.40, 1; 7, c. 91; 7, c. 191]. Similarly, did the population Catacomb archaeological culture of the bronze age in the Lower Volga region [7, c. 189]. The important fact is the presence of a pair of children's burials of tribal timber Carcass and Alakul cultures of the bronze age of the southern Urals [1, c. 22–23].

The Sauromatians Lower Volga and the southern Urals in the VI–IV centuries BC to bury children with adults, or separately, but next to the graves of adults, as a rule, the graves of women (mothers?) [8, c. 228; 9, c. 62–64, 73, 87]. So did the nomadic tribes of the Sarmatians (end of the IV–II centuries BC) of the southern Urals and the Lower Volga region [8, c. 300, 318; 9, c. 62, 92–100]. Together with female babies were buried and the Scythians [10, c. 59, 280]. On the contrary, the children of the tribes Siglinskas archaeological culture (V–IV centuries BC) of Central Asia and were buried in some family tombs with adults, but in special places, usually in the legs of adults [2, c. 56]. In the graves of children Carcass archaeological culture of the bronze age of the Middle Volga, Lower Volga and the southern Urals, as well as Sintashta archaeological culture of the southern Urals, relevant to this age group, found sheep Astragalus [1, c. 24; 4, c. 42; 6, c. 124–125; 7, c. 94;].

The bulk of children's burials in this age group, at best, contains only dishes with funeral food. In addition, in the group there are a number of burials of children, which are clearly distinguished by their high social status. Thus, among the burials Carcass archaeological culture of the Lower Volga region, Sintashta archaeological culture of the southern Urals and Peter archaeological culture, is known one burial of children with weapons [4, c. 42; 5; 7, c. 101]. Similar facts exist for the Sarmatians of the southern Urals [9, c. 112].

The second age group presented uninitialized teenagers 9–11 years, tribes Alakul archaeological culture of the southern Urals were buried separately from adults and grave goods, as well as the overwhelming number of adults, occasionally presents only decorations [1, c. 10]. Nomads Siglinskas culture these teenagers were buried in cells together with adults, with them in one row, but on the edges of these series. Separation from adults and reflects the inventory. A weapon with adolescents was found only arrows, and other weapons (daggers, stonechats, etc.) normally present in the inventory next

age group (25 years and older) [2, c. 57]. Equal (pair) burial adolescents and adult women, as well as single children known to the Sarmatians (III–II centuries BC) in the Lower Volga region [7, c. 58–59, 96; 8, c. 283–284, 318].

Adolescents (12–15 years), apparently already passed the rite of initiation and representing the third age group had the appropriate equipment, there is little to distinguish them from those of adults. Known paired burials girls (women?) carcass culture together with their peers and older men on the territory of the Lower Volga region [7, c. 191]. For burials girls Carcass culture of the bronze age of the Middle Volga and Lower Volga region, in addition to ceramics, characteristic only of rare jewelry, usually bronze bracelets or other jewelry [6, c. 62; 7, c. 69, 86]. Similarly, did the Sauromatians and Sarmatians of the Lower Volga region and southern Urals, however, part of the «teenagers» were buried separately [7, c. 80; 9, c. 64]. Obviously, this age group can no longer be regarded as a teen, and should be part of any adult members of society.

Based on the foregoing, we can conclude that the children of the first age group were still very closely associated with their mothers. Apparently, therefore, the population of

these cultures of the bronze age they were buried in the same graves with women (mothers?), or at least, near their graves. There are facts that did the same in the Eneolithic tribes of Pit archaeological culture of the Lower Volga region [7, c. 80; 9, c. 64]. However, the situation of children findings emphasize and mutton bones, clearly served as toys.

As an exception, not the rule, should consider those facts when the boys were supplied with weapons. Apparently, it was stressed that they belong to a special military stratum of society, followers of traditions which they were to become in the afterlife. It should be especially noted and paired Carcass burial and Alakul archaeological cultures of this group, reflecting emerged in the second quarter of the second Millennium BC in the border areas the tradition of early marriage conspiracy, obviously, had important political significance [3, c. 94–95].

Judging from the available facts, children of the second age group also were associated with women, but burial (transition to adult) inventory suggests that this relationship is significantly weakened. Time children's games goes by «children» prepared by the society for the transition to adulthood, «playing» in adult life.

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The problem of identification of educational achievements of bachelors: competence approach

Abstract: The article considers the approaches to solving the problem of identification of the results and educational achievements of university students. In the article there were set and analyzed some inner meanings of the term "educational potential" in the context of the objectives of competence formation and personal qualities and competence diagnosing.

Introduction

Education in Russia has always been the object of close attention of the state, since the general and professional culture, professionalism and upbringing of a citizen in many ways determine the quality of life and the level of development the society in a civilized world.

The positive experience of the successful construction of the educational space in the European countries has inspired many other countries, including Russia. Therefore, competence approach to learning at the turn of the XX century may indeed be regarded as a kind of technological breakthrough. Unfortunately so far in the scientific community it is represented rather ambiguously, usually as a conceptual phenomenon. The overall impression of uncertainty is strengthened by the fact that in education there is no universal "winning formula". Every time we begin to organize the learning process, we have to re-build "competence approach" in order to achieve specific goals and objectives of the educational activities in the optimal conditions under which the fullest subjective educational potentials are revealed and better educational outcomes are provided. That is why for all its attractiveness and innovation the competence approach in education has been and remains an inexhaustible source of "unanswered questions", a motivational factor and also a personal scientific research motivator for many beginners and venerable scholars.

Main part

The development of higher education in Russia in the context of competence approach identifies new objectives of basic and applied pedagogical researches, which include:

• correction of traditional methodological principles and methodical settings, comparison of scientific views and positions; determination of the importance of upbringing/teaching as process and outcome;

• differentiation of the conceptual field of competence ("kompetentsiya"), categorical definition of the basic concepts of correlation and structuring;

• theoretical and methodological substantiation of didactic conditions of the goals and objectives implementation of a holistic educational process;

• meaningful and semantic content of subjective competence ("kompetentnost") formation activity in the context of the Federal State Educational Standard (FSES) requirements, correlated with student-centered, activity, axiological approach to training etc.

The studies of foreign authors show the deepest development of common competence ("kompetentnost") problems (J. Raven, J. Coleman, R. Collins, E. de Bono, S. Schneider, L. Spencer etc). In Russian psychological and pedagogical literature there were considered the competence ("kompetentnost") formation processes in the subject areas of activity, in communication, also knowledge competences and so

on (V. S. Bibler, V. V. Davydov, S. Yu. Kurganov, A. M. Matyushkin, N. F. Talyzina, M. A. Kholodnaya, D. B. El'konin, P. M. Erdniev etc.) [1]. Special attention should be paid to the point of view of I. A. Zimnaya who shares the ideas of many well-known Russian scholars (A. V. Khutorskoi, D. A. Makhotin, Yu. G. Tatur etc). They agree about the idea that "competence" as an entity has two related but phenomenologically different shades of meaning (two different words in the Russian language: "kompetentsiya" vs "kompetentnost"). On the one hand competence ("kompetentnost") is the integrative generalizing result formed in the educational process. On the other hand competence ("kompetentsiya") is based on the requirements of "kompetentnost" and includes them [5, 18].

The research results prove the point of view of I. A. Zimnaya who giving the reference to the primary source materials pays attention to three main interpretations of the concept competence ("kompetentsia"): pedagogical one: learning content that should be mastered; "expropriated, given in advance social requirements (norms) to the educational preparation of the student, required for his high-quality productive activities" (A. V. Khutorskoi); psychological one: intellectual, subjective, psychological characteristics of a person that contribute to the mastering of learning content and his further activities (H. Heckhausen, R. Whaite, D. C. McClelland etc.); linguo-psychological one: inner psychic formation as a kind of a programme (N. Khomskiy, I. A. Zimnaya) [5, 20].

Delimitation of conceptual fields of competence ("kompetentsiya"/"kompetentnost"), definition of the basic categorical concepts, their correlation and structuring allows us to follow the logic of scientific research in the context of the previously identified patterns of special military competence ("kompetentnost") formation of university students [1].

The choice of methodological bases and methodical facilities is of fundamental importance for us because it forms the basis of the educational potential theory, and it also defines a longitudinal practice of professional competence ("kompetentnost") formation of teachers and future educational achievements of bachelors.

Setting goals, defining objectives and filling the content of educational activities with meaningful predicates is directly related to the problem of identifying the educational achievements of students throughout the set of didactic conditions of competence ("kompetentnost") formation. The latter is based on the selection of educational competence ("kompetentsiya") evaluation criteria/indicators; and also on given structural components and components of subjective professional competence ("kompetentnost") included in educational technology [3].

The adequacy in choosing the diagnostic tools for professional competence ("kompetentnost") formation and the successful identification of university students' educational achievements on condition of their fulfillment of the re-

quirements within the limits of normative result formation parameters suggests: level indicators; diagnostic procedures for assessing the dynamics of changes in the personal characteristics and parameters of activity and communication; evaluative comparison techniques, ranging, classification etc. Proprietary technological solutions are related to the diagnosing and educational achievement evaluation algorithms. They are defined according to the competence ("kompetentnost") formation objectives within the practice oriented mechanisms of substitution, transformation and adaptation of the professional activity knowledge and skills represented by descriptors and competencies ("kompetentsiya").

Informative and meaningful content of subjective activity in the context of the federal state educational standard requirements and basic bachelor educational programmes (050100 Teacher training education) is usually related to student-centered, activity and axiological approaches to learning in the holistic educational process [4].

The idea of the process integrity is connected to the relevant requirements for a substantial increase of the academic level of vocational training, for the organization of effective in-class work and independent work of university students. Among the priority personality formation objectives we should mention student upbringing in keeping with the spirit of respect for human dignity, national traditions, religious feelings and preferences, international cultural heritage forming the infinite human values and the source of vitality.

Unused system resources of the innovative component of the education reform are the main opportunities of the basic bachelor educational programmes. That's why it is really important to discover some new consistent patterns of upbringing and education matching the aims and objectives of a holistic educational process, and using the existing evaluation criteria and indicators of quality of the basic bachelor educational programmes.

Educational opportunity as a phenomenon and characteristic of the holistic educational process manifests itself on the levels of organization and implementation of basic bachelor educational programmes. But the structure of federal state educational standard and basic bachelor educational programmes includes the resources to form the professionally significant qualities and competences ("kompetentsiya").

For example, the unit of fundamental and natural science disciplines provides intellectual skills of scientific thinking, creativity etc. The unit of engineering and professional subjects provides the students with the opportunity to use intellectual skills. The unit of humanitarian disciplines creates their views, outlook, system of value orientations etc [4].

Summing up, it should be mentioned that the educational potential of the individual is better revealed within the objective-oriented, meaningful, motivational and notional filling of the activity of the subject of the educational process, and according to the optimal set of didactic conditions and adequate choice of result diagnosing means.

Conclusion

The problem of identifying the educational process results is determined by the meaningful ambiguity of the competence concept ("kompetentsiya"/"kompetentnost") and the following contradictions:

• insufficient development of the theoretical foundations of competence approach in relation to the goals, objectives and content of the educational activities of the subjects;

• absence of practice-oriented mechanisms of substitution, transformation and adaptation of the knowledge and skills presented in the educational content of the new competence framework;

• necessity to select criteria and indicators for evaluation of educational competencies ("kompetentsiya"), components and constituents of professional competence ("kompetentnost") of the individual;

• implicit, indifferent nature of the federal state educational standard requirements imposed on the learning outcomes of students.

The solution of this problem opens up various opportunities for further improvement of the educational process in the university, and also for further improvement of the quality of higher education in Russia and abroad.

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Quality criteria as a key element of higher education

Abstract: the article deals with the problem of quality assessment in the field of higher education in the world. The authors describe the solution of the problem in the modern period of reforms and globalization and authors' analysis of main quality assessment approaches are presented in the article.

Keywords: higher education, quality improvement, quality criteria, quality assessment, traditional and alternative approaches.

Quality is a key aspect of higher education. In many countries that are striving to guarantee all students the right to education, the emphasis on access to education often leads to the fact that the issues of quality of education remain in the shadows. But the quality of education depends on the volume and degree of assimilation of the students received knowledge; other than that it is the quality of education determines the extent to which students will be able in the future to take advantage of this knowledge to their personal and social development and the contribution they can make to the development of the country. Emphasis should be placed on improving the quality of higher education in all its aspects. But there are different approaches of quality improvement and quality assessment in the world.

How to study quality issues in the light of such different approaches?

Let us consider some possible solutions.

In *Austria*, the Act of 1997 on the quality assessment of education calls for measures to ensure the quality of the universities. In 2000 a law on accreditation was adopted for private universities. Britain did not follow the path of mutual recognition of accreditation procedures. A national approach is based, or rather moving towards mutual recognition of studies and qualifications. UK do not advocate the creation of a single comprehensive European Agency for Quality Assurance in Higher Education, as it believes that successfully operating system to ensure the quality of training should be sensitive to the expanding needs of a particular society, which are institutions of higher education. As the best way of strengthening cooperation in this field is to ensure they offer the comparability of learning outcomes.

Due to the nature of the education system in *Scotland*, measures to ensure the quality is somewhat different from the others. Funding Council for Higher Education in Scotland is officially authorized to assess the quality of educational services in 50 state-run institutions. In collaboration with the Council and the higher education institutions a method of institutional audit to improve the quality has been developed. This model considers greater involvement of students in the assessment process. It is used now in partnership with relevant stakeholders. This approach is used only in Scotland and includes a national student development service for those students who wish to take part in activities to ensure the quality, and the national theme in the field of quality improvement. The priority directions of quality improvement in Scotland are «evaluation» and «satisfaction of students.»

In *Italy*, the only functioning institution that assesses the quality of education is the National Committee of quality assessing (NCQA). Its responsibilities include the definition of common criteria for evaluating some universities, facilitate the appropriate pilot scheme, expansion of some valuation techniques, development of an annual program of external quality assessment in universities. Another important task of NCQA is to determine the criteria and methods of harmonization of the internal quality control conducted by relevant departments of universities. At the request of the Ministry, the Committee also plays an advisory role, conducts preliminary assessment and defines the standards, parameters and methodology rules. There is also a method of evaluating training programs involving the assignment of degree (bachelor's or master's degree), which is used in universities on a voluntary basis.

Norwegian Agency for Quality Assurance in Education (NAQA) was established by the Parliament of *Norway* in 2002. The Agency is an independent government agency created to oversee the quality of the higher education system through the assessment, accreditation and recognition of quality of systems, institutions and courses. The Agency performs the following functions:

— monitors the quality of higher education;

— evaluates the work of private universities as well as public universities which want to change their status;

— accredit academic courses when such accreditation can not be given to a specific institution;

— monitors and evaluates the accreditation which have been already given.

All *Finnish universities* are obliged to assess their own work and to participate in an independent evaluation. An evaluation report is open to the public. Students play an important role in all assessments. Most evaluations are measured by international experts. Finnish Council of Higher Education Evaluation (FCHEE) was established in 1995 to assist universities in the assessment [13].

The European Union investigated the impact of education on the economic growth. It was proved conclusively that advance in the education level increases macroeconomic performance. In particular, according to the data of the foregoing EU investigation, the annual 1% human capital increase in the higher education ensures 5.9% increase in the GDP growth rate per capita. The average training period (with account for the school, BA, MD and the doctoral degree training) is permanently increasing worldwide. By this indicator the leadership belongs to Australia where the average education term is 21 years; in the G8 countries between 1950 and 2012 the average period of the human cognitive activity only in the course of primary education increased by about 50% [4].

However, the conditions needed for the innovative socially oriented economic development are placing greater demands on the level of people's education. Over the recent years, the international community is challenged with a problem of assessing the quality of education due to fundamental changes in views on the education management itself.

On the one hand, we are witnessing the globalization of the world economy and hence education. On the other hand, it is quite understandable that each state, including Russia, desires to have its own national competitive system of higher education. Therefore, the problem of the quality of education in modern society is viewed both at the state level and at the level of higher education institutions themselves, thereby setting the vector of development for new areas of the pedagogical theory and practice. This background has given a fresh impetus to the research in the education sphere. "International organizations such as the Organization for Economic Cooperation and Development publish a variety of expert estimations and international statistical data that affect the national policy of education reforms and corresponding legislative initiatives. At the same time their analysis yields an unbiased assessment of national processes taking into account the specifics of a particular country" [1, p.14]. However, the authors are quite right to point out that the political integration makes the definition of national boundaries needed for carrying out comparative studies difficult and not to be taken for granted, because earlier there existed traditional frameworks for the internal (national) and foreign (European) policies.

What is normally understood by the quality of education? A short glossary of quality management terms for higher and secondary vocational education gives the following definition: "The Quality of Education is well-balanced compliance of education (viewed as a result, as a process, as an educational system) with statutory needs, objectives, requirements, regulations (standards)" [3]. This definition allows better understanding of the Berlin Communiqué requirements for national higher education quality assurance (QA) systems which include:

— definition of the responsibilities of universities and other institutions engaged in the educational process;

— comparable criteria and methodologies for assessing the quality of education;

— external and internal evaluation of university education programs, also with students participation;

— the system of accreditation, certification and similar procedures;

— evidence of international participation in assessment, international cooperation and international scientific and educational networks [2].

No less relevant is the issue of new forms of monitoring, assessment and certification of student achievements that could take into account trends towards integration into the world educational space. Solutions are closely connected with the investigation into the problem of assessing the quality of education in the higher education system with reference to the best world standards of the QA system organization. One of possible ways might be to study the USA experience. The American system of higher vocational education is focused on the development of the individuality of a future specialist, it is diversified and has its own traditions in seeking new forms of education quality assessment. In this context, a comprehensive analysis of the experience gained in ensuring the quality of the US university training, identifying its components, revealing the most valuable ideas and results of their implementation in educational practices presents not only theoretical interest but is of practical value.

The US higher school experience is also important from the point of view of its challenges also relevant for the current Russian education system: cutbacks in state funding and withdrawal of the federal government from the higher education; excessive specialism in training; undue expansion of elective courses in the vocational training program; the need to enhance the state participation in the higher school sector while maintaining the autonomy of universities..

In the US system of the higher education quality assessment there are traditional and alternative approaches. The traditional approach uses a three-level assessment: the educational institution level, the curriculum level and the course of study level. The traditional approach to evaluating the quality of the institution and the quality of the proposed curriculum is based on existing rankings and a certain reputation; the emphasis is placed on the peer assessment by authorized persons of a university, heads of departments or deans of faculties. It should be noted that the traditional approach to evaluating the quality of education has been

used in the United States for a long time: the ranking practice was pioneered by the famous American psychologist J. Cattell (1910); later, quite a number of investigations on the ranking issue were performed by R. Hughes. At present, the annual ranking of the best universities according to US News & World Reports (USNWR) takes into account the following seven assessment categories analyzed by C. Conrad and D. Gupta in the "Traditional and Emerging Approaches to Assessing the Quality of Higher Educational Institutions, Programs and Courses " [5]:

1. Peer assessment (25%) — The prestige is estimated by rectors, vice-rectors and deans of the universities that fall into the same category;

2. Students (15%) — The ratio of enrolled students to applicants; the proportion of enrolled students included in top ten percent of high school graduates; SAT and ACT tests;

3. Higher Educational Institution (20%) — Financing; the percentage of faculties granting the highest academic degrees; the percentage of FTE faculties; students-to-faculty ratio; the percentage of BA degree groups with less than 20 students and more than 50 students;

4. Graduates and expelled students (20%) — The percentage of first-year students who applied for the six-year program and the percentage of first-year students who returned after expulsion a year later;

5. Finance (10%) — The average costs for a FTE student (training, research, services);

6. Donations from alumni (5%)

7. The actual and projected percentage of graduates on the six-year training program (5%).

Therefore, the assessment of the education quality takes into account an aggregate of components making it possible to apply a system-based approach to the education system and provide a full analysis of the quality of education at a higher educational institution.

Although such an approach has proved its effectiveness and exists for almost a century, it is still facing criticism from researchers in this field. A number of American scientists bring up the issue of biased quality assessment using of the above criteria [8, p.256–261]:

— experts may be misinformed about the quality of education in a given educational institution;

— alumni can overrate their university;

— the level of students who study at a university that is assigned a high rating is often overestimated;

— current teaching quality may be inconsistent with the rating assigned a couple of years ago;

— experts conducting the assessment may be influenced by the age or size of the institution

According to R. Harnett, M. Clark and others, these ratings hardly reflect the quality of teaching or the level of civil and social responsibility as well as the level of students cooperation [10, p. 1310–1314]. Much more criticism is expressed by C. Conrad and D. Eagan calling such ratings "game of prestige" played by universities and colleges to maintain their status and reputation, rather than to improve the quality of education [7, p. 5–16].

In 1986, C. Conrad and R. Blackburn [6, pp.249–266] identified four main areas required for evaluation of the curriculum: university, students, resources and learning outcomes. Thus, it was proposed to assess the quality of learning programs taking into account the quality of the teaching staff, the quality of student learning outcomes and the quality of material and technical resources. Moreover, each component should be considered individually to achieve more reliable evaluation results, and the curriculum must be assessed by three categories — formative assessment, summative (final) assessment and assessment of the progress in mastering the curriculum — since each type of assessment pursues its own purpose [9, 11].

The purpose of the formative assessment is to improve the quality of the learning program by providing constructive information. This type of assessment helps a new program either enter the desired level or get asserted or help the existing program to try new strategies to improve its quality [9].

The summative (final) assessment summarizes the effectiveness of the program based on the results obtained in the course of the program implementation or after its completion. It determines the overall quality of the program and its advantages [12].

Along with traditional approaches to the education quality assessment there emerge alternative methods. On the one hand, alternative approaches focus on the evaluation of a higher educational institution, its curriculum and a course of studying a certain discipline, and on the other hand, the assessment system is based on the learning outcomes. Therefore, an attempt was made to get away from the summative assessment in favor of the instructional process and development of the individual educational space of students.

The most popular investigation to gauge the education quality at the educational institution level is "The National Survey of Student Engagement — NSSE)" funded by the J. Howard Pugh public charity fund and conducted under the supervision of the Indiana University. The term "student engagement" is understood by American researchers as learning in the active environment where certain conditions are created for the active cooperation of all participants in the educational process.

Contrary to traditional forms of assessment (e. g., ranking) focused on the amount of resources available for training, NSSE pays special attention to how universities engage students in the learning process. The main goal of the NSSE is getting information about the participation of students in different programs and the life of their institution. This is done to find out how students spend their time and what they receive as a result of training, all of which, in turn, is necessary to improve the quality of education.

As it happens, the main criterion in assessing a higher education institution is whether it meets the collaboration principle, while the priority of the individual becomes the

principal benchmark in the learning process. To be taken into account is creation of proper conditions for self-realization and development of the student. The principal feature of this type of assessment is its reliance on the learning outcomes rather than on the quantity of various resources provided by the university or a certain rating.

When assessing the quality of the learning program, American experts are paying increasing attention to such forms of quality assessment that are based on indicators of the student's learning level rather than on quantitative or ranking indicators: high quality programs are those that take into account joint activities of students, teachers and administration. Alternative systems of the higher education quality assessment in the USA address the problem in question at three levels — they analyze the activities of higher education institutions, evaluate the curriculum and the course of study. In doing so they estimate the quality of teaching taking into account the development of knowledge and skills of students.

Conclusion

Thus, the quality of education has a worldwide basis. It is noted in the program of socio-economic development of Russia that the current education system does not fully meet the needs of the labor market. In connection with this fact a priority for the Government of the Russian Federation in the field of education are:

— legislative support of modernization in the field of higher education;

— bringing the content and structure of the professional training in line with current labor market needs;

— increasing the availability of educational services;

— creating an independent quality evaluation.

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The using of listening varieties during the formation of skills to perceive and understand texts in Ukrainian-language by pupils on basic link schools with Russian language of instruction

Abstract: The article deals with the question of the kind of listening that is used to listening and learning to improve pupils learning in basic link of schools teaching in Russian. The author argues that listening and learning will be more successful if you use texts for listening consistently.

Keywords: listening, types of listening, contact and remote listening, figuring listening, intro, detailed and critical listening, speech activity.

Among all types of speech activities (listening, speaking, reading, writing) is most commonly used listening and speaking. In the real world of communication for listening accounts for 40 to 50 percent of the time [1].

One of the main objectives of the lessons of the Ukrainian language in schools teaching in Russian is to develop oral communication skills, including listening [3]. Ability to listen and hear, understand spoken underlying proficiency [1, p. 4].

Research on teaching students to pay attention to listening M. Vashulenko, J. Button, S. Dubovik, T. Ladyzhenskaya, M. Lvov, S. Tsinko, A. Khoroshkovska and others. Scientific analysis of literature indicates that interest scientists formation problem audiatyvnyh skills increases. However, questions remain relevant organizations audiatyvnoyi of Russian students basic level schools in the Ukrainian language lessons.

The purpose of the article is to attempt types of listening, learning to choose the right kind of listening during development of students' basic link schools with Russian language skills to perceive and understand the Ukrainian-language texts.

Listening called perception and understanding of speech. The problems related to speech perception by ear and success in developing the skills of listening, concerning not only the ability to perceive and respond to the "acoustic oscillations" in another language, but also understand the processes of linguistic articulation [4].

Despite the considerable amount of research in this field, Formation and listening skills development among language skills is important. This is due to the following reasons: listening defined as a byproduct of speaking, respectively work on it is sporadic and confined to the analysis of messages that are most appropriate and usually far removed from the perception of speech in vivo [7]. It is also believed that one reason for the lack of attention to listening is that until recently, it seemed easy enough speech skill.

Scientists who have studied the types of memory shown that the advantage in remembering words does not belong to the visual memorization and remembering the ear [3]. Research has confirmed that the information obtained through the auditory channel stored in memory is much stronger than in visual text. Thus, one of the main ways of educational information in the classroom is the perception and understanding of speech — listening [3]. Psychologists consider listening as one of the most important means of teaching speaking [6].

Conventionally, listening can be divided into contact and distance. Research contact and remote listening give radically different results. According to data obtained through experimental laboratory studies, the difference in the understanding of the same message that was listened to in terms of *contact and remote listening* is from 20 to 40 percent [3].

When the contact is always listening utilized visual and other support, namely the perception of nonverbal channel information (gestures, facial expressions, gestures, looks, clothes, communication distance). Also, the direct contact are much variatyvnishe paraverbalni characteristics: intonation, tone of voice, speed of speech, is also widely used excessive language elements: pause, repeat, changes in the formulation [3].

Remote listening Ukrainian-language texts, is more complex and requires a high level of Ukrainian language and requires much training.

Knowledge of vocabulary and grammar that allows to perceive «printed information», it is sometimes not enough. While listening is crucial «linguistic guess» that is meaningful process based on — an assumption which, in turn, is based on the «vocabulary» and a clear understanding of grammatical features of the language by which information is transmitted. Because listening is considered as perceptual and mental-mnemonic activity.

Remote listening effective in teaching Ukrainian stage when the main system structure of the language is learned. Initially, the study of Ukrainian language between hearing and speech analyzers installed functional relationship that allows for listening to distinguish speech sounds and identify them with the corresponding phonemes.

This process occurs as a result of a number of complex logic operations, analysis, synthesis, deduction, induction, comparison, abstraction, specification [3]. Also, listening as a form of speech perception are both text sounds, recogniz-

ing lexical and grammatical material in the speech interaction, understanding of the content and meaning as a whole while simultaneously feeding.

Objectives listening depend on its type. During the «figuring out» listening in teaching professional or everyday situations goal is to obtain the necessary and important information for themselves. Further transmission of this information is not provided. Take our listening (informative, entertaining) also involves listening to yourself. Further information transfer is not required.

In a real perception of information due to communication and goal situation that poses a listener. From this point of view scientists, including L. Kulish [19] There are three types of listening: *study, detailed and professional*. Some researchers define *global, detailed and critical listening* [5].

Scan or global, listening requires the listener universal coverage message content, the ability to determine the theme, the main message view, divide it into semantic parts distinguish compositional elements. Scan listening can be informative, entertaining and informative and entertaining.

The aim is to obtain cognitive listening particular, requied by auditor information. It can be used in the classroom, and work individually spilkuvanni. When the functioning of this type of listening whoever study is proactive, his intense attention, remembering arbitrary memory active. The material perceived the listener mainly in the form of dialogue cues during a single presentation, while not, however, exclude the possibility to ask again. The evidence that clear, as a rule, are not intended to convey information.

During the hearing pass entertainment listening attention without tension auditor which can be in relaxing condition. His involuntary memorization. Thanks emotion and excitement she recorded information in durable memory. With this type of information proceeds with students listening with such messages as lecture, speech, conversation.

During entertainments listening perception of information is through language games, language puzzles and crosswords, puzzles, acrostics, etc. When using the above methods, students will learn about casual entertainment in the necessary form.

Detailed auditing provides the most complete, detailed content of the message perception, awareness of the meaning of each of its elements. Note that the detailed text perception often required when carried out, for example, the jobs, the funds heard text; Transfer teacher explanation; when you need to remember multiple tasks without written teacher on

the board for their implementation in sequence; In the discussion, debates, speaking at a meeting, etc.

Critical listening is based on a global and detailed, requires express their views on what they heard and motivated their agreement or disagreement with a particular statement, critical reflection perceived by the ear. This type of listening is practiced during transfer text from a creative task. Therefore, checking the level of development of students' skills audiatyvnyh, keep in mind listening types, because it depends on the choice of form controls — test, oral or written transfer, the actual statement (oral or written) type of meditation and more.

Professional listening involves direct understanding and remembering information intended for reproduction the immediate or deferred. This type of listening, usually accompanied by the written fixation information. The process of auditing the auditor requires great mental and physical strain, maximum an active attention, storing arbitrary. During the immediate reproduction of the information received memory functions, while deferred — long term. Professional listening characteristic of translators, researchers, journalists and reporters.

For successful development of listening skills necessary to apply certain types of work, as well as for other types of speech activity. In the early stages of learning to hear commute small, interesting new information blocks. Exercises hearing and perception should integrate with other tasks; texts for listening should offer different types of speech genres, styles, complexity, but depending on the age and psychological characteristics of students of language, be specific to each age period. Model academic perception of speech includes phases: orientation in the situation of communication, hearing of goal, understanding and fixing memory or writing overall structure plan and oral expression, understanding the details of message content, selection and fixation of its most important elements, features of speech processing statements, making its own idea of the addressee speech, speech perception test results consistent with the goal set out in the first phase.

Conclusion. So listening is a semantic perception of both oral and written speech voiced, dynamic multi-level system of mental-perceptual, intellectual, mnemonic activity, type of speech activity, the integrity of which is due to the unity of motivation, target and executive parties; is a complex form of speech, which is formed of many components and levels; active creative process that involves the audience motivated action aimed at perception, cognition and understanding of reality by means of coded language and existing in the mind of the speaker.

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Section 10. Political science

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Preservation of ethnic and confessional balance in major cities of Central Chernozem region

Abstract: Today issues of regulating the existence of ethnos and communities in the districts of Central Chernozem region remain a serious problem, both from theoretical and applicative points of view. How should we deal with arguments emerging between representatives of different ethnos? Should diasporas influence the processes of adaptation of young population to circumstances of their new residence area? The author of this article is trying to answer these questions through a possibility of creating the so-called "ethno-confessional etiquette".

Keywords: ethno-confessional balance, ethno-confessional etiquette, interethnic relations.

The processes of globalization and integration which became an integral part of modern life have led to blurring of the boundaries of one or another ethno-confessional community: cultural traditions become erased, so, as a result, whole nations may vanish. In addition, representatives of ethnos living on the territory of the Russian Federation spare no effort in order to preserve their unique traditions, principles, rules. We are trying to consider how successful such aspirations are in corresponding with official state policy.

In late 1980s western scientists were already considering the role of unsolvable ethnic problem in the collapse of the USSR. For instance, T. Rakowska-Harmstone believed that "… the key issue would probably be not the increasing nationalism of the minorities but also and, maybe, more importantly the prevalence of the opinion among the Russians that there is a conflict of interests and well-being of the Russian nation and internationalist requirements of the regime". [1, 57] As the reality had shown, such statements were not without reason: the main goal of The Parade of Sovereignties held before the collapse of the USSR was to embody the saying about each nation "taking as much sovereignty as possible". As a result, the map of the world became filled with a variety of countries which can be called just national states. The problem of existence of exactly that type of state was in fact called in question as the world was actively turning into an informative society where there were practically no outer boundaries left since mass media is able to overcome any distance.

Apart from obvious advantages of transition in the formational society model and transfer to informative society, there also appeared serious threats to search and preservation of identity not only for smaller nations, but for ethnic and cultural diversity in such relatively homogeneous from the ethnic point view territories like areas of Central Chernozem region (Belgorod, Voronezh, Kursk, Lipetsk, Orel, Tambov oblasts). According to Rosstat, these areas have the following population size: Belgorod oblast — 1 544 108 people; Voronezh oblast — 2 328 959 people; Kursk oblast — 1 118 915 people; Lipetsk oblast — 1 159 866 people; Orel oblast — 769 980 people; Tambov oblast — 1 068 934 people. [2] In addition, although the Russians mainly prevail in the national composition of the above-mentioned areas, the percentage of them is decreasing. Moreover, the project of creating a general civil nation (based on principles of an academician V. Tishkov) [3, 1] seems to be more and more complicated. So, we can't but agree with a researcher G. Kesyan who in an article titled *Ethnosocial groups and their role in ethnopolitical conflicts* analyses the activities of contemporary ethnic diasporas, their aims and ways of preserving their national culture and traditions, "The phenomenon of a diaspora is primarily based on cultural originality which makes an ethnic organism viable. Isolation from historical homeland is compensated for by particular "ethnic jealousy", emphasized aspiration for preservation of national culture, contribution to its development, assimilation resistance, all of which increase the inner unity of a group. [4, 77] It should also be noted that in the Russian Federation it is the native population that frequently gave consent to creation of a general civil nation, "… Russian citizens of other descent more often tend to associate themselves with ethnic or religious identity" [5, 21].

Besides, it is hard to deny that nowadays ethnic diasporas become more and more influential in regional political space. For instance, in Voronezh oblast in 2010 it was announced that the National Chamber of the Region began its work.

[6] According to the Governor of Voronezh oblast Alexey Gordeyev, the National Chamber has another important task — to represent cultural and social interests of ethnic communities in state and local government authorities. What is interesting in this situation is that at first the National Chamber included representatives of all diasporas of the region but not even one representative of native population. Only after actions were initiated by "Russian Chamber — Coordination Centre for Russian Patriotic and Orthodox Organizations", created as a counterbalance, doctor of historical sciences Arkady Minakov became a member of the National Chamber [7]. At the same time, activities of the National Chamber in the region do not become more open, and only a certain range of mass media and coordinators themselves know about the events held by the organization.

We consider it interesting to analyse how programs and subprograms relating to the consolidation of the society are financed in Central Chernozem region.

On 20 August 2013 the Government of the Russian Federation issued a decree № 718 "On federal target program 'Consolidation of the Russian nation unity and ethnocultural development of Russia's nationalities (2014–2020)" [8]. The aims of the program are: consolidation of multinational society of the Russian Federation, harmonization of interethnic relations, encouragement of ethnocultural variety of nationalities in Russia. The overall budget is 6766,35 million rubles.

Regions create their own programs for development and improvement of ethnocultural interaction. The goals of such programs are clear: increasing the number of citizens tolerant to representatives of other nationalities, reducing the number of ethnic or religious conflicts, increasing the number of events stimulating the harmonization of relationship between "natives" and "newcomers". For example, in Belgorod oblast "Consolidation of the Russian nation unity and ethnocultural development of Russia's nationalities" subprogram 3 has the overall budget for 2014–2020 which at the expense of all sources accounts for 27333 thousand rubles [9]. In Voronezh oblast subprogram 8 aimed at solving the problems connected with consolidation of ethnic and confessional relations accounts for 56167,5 thousand rubles [10]. Tambov oblast is going to spend 88 600,0 thousand rubles during 2015–2020 to implement the "Consolidation of the civil unity and ethnocultural development of Tambov's nationalities" program, including 55 890,0 thousand rubles from federal budget, 26 880,0 thousand rubles from oblast budget, 5,0 thousand rubles from local budget, 5 825,0 from extra-budgetary funds [11].

As for other three oblasts of Central Chernozem region (Kursk, Lipetsk, Orel), there was no information on implementing the program of consolidation of interethnic and international relations on the websites of the local authorities. In general, it can be stated that relationships between representatives of different ethnos are being worked on; however, it is necessary to mention the quality of this work.

In the beginning of August 2014Voronezh Oblast Department of culture archive-keeping announced a contest granting subsidies to socially-oriented nonprofit institutions within "Ethnocultural development of Voronezh oblast" subprogram of a state program "Development of culture and tourism" in the following priority areas: development and consolidation of interethnic and interconfessional relations; preservation and protection of originality, language culture and traditions of nationalities in the Russian Federation [12]. Six nonprofit regional institutions took part in the contest. Here is the list of the winners: "Tolerant Theatre" (program for creation of family theatres in which performances are devoted to the topics of tolerance towards all people), "Development of Jewish Sunday school", "Voronezh oblast — our dream land" and "International photography festival "Images of History" (you can find details on all the projects on the website of 2014Voronezh Oblast Department of culture archive-keeping). Having examined all the above-mentioned programs, let us note the following fact: only one of them (International photography festival) answers to purposes stated in contest terms, that is ethnocultural development and mutual civilized enrichment. Development of tolerance in the region proceeds so actively that almost every program now has this marker word which usually means only one thing: we offer to develop tolerance to everything, in the literal sense of the word. None of the winning projects mentioned which part in creation of cultural paradigms would be assigned to native population. Meanwhile, it is planned to involve Russian population rather than representatives of national diasporas to take part in the projects. Such regional policy corresponds quite successfully with the words of G. Kesyan, "… in response to the challenges of ethnic problem diasporas provided a national answer — actualized their own ethnicity" [4, 82].

Issues of creating successful ethnocultural relations between representatives of different nations lead us to discussion of the problem of multiculturalism and possibilities of forming such a society in contemporary circumstances. S. Fedyunina points that, "… in practice multiculturalism is directed either at relativism or conformity which show themselves in naïve slogans or deep in hidden agenda" [13, 37]. The situation turns out to be paradoxical: on the one hand, today we have all the prerequisites for peaceful development of each ethnos not just in a particular region, but in the world as a whole. On the other hand, representatives of ethnoconfessional societies need more and more possibilities for increasing their influence through cultural communities. Thus, a serious question arises: how representatives of native population should act and where the boundaries of self-determination, which cannot be crossed for the sake of the state's unity, are.

Such conflicts could have been resolved by implementation of ethnoconfessional etiquette program based on the principle of mutual respect of ethnos representatives towards each other and understanding that, having come to a certain region of Russia, they should

respect the laws, traditions and customs of the "host region". Migration processes in the abovementioned districts of Central Chernozem region prove the following: the number of migrants is growing and, accordingly, it becomes possible for representatives of one ethnos to unite and create a strong society unit — a diaspora. And, as it was said before, after some time diasporas face the problem of monopolization of cultural (value) paradigm in the region. This being the situation in the regions where most part of the population belongs to one ethnic group, the Russians, it may lead only to further destabilization in the field of interethnic relations. In this case creating a document which would include a set of rules, traditions and customs of native population would not only have catalyzing but also educational influence on representatives of both young and middle-aged generation of people migrating to Central Chernozem regions of Russia.

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France, Germany and European Defence (Common Security and Defence Policy)

Abstract: This article covers French-German cooperation within the CSDP as well as problems which arise between France and Germany in this field.

Keywords: France, Germany, EU, CSDP, defence, security, crisis management.

Relevance of the research topic. It is widely thought that the France and Germany pair of countries is the acknowledged engine of European integration, which is the foreign policy priority for both countries. French-German partnership is

essential for Paris as well as for Berlin, therefore, these countries make efforts for its maintenance at the appropriate level even despite existing tensions of different nature, particularly in the field of military and political EU integration. FRG supports, in general, the French initiatives and projects within the Common Security and Defence Policy (CSDP), nevertheless, these countries have different conceptual vision of the main purpose of this EU component that military operation in Libya has brightly demonstrated. In this context, analysis of Paris and Berlin objectives which they set for themselves in the process of military and political EU integration presents scientific relevance for understanding of perspectives of further CSDP development.

Analysis of recent publications. Military and political aspects of French-German cooperation are studied in the works of Ruhl L. [1], Gareis S. B. and Leonhard N. [2] Strategies and objectives of Paris and Berlin in the EU are analyzed in publications of Meimeth M. and Göler D. [3], Clouet L.-M. and Marchetti A. [4], Stark H., Schild J., Krotz U., Schwarzer D. One should especially note the work of Major C. called "France, Germany and European defense: for more pragmatism and less pathos" [5] which covers results and problems of French-German partnership in the field of CSDP as well as presents recommendations concerning development of common European leadership of these countries.

Problem identification. This paper aims to specify the essence of French-German contradiction concerning further development of CSDP. To achieve this purpose, it is necessary to complete the following tasks: 1) to identify the role of CSDP in the French and German foreign policies; 2) to reveal peculiarities of French and German CSDP vision; 3) to briefly characterize common initiatives in this field; 4) to identify factors which hamper the intensification of cooperation between these countries within the CSDP.

Results of the research carried out by the author. French-German partnership is based on the Elysée Treaty which was signed in 1963 and laid the basis for cooperation between two countries in the field of foreign policy and youth policy, in the cultural dimension and in the security sphere. Berlin and Paris have been working together in these and other directions for more than 50 years.

It is France and Germany that stood at the origins of practical military and political EU integration: the Eurocorps was created in 1993 on the basis of French-German Brigade, and French-German initiative laid the basis for multilateral arms production project — the Organization for Joint Armament Cooperation (French: Organisation Conjointe de Coopération en matière d'Armement — OCCAr), which included in 1996 Germany, France, Italy and Great Britain.

Berlin and Paris worked actively together despite existing tensions on Amsterdam, Nice and Lisbon Treaties which formalized de jure the provisions concerning ESDP (CSDP).

N. Sarkozy and A. Merkel continued the line of their predecessors declaring importance of bilateral cooperation between France and Germany, particularly for the

strengthening of CSDP [6]. The February 2010 meeting of the French-German Council of Ministers resulted in adoption of "French-German agenda 2020" which formulated objectives in the framework of defense cooperation at the operational, political and industrial levels [7]. In February 2012, there was prepared another French-German declaration titled "Reinforcement of European Security and Defense means" [8]. Partners also develop military cooperation in the framework of the Elysée Treaty [2].

France, Germany and Poland within the "Weimar Triangle" in December 2010 addressed to the High Representative of the Union for Foreign Affairs and Security Policy Catherine Ashton "Letter of Weimar" which contains proposals of these countries concerning CSDP development: 1) creation of permanent planning capacities for operations; 2) improvement of tactical planning and command capacities; 3) intensification of cooperation between armed forces of EU member-states, especially within "EU-Battlegroups"; 4) reinforcement of the European Defence Agency's role in the field of joint armament production [4, 22].

However, according to several experts, all these "declarations of intent" and initiatives have not brought the expected results [1; 3; 4; 5] due to a lot of obstacles.

According to the author, the main problem in French-German relations, which hampers the real development of CSDP, is the different ambitions of countries at the international scene and correspondingly the different vision of main purpose of CSDP/CFSP (Common Foreign and Security Policy). Whereas Paris has certain global ambitions and aims to leadership in the Mediterranean and Africa, that reciprocally demands active security policy in these regions, meanwhile Berlin aspires less to the status of global actor, and its security policy is more Eurocentric [5, 13]. That is also related to the different vision of the united Europe's role in the world. For France, EU is a great power in a multi-polar world that demands from Europe to acquire its own military capacities. For Germany, EU represents rather a civilian power in a cooperative-multilateral international system [3, 199–200].

The other obstacle towards development of CSDP within the French-German couple is attitude of Germany to the use of military force that can be explained by the history of German state development during the "cold war". FRG aimed to strengthen anchoring in the "West block", especially in the EU and the NATO. Berlin built its own security policy in the framework of NATO that corresponded to Paris objectives then. In the conditions of post-bipolar world, Germany supported the development of EU security component, but as an additional to NATO mechanism [3, 195]. In the CSDP, Berlin gives preference to common defence over crisis management, unlike Paris. Among EU members Germany hesitates the most as for necessity of military operations deployment within CSDP [9, 84; 10]. Its contribution to the EU military operations is modest [3, 197]. In the crisis management Germany prefers economic, diplomatic and

other means. France expected that over the years Germany would be more decisive when it comes to the use of force during conflicts, maybe not it the manner which is typical for France, but it would not at least speak out against EU operations [5, 9]. And if certain moves sometimes occur in this context [5, 12–13], German position on the use of force in general has not changed.

In this context one should mention the military operation in Libya which France tried at first to initiate within the EU. But Germany strongly opposed such a proposal. As the result certain number of experts estimated as a "lack of activity" of EU during Libyan events as failure [11, 274] or even as "end" [9, 75–76] or "death" [9, 76] of CSDP and CFSP.

To "reanimate" the CSDP Germany and Poland that also opposed EU operation, from the summer 2011 aimed to enhance an activity in the field of political and military integration. In the framework of Weimar Triangle that is with France, these countries offered to create EU operational military headquarters, the necessity of which brightly demonstrated the operation in Libya (this proposal was already made in 2010 in the "Letter of Weimar"). Spain and Italy supported this initiative. Nevertheless, Great Britain which is important EU state in military view spoke out against this proposal. London argued that EU operational military headquarters is the duplication of NATO functions and a "waste of money" [12].

Another problem which hampers the intensification of military and political cooperation between Germany and France derives from different power systems in Germany and France [5, 14] as well as from different format of armed forces (if French and by the way British armies are professional, the reform of German Bundeswehr has started recently) [4, 10]. Furthermore, Berlin and Paris have problems in the industrial production [4, 15–17; 5, 7–8] (for instance, serious tensions arose between them as to the A400 M project financing [4, 15–16]).

Conclusions. Germany and France are important partners to each other in European integration project, especially in the economic and financial dimensions. However, in the political and military fields there are tensions of conceptual and organizational essence between them. The main obstacle towards further development of CSDP is the different vision of its principal purpose by Germany and France (and Great Britain by the way): for Berlin CSDP has foremost to carry out the function of a "common defence", meanwhile for Paris such a function of this EU policy is a crisis management. As for now, resolution of this problem is not likely, that is why these countries focus on an implementation of practical projects.

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Section 11. Psychology

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Influence of computer games on the sleep quality and the nature of dreams in students

Abstract: This study explored the use of different forms of the virtual world among students and the study of its influence on unconscious processes in students. The test group was comprised of 141 participants who were second to fifth year students at a technical university of Minsk city. We found that 38.3% of the participants spent more than 40 hours per work in the virtual world and 26.2% spent 25–39 hours per week. Moreover, 90.8% of the students engaged in computer games and game plots were present in the dreams of 16.3% of students. Nightmares and incubi were the cause of being awoken in 71.6% of students. Moreover, 14.9% of respondents expressed changes in depth psychology. Computer games are especially popular in the students' environment, and their substantial impact on the gamers' sleep quality and the nature of dreams was observed.

Keywords: computer games, computer addiction, gamers, dreams, psychiatric symptoms.

Introduction

The virtual world is a product of computer technologies. It provides users with enjoyment of every taste, but at the same time it is capable of intruding into a person's inner life, resulting in computer dependency. This new world has become an integral part of the lives of almost everyone, especially younger people, many of whom play computer games. Scientists often concur that there are more general features between gamers than individual distinctions [1, 35–38]. The gamers' generation is unique from previous generations their own world view has developed under the influence of this new environment. The projection of these ideas on the surrounding world is realized according to patterns, which cannot be determined by existing research techniques. In our previous study we assessed the influence of computer game genres on the psychological, mental, and emotional state of gamers [2. 50–55]. It has been shown that the virtual world has these effects on society, but the true influence on individuals is poorly understood.

Currently, the study of depth psychology in computer addicted persons is particularly pressing. The gamer knows nothing about the content of their unconscious desires and

appetencies. Visualized fantastic performances that are day-dreams in nature unfold before them on the screen, and the interest is directed to the realization of their internal desires in the developing action. New opportunities open before them, which are intensely induced and fared by a person's perceptions that are skillfully interwoven with the virtual world. An intense aggressive attack on the desires determined by base instincts is carried out with the purpose of evoking unconscious needs. The illusory opportunity to realize their desires in this daydream world is simultaneously granted. Such satisfaction of unconscious desires generates an internal conflict, which is reflected in the answer given by one of the gamers who stated that he felt more comfortable «in the real world, though it is equally bad everywhere». One can assume that this illusiveness leads to spiraling dissatisfaction, forcing the person to come back to the dreamland for abreaction. In this process, sublimation and repression mechanisms are activated and as a consequence, psychopathologic symptoms similar to hysterical are formed, which manifest as inadequate behavior. Researchers have found that the complexities of communication experienced by the user in the real world are not compensated in the virtual world, since Internet facilitates retreat from one's real self, and the emotional level becomes a leading one in self-feeling [3, 20–27; 4. 187–195].

The cognitive-behavioral model of pathological Internet use introduced by American psychologist R. Davis suggests two forms of Internet addiction: specific pathological Internet use and generalized pathological Internet use. The second form represents unspecialized, multi-purpose, excessive use of all Internet forms [4.] Previous studies have established personal and behavioral deviations that are characteristic of Internet-addicted persons [5, 657–664; 6. 279–284]. Other researchers have shown a relationship between behavioral disorders that are characteristic of this pathology and the symptoms of mental disorders in students [7, 272–278; 8, 267–272; 9, 793–800]. However, the influence of the virtual world on human mentality, including unconscious processes, has not been sufficiently studied. In this regard, Freud's direction is especially: «The study of dreams may be regarded as the most trustworthy approach to the exploration of the deeper psychic processes» [10, 1–2; 11, 3–12].

The objective of this study was to assess the duration of one's stay in the virtual world and the nature of its influence on unconscious processes in students.

Material and methods

Our pilot study was conducted by way of an anonymous survey among students studying at a technical university of Minsk. The objective of this study was to assess the influence of the virtual world on students' health. For this purpose, a special questionnaire was developed by K. Mezianaya and K. Karaneuski entitled, "Method of Screening Diagnostics of Computer Addiction and its Effect on Sleep", which asked participants about the length of time of stay in the virtual world, quality of sleep, and nature of the dreams. An informed consent was received from 141 students studying at a technical

university of Minsk, 119 (84.4%) male and 22 (15.6%) female. The study was conducted using a continuous questioning method, by means of the computer software downloaded in the university's internal network. The data received were not personalized. The average age of respondents was 21.4 years and the average total duration of virtual world use was 8 years.

Statistics

In this study we have performed frequency distribution of the computer dependence and sleep disorder symptoms in students. Data were processed using Microsoft Office Excel 2010 and the STATISTICA 10.0 package.

Research Results

Study of the use of different virtual world forms. The students were allowed to mark several answer variants. Two virtual world forms were used by 54 persons (38.3%), three forms by 48 persons (34%), and four by 15 persons (10.6%). Only two students managed to engage in all six virtual world forms. The analysis showed that 22 students (15.6%) only used one form of a virtual world. Of these, 13 persons were only engaged in computer games, 5 persons used social networks, and the others spent time surfing the internet and watching television.

Analysis of the frequency of virtual world forms use by the students. Our analysis found that almost all participants played computer games (128; 90.8%) This result indicates that computer games have become the same daily routine of their life as TV has for modern society. However, due to the dynamism of the process and discrepancy in answers, it was not possible to define the time devoted to computer games by the students. The respondents were allowed to mark several answers. Three virtual world forms were almost equally popular in the test group: surfing (including video hosting) was enjoyed by 70 (49.6%) students, social networks were used by 64 (45.4%) students, and television series or movies were watched by 63 (44.7%) students. Online sex and stock gambling were of less interest (8 and 9 students, respectively). In total, 98 (63.1%) students used the virtual world for entertainment and recreation. The aspiration to display patronage through rescue and protection of others in a game was seen in 46 (32.8%) students, while suppression and submission of associates was used by 54 (38.6%) students. The desire to attain superiority in a game was observed in 68 (48.2%) of students, 47 (33.6%) of students chose score orienteering games. It should be noted that some gamers who strived to rescue and protect in games tended to willingly use violence and destruction over the virtual world to achieve their goals.

In the virtual world, students pursue various purposes in both games and on social networks. Surfing, for example, is widely acquainted with pornography. If the user incurs a role of benefactor of others and becomes comfortable with this role for a long period of time, then he may get lost in messianic feelings. In other cases one's beliefs are imposed on partners. An online competitive game with the other person's psychology is an opportunity for some people to search for like-minded fellows. Approbation and rounding-out of one's

leadership abilities are affected here, such as «propagation of depression», as one of the respondents confessed.

Analysis of the duration of stay in the virtual world. Twelve students (8.5%) stated that they spent an extended period of time in the virtual world, including 4 students who spent up to a 100 hours a week and 8 students who spent up to 168 hours per week. For these students, their interest acquired an addictive nature: they either do not visit the virtual world at all or stay there around the clock for seven days at a stretch, engaging mainly in computer games. We found that 54 (38.3%) students spent 40 or more hours each week in cyberspace. A similar addiction index was determined by researchers in South Korea[11.] It is believed that one sign of computer dependency is when the duration of regular participation in virtual space as a sheer pastime without performing work exceeds 38 hours per week [12, 5–33]. In our study conducted in 2013, computer dependency was found in 33.8% of participants [2, 50–55].

Analysis of the influence of the virtual world on unconscious processes in students. An analysis of sleep quality and the nature of dreams in respondents was conducted in order to study the changes occurring at an unconscious level.

We found that 18 (2.8%) of students experienced a recurrence of a plot in dreams. The nature of these dreams, according to psychoanalysis data, often has the same basis as and is linked to a psychological traumatic experience (psychotrauma) in early childhood. The recurrence of plots in dreams suggests that in the mental sphere of users, such experiences sharply actualize, and what has been repressed and hidden deep in the unconscious now tries to gain access to the conscious world. Plots of computer games offer diverse possibilities for protecting oneself in different situations. Some of them can reflect a psychotrauma of one's childhood, for «dreams never occupy themselves with trifles» [13, 1–3].

Other symptoms that contribute to changes in the unconscious sphere of students are "dreams within a dream" as analyzed by Freud. He established that «the inclusion of a certain content in a dream within a dream is, therefore, equivalent to the wish that what has been characterized as a dream had never occurred». In our study we found that 32 (22.7%) participants had such a nature of dreams.

A destructive nature of the influence of the virtual world on the mentality of students was also confirmed by the fact that 29 (20.6%) of the students stated to themselves in a dream: "I just dream it!" The desire to sleep, as Freud has established, leads to the following: «Don't worry; sleep on; it's only a dream, is in many cases the suggestion of the Pcs to consciousness when the dream gets too bad» [14, 1–3]. In our study we found that 82 (58.2%) of students woke up involuntarily due to the unpleasant nature of dreams.

On the other hand, nightmares (incubi), according to psychoanalysis data, represent a punishment for realizing something illicit, forbidden, or a breach of moral standards. Our analysis found that 78 (55.3%) students woke up due to fear and apprehension. Incubi and unpleasant dreams were

the reason of waking up in 101 (71.6%) students, although 45 (31.9%) of these students also defined their dreams as pleasant. Freud found that dreams are the hidden realizations of repressed) wishes. If, however, moral standards and taboos are broken in a dream, then it is interrupted and replaced by awakening. We next established that such negative plots may be, in particular, the dreams about self-punishment and other peoples' punishment. In dreams, as Freud has established, further development of mental life processes takes place and remains purposeful. Therefore, after elimination of desirable target representations for any reason, unconscious and/or undesirable ones occupy leading positions.

Another substantial indicator of excitation and inhibition process disorders during sleep is somnambulism. In our study 9 (6.4%) participants suffered from this illness. In four cases, the sleepwalking had appeared recently (and even right before the interview), for the other cases it had taken place since their childhood. All of these students spent more than 6 hours a day in the virtual world.

Analysis of the nature of dreams. We next assessed the nature of dreams with the purpose of assessing the impact of computer game plots on the gamers' mentality, since, as Freud put it: «It has been my experience — and to this I have found no exception — that every dream treats of oneself. Dreams are absolutely egoistic…» [13, 1–3].

About 5.7% students continued gaming in their dreams. In 15 (10.6%) cases, a hero or a virtual world image were present in the dreams, owing to his/her identification with the characters of games. The type of character is important: some students saw themselves as a scientist, soldier, or prom-trotter, and two students saw themselves as a killer. Sometimes the role of such an image is played by "the almighty essence", and sometimes by a shooting tank.

The consequence of such processes was the occurrence of strange and unusual dreams at a unconscious level in 20 (14.2%) students, while in 6 students stated that these had occurred since childhood. As a rule, such dreams are accompanied by the recurrence of a plot and by a dream in a dream. Twenty-one (14.9%) students experienced strange premonitions in a dream: at an unconscious level they had "strange sensation of future changes, presentiments of their selectness, some mission". The analysis also showed that such students often played strategy genres more than 6 hours per day, and some of them for up to 168 hours a week.

Conclusion

Data obtained in this study indicate that for youths, and in this case the students, there is a total involvement of all services offered by the virtual world and, in particular, computer games. We found that 38.3% of the students remained in cyberspace for 40 and more hours per week, which equals a full work week, suggesting computer dependence. Moreover, we found that the number of students within this group is 4.5% greater than that found in our 2013 study.

The mentality of students was found to be on the verge of exhaustion in 40% of students due to the many hours spent in

the virtual world as well as poor quality of dreams. Virtual images, especially in computer games, actualize processes in both "super-ego" and unconscious spheres. The aspiration to receive desires by ignoring moral norms and subsequently rationalizing the violations leads to the internal conflict, which is expressed in destructive nature of dreams resulting in sleep disorders caused by anxiety and fear in 55.3% of respondents, being the symptom of depressive disorders.

The personality of some gamers (10.6%) probably undergo, under the impact of game plots and self-identification with the game character, transformation of the "I am a Superman" type. This creates the factors that promote the development of psychopathological disorders. Currently, the impact of this type of dependence on mental health, as a rule, is not considered in cases of serious mental illness in a gamer. The coming generation, which includes children of present users of computer games, social networks, and Internet surfing, will be brought up under an active influence of conceptualization of their parents and a quickly changing virtual world. This poses a problem that requires special consideration by scientists and experts, since there is currently insufficient knowledge for making adequate decisions and recommendations within this field.

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Section 12. Regional studies and socio-economic geography

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Ecological trend in tourism development

Abstract: Geo-ecological study of the condition of recreationally important territories and definition of priority directions in the development of recreational activity appears necessary and timely. The study of tourist development of the regions implies their comparison. The development of recreational activity on the territory should be compared to the complex of geo-ecological conditions and have a certain social causality.

Keywords: tourism, recreational activity, tourist and recreational complex, geo-ecological study, recreational resources.

The problems of recreational use of natural resources are closely connected with geo-ecological researches. They are based on the study of modern condition of the environment and evaluation of its changes under the impact of economic, including recreational, activity. It appears necessary and timely to study the condition of recreationally important territories and define priority directions of the development of recreational activity [1].

Seaside zones become the districts of the biggest concentration of human activity. Coastal complexes are complicated transitional zones — ecotones, formed at the borders of different spheres: land and sea, fresh and sea water, water and bottom, water and atmosphere, land and atmosphere. Environmental and resource reproductive functions of landscapes that are important for a man and vulnerable under anthropogenic impact depend on the properties and conditions of coastal landscapes. The peculiarity of coastal landscapes is the fact that main traffic arteries pass through their almost entire territory. A catastrophic landslide, mudslide and development of ravine erosion are possible in the condition of intensification of load on traffic arteries. The strongest impact on coastal landscapes is made by resort and recreational business, mineral resource development etc. Tourism, on the one hand, creates damage to seaside landscape, but on the other hand, tourism development requires the conduct of environmental protection events, preservation of ecological security of recreational territories. Thus, the problems of protection of unique nature of sea coasts are becoming more current. Quality differentiation of territory allows taking into account the concrete conditions as well as the peculiarities of local geo-systems [6; 8].

Despite some uniformity of relief, plain coastal landscapes differ significantly in their natural resource and ecological potential and, consequently, in the level and charac-ter of development. Mutual location of natural (nominally primary), secondary-derived and anthropogenic-modified modern landscapes relative to one another certifies about the directions of business development of natural resource potential of the territory, the peculiarities of which predetermined the transformation of the original system of landscapes [9].

The study of the tourist activity in seaside mountain regions is of big interest for scientists and tourism professionals. Unlike plain territories, the mountain ones are spaces with a large division of different sites. It is determined by the diversity of natural conditions and ethno-social groups, cultures and economic set-up of the population of these territories. In this respect, there is a methodical problem of study and comparison of tourist development of mountain landscapes. Differentiation of tourism development is primarily related to orographic conditions and landscape structure of the territory. The diversity of hypsometric conditions determines significant diversification of tourist activity even within a relatively small space. Vertical and seasonal differences of tourist activity are typical within one region with different climatic and geomorphological conditions. Species diversity, presence of relic and endemic kinds of living organisms requires the realization of measures on protection of natural diversity. Mountain territories are characterized by an increased degree of vulnerability of natural and cultural-historical resources, which defines the need for monitoring and regulation of recreational loads. The economy of mountain territories is related to traditional holding, and local socio-cultural environment is subject to increased impact of intensive industries of economy. Many mountain regions have trans-border location, which should also be taken into consideration during tourist development.

The following scheme of study of tourism can be the most appropriate in methodological aspect. It consists of seven stages:

1. Evaluation of tourist-geographic location of a region and analysis of its administrative-territorial division (territories of states and their subjects located within the region);

2. Physico-geographic peculiarities of the region and evaluation of its natural tourist resources;

3. Political and social conditions of tourism development (activity of the management of administrative subjects, social organizations, history of tourist development);

4. Social peculiarities of the territory (density, structure of employment, urbanization, migration, ethno-national composition, social conflicts, language, religion, art, traditions, folk art) and cultural-historical heritage;

5. Economy and management of tourism (basic socio-economic indicators of tourism, seasonality, infrastructure, management bodies);

6. Spatial structure of tourism (tourist centers and routes);

7. Major problems and prospects of the sustainable development of tourism [4].

The study of tourist development of the regions presupposes their comparison. However, the uniqueness of some tourist territories makes it quite problematic. Inhomogeneity of recreational potential of mountain and plain territories makes them difficult to compare.

V. S. Preobrazhensky, Yu. A. Vedenin, L. I. Mukhina and others worked on the development of theoretical and methodological provisions of geo-ecological studies in the recreational sphere. Recreational potential of the territories is understood as a combination of natural, engineering-technical and cultural-historical objects, substances and conditions associated with the given territory. Collectively, they define the feasibility of the territory for development of different kinds of tourism; create the possibility of various recreational activities, treatment and rehabilitation. Natural factors act as both its conditions and recourses in the recreation organization. The characteristic of recreational resources includes the data about the quality of natural resources, the area (or volume), which these qualities characterize and about the duration of the period of manifestation of these qualities [5].

There is a group of natural resources that do not participate directly in the recreational process, but ensure a normal functioning of recreational facilities. Thus, natural recreational resources include natural and natural-technical systems and natural phenomena (including its territorial diversity), which have suitable properties for recreational activity and can be used to organize recreation and rehabilitation of certain population during some period. The study of separate components and complex natural-recreational characteristic is covered during the study of natural conditions of recreational complexes. Operational units of recreational evaluation may include both natural systems in their natural boundaries and territorial administrative formations.

A complex study of geo-ecological conditions, including natural, socio-economic and historical-cultural conditions of recreational activity, is a compulsory element of formation of business specialization of any territory. The development of recreational activity on the territory should comport with the complex of geo-ecological conditions and have a certain social causality. Despite a years-long history of development, recreation is often of non-controllable self-regulating character. In order to study social characteristics of holiday-makers, their recreational needs, requirements to the environment and spatial distribution of places of recreation, it is reasonable to explore the issue of selectiveness of holiday-makers with regard to a natural territorial complex and conduct surveys in the places of recreation. Recreation in this case is a man's activity aimed at restoration of their physical and spiritual health in the process of holidaying and tourism. The most important geo-ecological evaluation of the territory is ecological-recreational potential, i. e. a certain set of natural conditions and resources that have a favorable effect on physical and psychical condition of the man. Ecological-recreation potential of the recreational territories has a determining role in the effectiveness of solution of the given task. The ecological component of the indicated potential is primarily expressed in those properties and conditions, which have a direct impact on the senses and health condition of the man determining the degree of usefulness of natural conditions for recreation. Ecological potential can have both positive and negative impact on recreation. Many peculiarities of climate (temperature, wind speed etc.), temperature of superficial waters, presence of blood-sucking insects, many natural disasters, technogenic pollution etc. have a direct impact on the comfort of holiday conditions and the man's health.

Another component of the ecological-recreational potential is the combination of natural riches, which are used as natural resources for recreation (mineral waters, therapeutic muds, forest, water bodies etc.) and contribute to the satisfaction of vital needs of the holiday-makers.

The evaluation of ecological-recreational potential on the territory is conducted under the following criteria: physiological, functional-esthetic and geo-ecological. Physiological criterion of evaluation reflects the impact of climate on the man's organism. During the conduct of functional-esthetic evaluation of the ecological-recreational potential, the primary attention is paid to the definition of usefulness of different natural territorial complexes for recreation and tourism and their esthetic attractiveness [1]. Using the method of evaluation by points developed by V. S. Preobrazhensky, L. I. Mukhina and other researchers, we reckon that geo-ecological expertise of the conditions of recreational activity in the regions should be performed based on such indicators as the character and degree of economic development of the territory and general ecological condition of the territory.

The evaluation of the ecological-recreational potential should be accompanied by the definition of permissible loads on the natural territorial complexes and their recreational capacity. It is a necessary condition of rational use of natural

resources for recreational purposes. A permissible recreational load is a maximal load under which the territory preserves the ability of self-regeneration. To define it, the indicators of evaluation of intensity of nature use such as density of holiday-makers and recreational load are used. The density of holi-day-makers is a one-time number of tourists per unit of area. Recreational capacity is a maximum number of people who can use the given territory at one time for recreation without causing the degradation of its vegetation cover and experiencing psychological discomfort [1].

The evaluation of recreational load on the territory is systematic complexes in respect of time and multi-factor re-searches. Apart from the direct evaluation of recreational load on certain objects for the purpose of their preservation and successful functioning, it is required to undertake long-term measures of general character: improvement of nature preser-vation legislation, classification and inventory of monuments of nature, monitoring and ecological evaluation of the condi-tion of these objects etc. [2].

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Section 13. Agricultural sciences

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Ecological assessment of the physical and chemical indicators of quality of meat-and-milk products delivered to the markets in astana

Abstract: The problem of quality of animal products is one of the most relevant for consumers. based on the characteristics of our country are the product of everyday meat and dairy products, which make up most of the minimum consumer basket of Kazakhstan's population. In experiments were used as the sample locally produced and imported from neighboring countries. Product quality control shows the current situation on the food market.

Keywords: meet, milk, product quality, heavy metals, pesticides, pollution, agriculture, cattle breeding.

The quality of livestock products is one of the most relevant problems for consumers. Milk and dairy products comprises 15,9% of the minimum cost of the consumer basket of the working population of Kazakhstan [1, 7]. In 2010 production of dairy products was 5381 thousand tons of milk [2]. Milk contains all nutrients necessary for the human body. Only protein of milk provides casein to the human body [3, 304].

The meat industry is one of the largest segments of Kazakhstan agriculture. Meat products are sources of high-quality protein and the vitamins necessary for normal development of organisms. According to Agency of statistics of the Republic of Kazakhstan, 1 648 468,5 tons of all types of cattle and bird were slaughtered in Akmola region in 2013 Whereas in 2012, it was 1 636 670,6 tons [4]. Research quality of meat and dairy products produced in the city of Astana, which is one of the largest regions in the production and processing of livestock products, consumption — are relevant.

The purpose of work is the assessment of physical and chemical indicators of the quality of meat-and-milk producs delivered to the markets in Astana.

Figure 1. State density of the milk

Materials and methods. In the experiment milk "Natige" with 2,5% of fat content, "Aynalayn" of 3,2%, "Food master" of 2,5%, "Odari" with 3,2%, "Moyo" with 1,5%, "Depovskoe", "Domik v derevne" with 2,5%, "Miloko"and "Astana Onim" were used. Meat samples were selected from the enterprises of Akmola region: "Astanalyk" food factory, meat processing plant of "Sabynda", OKS LLP and Rubikom enterprise. The samples were taken from the top part of cervical department. The primary physical

and chemical characteristics of milk, the determination of heavy metal ions was carried out by conventional methods [5–7].

Results and discussion. As can be seen from the list of the studied samples of dairy products, to assess the quality of dairy products we analyzed the most consumed products. The main physical and chemical indicators of quality dairy products are state of density, acidity, fat content. Figure 1 shows a picture of the state of this indicator in the studied samples.

According to results, the density indicator of milk complies with the standards and is within 25–27% (fig. 1). Another indicator of quality of milk is acidity. Our revealed that acidity of milk from the producers Aynalayyn, Natige, Odari, Miloko, Astana Onim, Moyo andFoodmaster complies with the standards. Acidity of milk of the Lodge brand in the village is slightly higher than the norm (fig. 2).

Determination of acidity

- Ainalaiyyn
- Natige
- Odari
- Miloko
- Domik v derevne
- Astana Onim
- Moyo
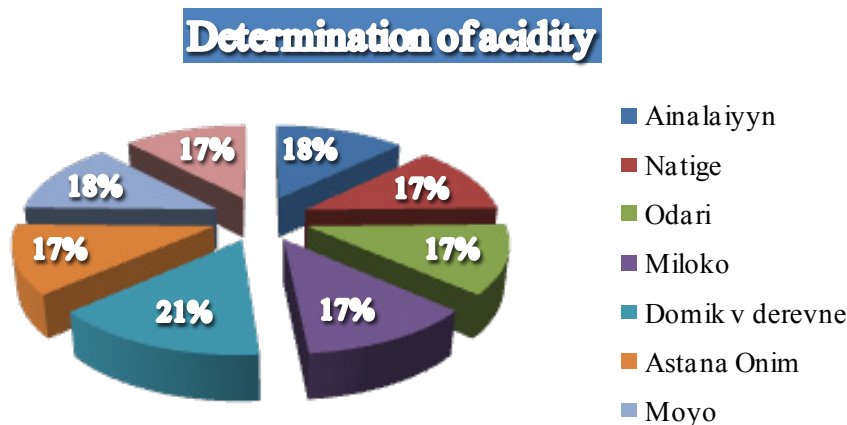
Figure 2. Characteristics of acidity of milk (%)

In addition, themass fraction of fat of milk from producers Astana, Onim, Present, Natizhe, Mine corresponds with indicated fraction on packings (table 1).

Table 1 – Relevant information on the mass fraction of fat and fat content

Name trial	Information the package	Information experience	Actual fat content
«Ainalaiyyn»	3,2% fat	Does not match	2,7%
«Natige»	2,5% fat	Matches	2,5%
«Odari»	3,2% fat	Matches	3,2%
«Miloko»	1,5% fat	Does not match	1,3%
«Domik v derevne»	2,5% fat	Does not match	2,3%
«Astana Onim»	2,5% fat	Matches	2,5%
«Moyo»	2,5% fat	Matches	2,5%
«Food master»	2,5% fat	Does not match	2,3%

Determination of impurity toxicants of environment is important for studying of problems of food security of livestock production for consumers: heavy metals, radionuclides, residual pesticides etc. We have established indicators of contamination of meat products by ions of heavy metals sold in the markets of Astana. In a experiment, the concentration of such elements as Pb, Cd, Hg and As were studied. The impurity of meat products by ions of the heavy metals are shown in table 2. The analysis showed that heavy metals may accumulate in agroecosystems through toxic chemicals, phosphoric and nitric fertilizers (arsenic); as a result of sewage irrigation or emissions of motor transport (cadmium, lead), when burning fuel on a heatpower main line. Mercury accumulates in the agrofitotsenoza as a result of sewage and pesticide application. Selenium accumulates in the soil, generally as a result of organic fertilizers and irrigation sewage. Fluorine, as a rule, accumulates following application of phosphoric fertilizers.

Table 2 – Features samples of meat contamination by heavy metals, mg/kg

Code samples	Pb	MPC	Cd	MPC	Hg	MPC	As	MPC
1	2	3	4	5	6	7	8	9
1	–	0,5	–	0,05	0,014	0,03	–	0,1
2	–	0,5	–	0,05	–	0,03	0,02	0,1
3	–	0,5	–	0,05	–	0,03	0,08	0,1
4	–	0,5	–	0,05	–	0,03	0,05	0,1
5	–	0,5	–	0,05	0,024	0,03	–	0,1
6	–	0,5	–	0,05	–	0,03	–	0,1

1	2	3	4	5	6	7	8	9
7	–	0,5	–	0,05	–	0,03	–	0,1
8	–	0,5	–	0,05	–	0,03	0,06	0,1
9	–	0,5	–	0,05	0,030	0,03	0,08	0,1

Determination results of meat contamination by heavy metals shows that the investigated samples no lead and cadmium. In the content of meat a it was observedarsenic and mercury. Hgis found in 30% of material with the range from 0,014 to 0,030 (maximum concentration limit — 0,03); As is found in more than 50% of material with the range from 0,02 to 0,08 (maximum concentration limit — 0,1).

The statistical test shows that demand for dairy and meat products is increasing in our republic. Moreover, the production of meat-and-milk products increases every year. The meat-and-milk products in markets in astana are supplied by producers from Akmola region as well as from other regions such as Kostanay, Karaganda, Pavlodar and from Kokshetau, Shchuchinsk, Makinka, Petrovka etc. All these facts testify the need large-scale ecomonitoring researches.

Conclusion. Definition of primary physical and chemical indicators of milk and meat is one of parameters of quality of meat-and-milk production. To ensure high product quality and competitiveness, it is important not so much the identification of poor quality, as it is a warning. Ensuring quality means guaranteeing such level of quality of production which allows the consumer to buy with confidence it for a long time, and this products have to meet requirements of the consumers.

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Section 14. Transport

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New possibilities of greenhouse gases emission inventory

Abstract: A method of inventory of greenhouse gas emissions from "road-car" complex depending on road cover evenness is offered. Calculations by IPCC methodology and offered methods give similar results, therefore worked out methods may serve as an alternative to IPCC methods and be used in stating the reasons of excess emissions by car-road complex.

Keywords: car-road complex, greenhouse gas, cover evenness

1. Introduction

In last decades it became evident that motor-car transport plays not the last role in climate fluctuation, as automobiles emit a considerable amount of greenhouse gases. Climate fluctuation is a worldwide problem; a number of scientists are making efforts to solve it all over the world [2; 3]. At present in many countries researches are carried out to develop the models of climate warming. For successful work in this direction first of all it is necessary to take into consideration the gases emitting into atmosphere, mainly greenhouse ones.

The problems of greenhouse gases inventory are considered in numerous works [4; 5; 10; 13; 15]. Accountability in greenhouse gases emission becomes compulsory for International Institutions, in particular, for statistical reports of World Bank, International Energy Agency, UNO organizations and others [4; 8].

Greenhouse gases are not polluting substances in a common understanding of this word. In those concentrations actually observed in atmosphere they do not cause harmful effect on human health or eco-system. So the control is carried out on absolute amount of emission during sufficiently long time — usually for a year. Emission per year is a factual contribution of this source emission into global greenhouse effect. Exactly global effect as greenhouse gases "live" in atmosphere for a long time, they are well mixed there; so neither global nor regional effect depends on the location of emission.

As far as motor transport is one of the main sources of greenhouse gases emission, an acute problem arises to organize an inventory and ecological monitoring of the system of road complex.

The problem is which one of the parameters to take as a controlled one. Carried out studies have shown that all processes, occurring in operation of motor transport complex, in this or that way depend on the state of road paving. Investigation of these dependences will give the opportunity to obtain the models allowing to determine greenhouse (or other) gas emissions in relation to the state of road paving and traffic intensity.

So, if in monitoring it will be revealed that the state of road paving is not "satisfactory" in assessment by adopted standards, we may state an excess of emissions. Based on results of monitoring of the state of road paving and traffic intensity on roads of different categories, we may conduct an inventory of emissions.

2. Material and methods.

2.1. Emissions inventory methods review

At present there exist a number of methods to perform an inventory of emissions from motor transport, including greenhouse gases emission. Methods, adopted in Russian Federation [16], foresee two ways of inventory of harmful emission into atmosphere by motor transport vehicles (MTV):

— according to amount of fuel consumption;

— according to total mileage of motor transport vehicles

Inventory of harmful substances based on fuel consumption is done in the following way [16]:

1) Emission of i-polluting substance by motor transport vehicles of corresponding design type is calculated by the equation:

$$M_{ipj} = g_{ipj} \cdot Q_{pj} \cdot 10^{-3} \ [\text{ton}] \qquad (1)$$

Where Q_{pj} is a consumption of motor fuel of p-type by MTV of j –design type during defined time, t; g_{ipj} is specific emission of i –polluting substance by MTV of j –design type, using p-type of fuel, g/kg;

2) Emission of i — polluting substance by all types of MTV, using motor fuel of definite type M_{ip} is calculated by the equation:

$$M_{ip} = \sum_{j=1}^{j} M_{ipj} \quad [\text{ton}] \qquad (2)$$

3) Emission of i-polluting substance by all MTV using all types of motor fuel (petrol, diesel-fuel, gas) is calculated by the equation:

$$M_i = \sum_{p=1}^{3} M_{ip} \quad [\text{ton}] \qquad (3)$$

To conduct an inventory based on this method it is necessary to have data on fuel consumption of different types of MTV, which presents a shortcoming of this method, as an amount of fuel consumption varies considerably for each type of MTV.

Here is an order of inventory process of harmful emissions based on total mileage of MTV [9; 16]:

1) Emission of i — polluting substance of MTV of corresponding design type during the motion on motor roads is calculated by the formula

$$M_{ijl} = m_{Mijl} \cdot L_{jl} \quad [\text{ton}] \qquad (4)$$

where m_{Mijl} is a mileage emission of i-polluting substance of MTV of j –design type, g/km; L_{jl} is total mileage of MTV of j-design type, thousand of km.

2) Emission of polluting substances during the motion of MTV of all design types is calculated by the equation:

$$M_i = \sum_{j=1}^{j} M_{ijl} \quad [\text{ton}] \qquad (5)$$

As an initial data to calculate an emission it is necessary to have information of a number of motor vehicles and mileage. The number of passenger cars, trucks and buses is calculated according to a number of cars registered in a country (presented by State Traffic Inspection). Annual mileage of cars of different types is taken according to statistical data. Some mistakes are unavoidable in inventory based on total mileage: several aspects, such as traffic intensity, quality of road paving, run of transit vehicles, are not taken into consideration.

Emissions from motor transport traffic

One of modifications of the methods of inventory of polluting substances from motor transport based on amount of emission from mileage is a method of determination of an amount of pollution into atmosphere from motor transport traffic, worked out in St. Petersburg [18]. Emission of i-harmful substance by MTV traffic is determined for concrete road along its length

$$M_i = L \cdot \sum_1^K m_{Ki} \cdot N_K \cdot K_v \quad [\text{ton}] \qquad (6)$$

where m_{Ki} is a mileage emission of i –polluting substance by cars of K -group, g/km; N_K is a traffic intensity (number of cars of each of K group in both directions), cars per day; K_v is a correction coefficient, which accounts for average velocity of traffic motion; L is the length of road, km.

This method of inventory is free from some mistakes typical for a previous one, but it does not consider the quality of road paving either.

In some countries the methods, worked out by Intergovernmental Panel on Climate Change, (IPCC), are used to conduct an inventory of greenhouse gases emitted by different sources, including motor transport. Consider basic statements of IPCC Guidelines [6, 12] concerning motor transport in detail.

• An assessment of emission of motor transport may be based on two independent sets of data: fuel sold and mileage of transport vehicle. When two sets are available, it is necessary to compare the results.

• It is recommended to calculate emission of CO_2 mainly on amount of fuel sold, and CH_4 and N_2O — on distance covered.

• Subject to reliability and information content of data, an inventory may be conducted on three levels of accuracy. Coefficients of emissions were determined for each level of accuracy.

For example, when calculating on the first level, CO_2 emissions are determined by:

$$EM_{CO_2} = \sum_a \left[Fuel_a \cdot EF_a \right] \qquad (7)$$

Where EM_{CO_2} is carbonic gas emission, kg; $Fuel_a$ — an amount of fuel sold, ton/joule; EF_a — coefficient of emission (kg/ton/joule), equal to carbon content in fuel, multiplied by 44/12; a — type of fuel (petrol, diesel fuel, gas, etc.)

In design on higher levels the coefficient of emission is corrected relative to source nature of fuel. In [12] there is a remark that coefficients of emission in developing countries may differ from ones adopted in other countries due to bad quality of fuel, specific features of roads, age of transport vehicles, incorrect operation of catalysts, etc.

As seen from presented material, results of monitoring, as a rule, are not attached to implementation of inventory, that is, monitoring and inventory are carried out independently on each other. Estimation of standard indicator, which will allow us to conduct an inventory of emissions based on monitoring results, could considerably simplify the problem of assessment of emission.

First attempts to find a criterion to conduct a monitoring with further inventory were described by Aleksikov, Fyodorov, Stolyarov [1; 7; 17].

In [7; 17] the problems of monitoring and inventory of emissions of motor transport vehicles were considered under different schemes of organization of winter maintenance of roads. In these works an interaction of emissions of transport vehicles with the state of road paving was sufficiently well studied, but only winter maintenance of roads was considered.

As Aleksikov demonstrated the dependence of amount of burned fuel on traffic intensity and structure of traffic, roughness and coefficient of friction was stated:

$$Q = C_O \cdot N^{a1} \cdot \alpha^{a2} \cdot S^{a3} \cdot \varphi^{a4} \qquad (8)$$

where C_O — CO emission, kg/day; Q — fuel consumption, thousand liters/year ·km; N — traffic intensity, car/day, α — quantity of passenger cars in transport traffic; S — roughness of road paving, cm/km; φ — coefficient of friction; a_1,

a_2, a_3, a_4 — coefficients accounting the effect of each factor on total fuel consumption.

In this model fuel consumption is re-counted on "reduced toxicity", expressed in kgCO/day, so the model is inapplicable to account greenhouse gases.

Based on the study of offered methods of inventory of greenhouse gases (and other emissions) one may draw the following:

• All existing methods are supposed to conduct an inventory of pollution from direct emission on roads without consideration of emission alterations connected with exploitation of motor transport complex;

• As the most perspective method may be considered the method of inventory of emissions based on monitoring of road state.

2.2. Aims and methods of investigation.

A method of inventory of greenhouse gas CO_2 based on characteristics of roughness of road paving is offered. To explain the essence of offered method we will consider some properties of roads, cars and "road-car" complex.

Road. The problem of the road is to ensure a certain speed of transport traffic. To do so it should possess sufficiently low roughness of cover. To maintain a roughness on a required level during operation of road it is necessary to perform a certain number of repair works, which in their turn, are connected with certain gradually increasing amount of emissions.

The following chain of considerations is offered:

1. The road is put in commission with a certain roughness of paving.

2. The rise of the level of roughness occurs with time depending on traffic intensity and climate conditions according to a defined law.

3. Operational (acceptable) roughness of pavement may be given within some limits (from "satisfactory" to "excellent") according to adopted standards of assessment.

4. Subject to given acceptable roughness a number of necessary average repairs is changing. It is evident the higher are the requirements to roughness of road paving, the more frequently average repairs are needed.

5. Setting service time of the road (duration of its life cycle), one may determine an amount of harmful substances emitted during that time due to repair works (work of road construction machines, material production, etc.).

6. As the roads on different stages of wear are simultaneously in the process of operation, it is reasonable in inventory of emissions to take into account average annual values of emissions for each type of roads.

Car: 1) It is known that an amount of emission of a car in considerable extent depends of its speed of motion.

2) For each type of car there exists such a speed at which the engine is running in optimal mode with minimal fuel consumption and emission amount.

"Car-road" system. Car-road interaction consists in the following:

1. Car, moving on the road, damages it and is damaged itself. The higher is a roughness the more damaged is a car and more repairs are needed; hence additional emissions.

2. The lower is a roughness of a pavement the higher is a speed, the less are emissions (till some limit of speed) at a motion of MTV.

So, an understanding of regularities of dependences between the state of pavement and emissions of transport traffic gives us a possibility:

1. To conduct an inventory of emissions of the system "car-road", based on data on roughness of a pavement and intensity of traffic;

2. To organize the system of monitoring of emissions, which will allow us to register their amount as well as to serve as an instrument of influence on road services and thus facilitate the lowering of emission amount.

There are a great number of published works with information on emission amount under different processes, occurring in car-road complex (emissions from car motion, from car repair works on roads, maintenance and repair of roads, in material production, etc.).

To work out the methods of inventory of CO_2 emissions from car — road complex at operation of roads of general-purpose in conditions of the Republic of Uzbekistan a computer experiment was carried out based on published data on emissions and on experimental dependences, obtained by different authors.

Experiment has been conducted in the following order:

1. Models of the processes and data for emission calculation were chosen.

2. With chosen data and models computer experiment has been conducted; it presented variation problem with inclusion of traffic intensity from 1000 up to 10000 car/day under acceptable roughness from 3,5 to 15 IRI (S=60…70 cm/km) (IRI — International Roughness Index, m/km; S = 60…70 cm/km — roughness by bump measuring instrument, cm/km. In Uzbekistan both dimensions are used).

3. Experimental

3.1. Describing the dependences of CO_2 emissions on traffic intensity

As a result of experiment the dependences of CO_2 emissions on traffic intensity were obtained for each chosen roughness in the form of quadratic equations with different coefficients.

Having studied the character of dependences of coefficients on roughness in obtained equations and having described these dependences by Newton's interpolation polynomial, we get universal equations of the form

$$m_{CO2} = (A\, N_i^2 + B\, N_i + C) \qquad (9)$$

where N_i — is an average intensity of traffic on the roads of i-category, thousand car/day,

i — road category;

A, B, C — coefficients determined from equations (12–17).

Results of experiment allow us to offer the methods of estimation of CO_2 emission at: the motion of traffic; technical main-

tenance and repair of MTV; maintenance and repair of roads; fuel production; material production for repair works, etc.

Consider possible option of the methods of inventory of CO_2 emissions from car — road complex. CO_2 inventory may be of two types:

1. Approximate calculation of CO_2, emitted into atmosphere.

2. Corrected calculation of CO_2 and estimation of emission excess based on monitoring data.

To conduct approximate calculation of CO_2 it is necessary to have the following data:

—Average value of roughness of roads with different types of pavement in the Republic of Uzbekistan during discussed year (based on data of annual troubleshooting of roads conducted by State JSC "Uzavtoyul" ("Uzbekistan motor roads") services);

—Length of roads of different categories, km (Table 1);

—Intensity of traffic motion, car/day (average value is taken for each category of roads (Table 2);

—Structure of traffic (50% of passenger cars and 50% of trucks are assumed in calculation).

Table 1. – The length of motor roads on categories

Category, type of road paving	I capital	II capital	III capital	III light	IV capital	IV light	V light	Total
Length, km	2376	5574	3705	3705	9699	9699	7799	42557

Table 2. – Intensity of traffic on categories of roads, car/day

Category, type of road paving	I	II	III	IV	V
Intensity, car/day	7000–20000	2000–7000	1000–3000	100–1000	<
Average intensity, car/day	13500	5000	2000	550	100

Specific emission of CO_2, ton/year·km is determined from Eq. 10 for roads with capital type of paving and from Eq. 11 for roads with light type of paving

$$m_{CO2} = (A\,N_i^2 + B\,N_i + C) \qquad (10)$$
$$m_{CO2} = (A'N^2 + B'N + C') \qquad (11)$$

where N_i — is an average intensity of traffic on roads of i-category, thousand car/day; i — category of road; A, B, C, A$'$, B$'$, C$'$ — coefficients determined from equations *

$A_i = -0{,}000008688(IRI_{cpi})^8 + 0{,}000585373(IRI_{cpi})^7 - 0{,}017016784$ $(IRI_{cpi})^6 + 0{,}279385699\ (IRI_{cpi})^5 - 2{,}836359632\ (IRI_{cpi})^4 +$ $18{,}21080871\ (IRI_{cpi})^3 - 71{,}97313455\ (IRI_{cpi})^2 + 159{,}4341975$ $(IRI_{cpi}) - 150{,}497783 \qquad (12)$

$B_i = -0{,}000038605(IRI_{cpi})^8 + 0{,}0035213(IRI_{cpi})^7 - 0{,}129120942$ $(IRI_{cpi})^6 + 2{,}527767264\ (IRI_{cpi})^5 - 29{,}17135835\ (IRI_{cpi})^4 +$ $204{,}573212\ (IRI_{cpi})^3 - 855{,}9080764\ (IRI_{cpi})^2 + 1963{,}566667$ $(IRI_{cpi}) - 1849{,}876144 \qquad (13)$

$C_i = -0{,}000733432(IRI_{cpi})^8 + 0{,}04751178(IRI_{cpi})^7 - 1{,}308293548$ $(IRI_{cpi})^6 + 19{,}99653795\ (IRI_{cpi})^5 - 185{,}6542291\ (IRI_{cpi})^4 +$ $1072{,}386057\ (IRI_{cpi})^3 - 3763{,}169261\ (IRI_{cpi})^2 + 7327{,}045842$ $(IRI_{cpi}) - 6034{,}965189 \qquad (14)$

$A'_i = -0{,}025844696\ (IRI_{cpi})^5 + 1{,}260701208$ $(IRI_{cpi})^4 - 24{,}0599029\qquad (IRI_{cpi})^6 + 223{,}9966392$ $(IRI_{cpi})^2 - 1015{,}16234\ (IRI_{cpi}) + 1791{,}801901 \qquad (15)$

$B'_i = 0{,}119602\ (IRI_{cpi})^5 - 5{,}827709\ (IRI_{cpi})^4 + 111{,}110845$ $(IRI_{cpi})^3 - 1033{,}391737\ (IRI_{cpi})^2 + 4680{,}505456\ (IRI_{cpi}) -$ $8198{,}840181 \qquad (16)$

$C'_i = -0{,}09864335\ (IRI_{cpi})^5 + 4{,}744248895$ $(IRI_{cpi})^4 - 89{,}42294478\qquad (IRI_{cpi})^3 + 823{,}812271$ $(IRI_{cpi})^2 - 3703{,}244415\ (IRI_{cpi}) + 6501{,}290406 \qquad (17)$

where IRI_{cpi} — is an average in Uzbekistan roughness of pavement of roads of capital and light types, respectively.

Emission on the whole length of the road is calculated by

$$M_{CO2} = m_{CO2} \cdot L, \text{ton/year}$$

With data from Table 1 $M_{CO_2}^{cap}$ and $M_{CO_2}^{light}$ are calculated by the following way:

Roads with Capital covering

$$M_{CO_2}^{capI} = (A \cdot 13.5^2 + B \cdot 13.5 + C) \cdot L_I^{cap}$$
$$M_{CO_2}^{capII} = (A \cdot 5^2 + B \cdot 5 + C) \cdot L_{II}^{cap}$$
$$M_{CO_2}^{capIII} = (A \cdot 2^2 + B \cdot 2 + C) \cdot L_{III}^{cap}$$
$$M_{CO_2}^{capIV} = (A \cdot 0.55^2 + B \cdot 0.55 + C) \cdot L_{IV}^{cap}$$

Light

$$M_{CO_2}^{lightIII} = (A' \cdot 2^2 + B' \cdot 2 + C') \cdot L_{III}^{light}$$

...

$$M_{CO_2}^{lightV} = (A' \cdot 0.1^2 + B' \cdot 0.1 + C') \cdot L_V^{light}$$

Total emission of CO_2 by car-road complex is
$$M_{CO_2}^{total} = \sum M_{CO_2}$$

Corrected calculation of CO_2 amount is done based on the roughness of road paving and traffic intensity, defined while monitoring different sections of the road.

Emission excess on those sections of the road where the roughness of pavement has an assessment "bad" is calculated in relation to emission amount at "satisfactory" roughness.

3.2. Organization of monitoring

Volume of sampling

Republic of Uzbekistan includes 13 administration units (12 regions and the Republic of Karakalpakstan), each administration unit has 10–15 transportation sectors.

Monitoring is fulfilled by the method of selective control on the state of roads. Sampling from 2 transportation sectors of 1 administration unit (region) with probability 0,91 gives an error ±0,5 IRI in defining average roughness of the pavement in the Republic.

The order of monitoring

1. To investigate the map of motor roads belonging to transportation sector under inspection (category of roads, their length, types of road paving, types of covering); (Table 3)

Table 3. – Notation conventions of the length of roads on categories

Category	Type of paving	Length
I	Capital	L_1
II	Capital	L_2
III	Capital	L_3^C
III	Light	L_3^L
IV	Capital	L_4^C
IV	Light	L_4^L
V	Light	L_5

$$L_1 + L_2 + L_3^C + L_3^L + L_4^C + L_4^L + L_5 = L_{tot} \qquad (18)$$

where L_{tot} — is a length of roads belonging to a road economy.

2. To draw the route of laboratory motion;

3. Methods of determination of necessary parameters (roughness and traffic intensity) depend on availability of instruments in movable laboratory.

3.3. Order of measuring and processing of results obtained.

3.3.1. Roughness, traffic intensity and structure of traffic

1. Roads of i–category in monitoring are divided in a map by k sections with length l between crossings with other roads. Check up: $l_{1i} + l_{2i} + ... + l_{ki} = L_i$

2. Average roughness of each section is determined from:

$$S_{AVi} = \frac{\sum_{1}^{n_i} S_i}{n_i}, \qquad (19)$$

where n_i — is a number of measurements of roughness per each kilometer: $n_1 = 2l_i$ (measurements are conducted in both directions).

Estimation of roughness of section l_i is done based on the data from Table 4.

Table 4. – Assessment of road roughness in relation to the type of road pavement [11]

№	Assessment	Points	Type of road pavement		
			Capital advanced	Capital light	Transition type
			Registration of bump measuring instrument, cm/km*		
1	Excellent	5–4	60…70 (3,43…3,96)	80…90 (4,49…5,02)	230 (11,27)
2	Good	4–3	71…100 (4,01…5,51)	91…140 (5,07…7,67)	231…320 (11,3…13,74)
3	Satisfactory	3–2	101…110 (5,6…6,08)	141…210 (7,72…10,63)	321…460 (13,76…16,7)

* Roughness values in IRI units are given in brackets

3. Average daily traffic intensity N_i in each section is determined by the method of short-term observation [14] with further calculation for 24 hour intensity by stationary observation; for this, it is necessary to locate the places of traffic observation (in points of crossing with other roads).

4. The structure of traffic is calculated simultaneously with traffic intensity

Passenger cars P —%, $N_P = X$ $P = \dfrac{X}{X+Y} 100\%$

Trucks T —%, $N_T = Y$ $T = \dfrac{Y}{X+Y} 100\%$

Total $N_{TOT} = X + Y$

5. Processing of obtained results is done by the following way:

–With formulae (1) and (2) with correction on the structure of traffic, specific mass emission of m_{CO2}, ton/year·km is calculated in each section of road of *i*-category.

–Average specific emission of m^{AV}_{CO2} is calculated for each category of roads.

–Total emission of M_{CO2} is calculated on roads of each category.

–Specific excess of emissions E_E, ton/year·km is calculated in sections of roads with "bad" assessment of roughness. In the sections with "satisfactory" and lower roughness emission excess is taken as 0.

–Average specific excess emission of E_{AV}, ton/year·km is calculated on roads of a given category.

–Total excess emission of E_{TOT}, ton/year·km is calculated on roads of each category.

–Total emission of CO_2 is calculated along the whole length of roads of all categories.

–Total excess emission of CO_2 is calculated based on the whole length of roads of all categories.

5. Results and Discussion

Comparison of worked out methods with ones by IPCC

As far as an approbation of worked out methods *in real conditions* is unrealizable, as CO_2 is kept in atmosphere for a long time and to track the source of its emission is impossible, we will do comparative calculations of the methods described in [6, 12] and the ones offered here.

5.1. Calculations by IPCC methods

Annually about 1,5 million ton of petrol and 1,5 million

ton of diesel fuel is sold in the Republic of Uzbekistan (statistic data of 2012).

$$Emission\, CO_2 = \Sigma[Fuel_a \cdot EF_a],$$

where EF_a — is a coefficient of emission, kg/TonJoule

a) Petrol (TonJoule)

$$1.5 \cdot 10^9 kg \cdot 44 \frac{MJ}{kg} = 0.0660 \cdot 10^{12} MJ = 0.0660 \cdot 10^6 TJ,$$

where 44MJ/kg — heat of petrol combustion

$EF_a = 69300\ kg/TJ$ (IPCC Guidelines, 2006)

$Emission\ of\ CO_2 = 0.0660 \cdot 10^6 \cdot 69300 = 66000 \cdot 69300 =$

$4573800 \cdot 10^3\ kg = 4573800\ ton\ of\ CO_2$

b) Diesel fuel (TJ)

$$1.5 \cdot 10^9 kg \cdot 42.7\ \frac{MJ}{kg} =$$

$$= 0.06405 \cdot 10^{12} MJ = 0.06405 \cdot 10^6 TJ$$

where 42,7 MJ/kg — heat of diesel fuel combustion

$EF_a = 74100\ kg/TJ$ (IPCC Guidelines, 2006)

$$Emissions\ of\ CO_2 = 0.06405 \cdot 10^6 \cdot 74100 =$$

$$= 4746105\ ton\ of\ CO_2$$

Total emission of CO_2

$4573800 + 4746105 = 9319905$ ton of CO_2/year

5.2 Approximate calculation of CO_2 account by offered methods (Eqs.10–11, tables 1,2)

According to data presented by "Uzavtoyul"

Average roughness of roads with capital pavement 5,2 IRI — with light pavement 7,08 IRI

Coefficients for Eqs. 10–11 are calculated for specified roughness:

For roads with capital pavement A = 0.494088842, B = 51.81936007, C = 6.735261

$$M_{CO_2}^{capI} = (A \cdot 13,5^2 + B \cdot 13,5 + C) \cdot L_I =$$

$$= \begin{pmatrix} 0.494088842 \cdot 13,5^2 + \\ 51.81936007 \cdot 13.5 + 6.735261 \end{pmatrix} \cdot 2376 =$$

$$= 1892114.089\ ton/year$$

$$M_{CO_2}^{capII} = (A \cdot 5^2 + B \cdot 5 + C) \cdot L_{II} =$$

$$\left(0.494088842 \cdot 5^2 + 51.81936007 \cdot 5 + 6.735261\right) \cdot 5574 =$$

$$= 1550599.191\ ton/year$$

$$M_{CO_2}^{capIII} = (A \cdot 2^2 + B \cdot 2 + C) \cdot L_{III} =$$

$$= \left(0.49408884 \cdot 2^2 + 51.81936007 \cdot 2 + 6.735261\right) \cdot 3705 =$$

$$= 32276.53966\ ton/year$$

$$M_{CO_2}^{capIV} = (A \cdot 0,55^2 + B \cdot 0,55 + C) \cdot L_{IV} =$$

$$= \begin{pmatrix} 0.49408884 \cdot 0,55^2 + \\ +51.81936007 \cdot 0,55 + 6.735261 \end{pmatrix} \cdot 3705 =$$

$$= 343202.7152\ ton/year$$

Total emission on roads with capital paving is 3818192.535 ton of CO_2

For roads with light pavement: A' = 1.802056483, B' =56.24885, C' =10.88758

$$M_{CO_2}^{light\ III} = (A' \cdot 2^2 + B' \cdot 2 + C') \cdot L_{III}^{light} =$$

$$= \left(1.802056483 \cdot 2^2 + 56.24885 \cdot 2 + 10.88758\right) \cdot 3705 =$$

$$= 483848.8887\ ton/year$$

$$M_{CO_2}^{light\ IV} = (A' \cdot 0.55^2 + B' \cdot 0.55 + C') \cdot L_{IV}^{light} =$$

$$= \begin{pmatrix} 1.802056483 \cdot 0,55^2 + \\ +56.24885 \cdot 0.55 + 10.88758 \end{pmatrix} \cdot 9699 =$$

$$= 410942.3911\ ton/year$$

$$M_{CO_2}^{light\ V} = (A' \cdot 0.1^2 + B' \cdot 0.1 + C') \cdot L_{V}^{light} =$$

$$= \begin{pmatrix} 1.802056483 \cdot 0.1^2 + \\ +56.24885 \cdot 0.1 + 10.88758 \end{pmatrix} \cdot 7799 =$$

$$= 85052.74806\ ton/year$$

Total emission on roads with light pavement is 979 844.0279 ton of CO_2/year.

Total emission of CO_2 is 4 798 036.563 t/year — <u>for the network of general-purpose roads only.</u>

If to take into account street-roads network of cities and large centers of population, total emission will be 9036065 ton of CO_2/year. So, calculations by IPCC and offered methods give similar results. The difference in results may be explained by the fact that in offered methods emission is calculated without consideration of emission from farming and special machines.

Shortcomings of IPCC methods:

1) They give somewhat overrated results, as a coefficient is calculated for the whole amount of carbon, contained in fuel, CO_2, CH_4, CO, VHOC and solid particles (IPCC text).

2) IPCC methods could not serve as an instrument to reveal the reasons of changes in emission amount and to take the measures to prevent them.

3) They take into account only fuel burned in cars and do not consider emissions during maintenance and repair works of roads and automobiles

Offered methods allow us:

— to account emissions from all processes, occurring in operation of car-road complex;

— to evaluate emissions from results of comparatively simple monitoring of roads state;

— to substantiate the measures of influence on road services to improve environmental conditions.

So, offered methods may serve as a basis for a new methodology of approach to inventory of emissions by car-road complex and to be an alternative to other known methods, when it is necessary to reveal the reasons of excess emission and to take the measures to lower environmental loss.

6. Conclusions

Based on results of carried out analysis we may conclude, that:

1. There does not exist a method of inventory and monitoring of emission in car-road complex on the whole.

2. Existing methods of inventory and monitoring of emission for some components of car-road complex, based

on instrumental measurements or processing of vast amount of statistic data, require considerable financial expenditures and are inconvenient for practical use.

Carried out investigations allow us to create a new method of inventory and monitoring of emission of car-road complex based on criterion of roughness of road paving, consideration of moving cars, road repair works, process of fuel production, material for technical maintenance and repair works of cars and road paving.

Worked out method of inventory and monitoring is directed on consideration of greenhouse gases, but it may be also used to account all types of pollution in atmosphere.

On the basis of offered method a methodology was worked out to conduct an inventory of greenhouse gases for the roads of general-purpose; it provides rather exact picture of the effect of car-road complex on environment at low financial, time and labor costs and it allows to carry out complex express-assessment to inform the community and to elaborate well-timed measures to decrease harmful effect on environment. Worked out methods may serve as an alternative to IPCC methods and be used in stating the reasons of excess emissions by car-road complex.

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Section 15. Philology

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Problems of publication of karakalpak folk fairy tales and epics in world languages

Abstract: Karakalpak folk fairy tales and epics have high ethic and esthetic power. Folklore works of our people provoke interest around the world. In this respect, translation of these works in world languages has a big importance. National and foreign authors translate these works in different languages and publish them. The article considers the modern condition and problems of translation and publication of folklore works of Karakalpak people, including fairy tales and epics, abroad.

Keywords: fairy tales, epics, Karakalpak folklore, translation, publication, oral folk art, tale-tellers, performers of epic [1].

Karakalpak folk fairy tales and epics have high ethic and esthetic power. Apparently, this is why folklore works of our people attract the attention of peoples of the world. It should be noted that translation of these works in world languages and publications have a big importance. Scientific works of national and foreign authors take a considerable place in this sphere.

The works of oral folk art have a special place in the growth of spiritual culture of the mankind. One hundred volumes of folklore works of Karakalpak people certify the richness of folklore. Folklore works of Karakalpak people stand out due to their multivariance and unique marvelous performance. Before the appearance of writing system, even till date these works haven't lost their value. Fairy tales and epics of our people are different in deep content and peculiarities of performance. These works masterfully depict the images of brave, courageous, skilled patriots, wise characters who are an example to follow for young generation, thus having an educational nature.

Demonstration of interest in Karakalpak fairy tales and epics is observed not only in the country, but in the neighbor states and abroad. Due to this, fairy tales and epics of Karakalpak people were translated in different languages and such work continues successfully.

If we refer to history, N. Karazin wrote down «A fairy tale about the kingdom of women» from the words of Karakalpak tale-tellers and prepared it for publication [1]. Several fairy tales written down from the mouth of folk tale-tellers in Turtkul (Petro-Aleksandrovsk) were published in Russian language [2]. During the period from 1929 to 1946, a Russian scientist N. A. Baskakov was on artistic trips in all districts and towns of the Republic of Karakalpakstan, where he collected folk fairy tales, legends used by him while writing the book «Karakalpak language» [3]. The book contained Karakalpak fairy tales: «A shepherd who lied 100 times», «Cowardly old man», «White bone», «Karakhan padishah», «Khan's daughter», «The son of a rich man», «Four brothers», «Wedding of Zhiyrenshe», «Duck and frog», «Orphan», «A jester who deceived the devil», «Auezmurat the coward», «Old man the liar», «Fisherman» etc. Although, these fairy tales require further research, it was the first experience of collecting Karakalpak folk fairy tales, their translation in Russian language and publication.

In 1959 Karakalpak fairy tales were published in the book «Amu's curiosities». It is known that the credits to the writers M. I. Sheverdin and I. Sheverdina for the translation of Karakalpak fairy tales in Russian language are big. The same year Karakalpak fairy tales translated into Russian and prepared for publication by A. A. Volkov and I. S. Mayorov were published under general editorship of M. I. Sheverdin («Karakalpak fairy tales», Karakalpak state publishing house, Nukus, 1959).

The credits to Russian scientists for the wide distribution of Karakalpak folklore are big. Thus, they translated Karakalpak folk epics «Forty maidens» and «Shryar» into Russian. The variant of the epic «Forty maidens» written down by Arseniya Tarkovskaya performed by Kurbanbai Tazhibaev was published in Russian in 1983 [4]. Later, oral folk works of Karakalpak people were translated in other world languages and published.

World famous scientists — folklore scientists, historians and ethnographers study the history and culture of Karakalpak people, including folklore, the results of which are published in scientific and fiction publications and conference materials. For instance, during artistic trips in our region, a

German scientist Karl Reichl paid a lot of interest to folklore. He supported the publication of some folklore works of Karakalpak people in English and German in the publications of Finland and Germany.

It should be noted that in 2012, supported by UNESCO, discs named «Karakalpak epic heritage» were released in Paris under the editorship of Frédéric Léotard with the help of the scientific and creative personnel of the Scientific research institute of the humanities of the Karakalpak department of the Academy of sciences of the Republic of Uzbekistan, including prominent scientific figures such as Zh. Khoshniyazov, A. Alniyazov, S. Amirlan, G. Nuratdinova, folk singer G. Otemuratov and others. This disc contained folk songs from 22 folk epics [5].

To summarize the above stated, it should be noted that the interest in folklore works of Karakalpak people has grown in recent times. In this respect, we consider it necessary to conduct researches, collect different variants of these works and ensure literary translation for publication in different world languages.

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Language, Cognition and Culture in Eco-Narratives

Abstract: This paper represents the on-going project in ecolinguistics titled "ECOWord". The main objective of the project is to bring about suitable answers to the questions of human-nature relationships reflected in eco-related texts.

Keywords: ecolinguistics, cognitive semantics, conceptual metaphor, discourse, narrative

Introduction

The emergence of various ecological approaches in linguistics that developed since publication of Haugen's "The Ecology of Language" [5] generated several significant ways to study this interdisciplinary field. Because the language of ecology and specifically "the environment of language" open an infinite world of possibilities [11, 2], it is important to define how we approach language-environment constructs primarily from the linguistic point of view. Such an approach can be described nowadays more as juxtaposed and less as opposing. The on-going dynamics demonstrate that language can be both a tool in analysis of eco-related issues and be the object of ecological research. On the one hand, language conceptualizes as a "living organism" that influences the way we perceive the world and interact with it. On the other hand, language is shaped by the environment, in which it is functioning.

Eco-narrative is understood as a form of environmental writing, a text that passes ecological tenets through rhetorical, linguistic and cognitive strategies.

Discourses on literature and the environment, the dynamics of environmental perception and the interaction between humans and the world around them as a solution to the many problems of such relationships has been the main focus of ecolinguistics and ecocriticism. From this point of view, the current ecological crisis created environmental thinking and it is important to be fully aware of what kind of knowledge we have on this issue (do we need more), what power generates critical thinking, what are the desires and intentions of humans.

The ecological frameworks in linguistics use different terms for researching the relationships between the language of humans when describing the environment, such as "language ecology", "the ecology of language" or "ecolinguistics" but it is generally accepted that the worldview on the interaction between humans and the rest of life on earth has a dual nature: anthropocentric (*nature as machine*) and biocentric (*nature as mother*) [12, 1–3].

The biocentric worldview is a "set of beliefs, assumptions, biases or ideologies that place the biosphere at the centre of a person's life, thought and feeling" [12, 7]. The role of humans in the anthropocentric worldview as dominant over nature and seeing nature as no more than "an instrument for human ends" [12, 3] evokes the series of questions such as "What is the impact of humans on nature sustainability of the environment?" and "What can we do about it?"

Discussions related to cognitive assessment of the global environment and the impact of humans on nature

and vice versa have brought an interesting insight to the topic of language and cognition. In the words of Hutchins (2010), it is now apparent that "cognitive science is shifting from viewing cognition as a logical process to seeing it as a biological phenomenon" [7, 705]. Although the ways and outcomes of the human-environment interaction are one of the most important topics in cognitive ecology and ecocriticism, understanding of the issue of language and psychology in this sense is lacking in depth. Further research in this application should meet this challenge.

Summarising all the above, it seems obvious that the key solutions on the topic should be found in an interdisciplinary approach. Only linguistic or strictly cultural approaches are not sufficient to research such complex constructs of human-nature relationships. Thus, I propose to focus on three main areas, each highlighting a particular sector of an interdisciplinary framework involving linguistics, cognitive psychology and cultural studies: (i) biosphere as expressed in eco-narratives of different cultures; (ii) metaphorical density (i. e., a number of coded conceptual metaphors per document) and diversity in conceptualization of ecology related issues in environmental writing; and (iii) psychological evaluation of eco-narratives in society in different cultures.

To attain these goals, the following questions should be prioritized: (i) How does the language system transport ecological ideas in eco-literature? (ii) How does language shape the environmental cognition of people in different cultures? and (iii) How images (e. g., visual perception of travel experience imagined or experienced) and words (e. g., metaphors, emphatic descriptive constructions) embody thoughts on human-nature interaction?

Both anthropocentric and biocentric worldviews are significant in this kind of analysis. However, to fully reveal the issues behind a "partnership model" [12, 7] between humans and nature in the age of global environmental crises, the anthropocentric view is considered as the more important with its various gradations.

Methodological Approach and Project Management

According to Howarth (1996), nature is known though images and words [6] and thus validity is found through data (i. e., "in words") involving semiotic perspective of text (discourse analysis) as well as extra linguistic data, such as intentions or attitudes embedded in texts (textual attitude analysis) and thought construction tools as image-schema or conceptual metaphor (conceptual cross-domain mapping). Thus, the source material of such complex study should reflect its diversity. Consequently, the corpus of environmental writings is divided into three sections: (i) literature on nature, ecosystems; (ii) exploratory and adventure literature; and (iii) literature on climate change, population and global sustainability.

Apart from eco-narratives covering topics on nature and environment, specific attention is paid to travel writings. Starting from travel literature of ancient Greece (Pausanias, 2nd century CE) or the Song Dynasty of medieval China, this genre continued to tell the stories of the unknown via maritime diaries of writers like Richard Hakluyt or well-known explorers such as Captain James Cook. Both fictional literature in the form of essays and poems and guides of travel writers in the forms of diaries served as sources of information about unknown lands, inevitably including notes on nature and the environment. In spite of quite an impressive historical background, the study of travel literature of various kinds as an independent study started to gain power only in the mid-1990s [10]. Nowadays such literature is transformed into independent studies on environment and travelling involving, for example, nature literature and exploratory literature.

The methodological framework is two-fold: the grounded theory principles of qualitative data analysis [4] are employed in the cognitive linguistic part of the research using computer-assisted qualitative data analysis software (CAQDAS). A software-based methodology for studying concepts, conceptual metaphors in discourse [8, 22–23] was already applied successfully to trace discourse dynamics [2]. The source material is analysed to disclose and interpret linguistic, cognitive and discursive functions of eco-related texts. It is possible to research all functions using CAQDAS because the structure and capacity of CAQDAS are designed for profound qualitative analyses like this project.

Psychological evaluation of eco-narratives in society of different cultures

Ecocriticism from the psychological perspective is a way of finding specifics of human psychology in the age of environmental crises. Unique folk psychology is created and expressed through narrative, when narrative construction of reality is strongly connected with social intelligence [1]. Environmental issues are relevant for the stylistic categories of fiction and non-fiction narrative because even fictionalized accounts of imaginary or historical events is a part of human interaction with the world. In the case of fiction narrative, ecological, social or other principles are "mapped" in the narrative and are informed by such to see how society might look under such principles.

More recently the emphasis has shifted towards psychological meaning construction [9], which has a direct relation to the expression of the way people organize their relationships with the world. Narrative organization and psychological organization are current topics to disclose the relationships of a speaker's perspective and experience of text. Narrative composition here refers to psychological relationships (emotions, attitudes) between characters in the narrative. Originating from Peirce's concept of unlimited semiosis (1931), Eco [3] developed an interesting insight on the role of a reader in the process of making meaning from texts, emphasising in his Theory of the Model Reader (1998) that a reader may actualize various meanings and contents to decode the narrative. For a reader to acquire awareness on various eco-related topics "encoded" in text, one needs to actualise the meaning-content of text. Here the notions

developed by Eco — the empirical reader and the model reader — find their application to answer the question on the extent of general awareness and/or encyclopaedic knowledge on the subject.

Concluding remarks

What I expect to achieve is a profound analysis of eco-thematic texts in a variety of genres. The eco-related information embedded in the written language is something that can be used for better understanding of the way people conceptualize ecological reality and store it for future retrieval. This seems especially useful for educational purposes. Furthermore, conceptual coding of eco-related information of the eastern and western writers will show contrast between cultural backgrounds on the topic.

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Section 16. Philosophy

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Common sense contra scientific knowledge: The point of misunderstanding

Abstract: It's asserted in the article that the answer to the question, why science was emerged in the history of humanity, demands from common sense to go beyond the bounds of the unconsciously learned allegations and to understand that there are so deep levels and so laws of nature and society that can't be known without the use of special tools and methods of science.

Keywords: common sense, science, knowledge.

No matter how profound and overwhelming the impact of scientific knowledge on modern society is, one of the most persistent illusions of social consciousness remains the idea that humanity could get knowledge produced by science without any science. Even among undergraduate students we can meet some ones who believes that the laws of nature and society can be opened either in ordinary practice by acting at random and correcting errors, or in a prophetic dream. To dispel this illusion is necessary if we want to keep science as a special cultural phenomenon.

Undoubtedly, even the most distant from science people isn't wrong in the fact that any kind of human activity includes elements of cognition, carrying certain information about reality. The history of the origin and development of man as a socio-cultural creature is the history of the formation of man as a thinking, intelligent, capable of knowing the logic of things and to follow this logic (laws) in the process of practical and spiritual obtaining of the world. Thanks ability of thinking, which reveals the essential properties and relationships between phenomena of reality even at the level of ordinary consciousness in everyday practical activity, man has learned to make fire, to create and improve tools, to domesticate animals, to cultivate the land, to build houses, and much more.

It follows that cognitive activity as a specific form of the relationship of subject and object isn't limited to the science, which is only one of the forms of the historical development of knowledge, and that scientific knowledge as the result of scientific researches doesn't exhaust by itself the totality of the knowledge produced by humanity. On the contrary, humanity has indeed a lot of vital knowledge accumulated long before or regardless of scientific knowledge.

It's just this undeniable fact of human history that makes it possible to ask: Why were people need to invent a special form of knowledge of the world, which over two thousand years was rapidly moving away from everyday life, like the galaxy, inhabited by strange ideas and theories, encrypted in incomprehensible formulas?

Anyhow self-evident the answer to this question may seem to philosophers, historians and methodologists of science, it can't be received on the ordinary level, because it demands from all inquirers to exceed the bounds of the unconsciously learned allegations. The question will arise again and again, until it becomes clear that there are so deep levels of the nature and so laws of development of the phenomena of reality that can't be known without the use of special tools and methods.

If watching every day for thousands years sunrises and sunsets people were able, eventually, to understand the structure of the Solar system, scientific knowledge of this problem, carried out by astronomers, wouldn't be needed to humanity. If the ability to count on one's fingers would give an opportunity to calculate squares, planet's orbits or trajectories of flying objects, neither mathematics nor physics as branches of scientific knowledge would be needed to people. In other words: if the essence and laws of natural and social phenomena were knowable in the processes of economical, magical, artistic, religious, political or any other kind of human activity, science as a special kind of cognitive activity would be excessive.

However, there are such aspects of reality, such levels of entities, such regularities that can't be known by any other — non-scientific — way, even if an arbitrarily large expenditure of human force would be applied for an arbitrarily long period of time (which, in itself, is incompatible with the duration and nature of human life, and therefore — is obviously impossible condition).

No set of non-scientific knowledge reflects those aspects of reality, knowledge of which is extracted in the process of scientific cognition, because, in contrast to all the other forms of knowledge, science, since the first targeted observations

of astronomical objects and phenomena of nature and to nowadays sophisticated experiments, continuously moved along the path of creating its own — special-scientific — basis of its existence and development. The practical interaction with the object of cognition in the process of controlled observation and experiment is no one of the scientific methods only, but an expression of just the very essence of the scientific attitude to cognition and its fundamental differences from all the other kinds of cognitive activity.

Knowledge of single, separate, specific parties and properties of reality, actually produced by people during everyday practical and spiritual obtaining of the world, will always be fundamentally different from scientific knowledge, since it has neither the inter-subjectivity (because there are no universal means for its expression, preservation and transfer), nor the ability to penetrate the regularities of the phenomena of reality (because it would be necessary to go beyond the ordinary practice). Meanwhile, all of the elements of scientific knowledge have properties that ensure the achievement of the main goal of scientific knowledge — inter-subjective knowledge of the essence and laws of development of the phenomena of reality.

Just for achieving this purpose *special objects* of scientific researches, that doesn't coincide with the objects of nonscientific practical or cognitive activity, are separated; *special scientific tools and means* of studying the object are created; *special scientific methods* of verification/falsification the truthfulness of the results of scientific researches are developed; *the whole system* of scientific knowledge (including scientific facts, hypotheses, theories), empirical and theoretical validity of which doesn't remain unchanged in the process of development of scientific knowledge, is continuously improved; *special scientific procedures* of presentation, discussion, storage, inheritance, etc. of scientific knowledge are invented; *the system of institutions*, organizing and serving the production and broadcasting of scientific knowledge and the reproduction of scientific personnel, exists.

Both types of Being — natural and social — can be the objects of scientific knowledge that (1) studies natural processes independent from the will and consciousness of man as the subject of history, (2) relies on a special practical interaction with the studied object — experiment and observation, (3) forms the empirical basis, the content of which may be interpreted independently from the adopted hypotheses, (4) creates a theoretical model of the studied object, which reveals its essence at the level of quantitative laws, enabling to predict new empirical dates.

As a special form of cognitive activity, the purpose of which is the systematic disclosure of essence and laws of the natural phenomena by using specially created material and ideal means and methods, scientific knowledge is emerging at the stage of civilization in the 3rd Millennium BC, acquires sustainable features to the middle of the 1st Millennium BC in Ancient Greece, but aware itself as the special form of knowledge, different from any other form of cognitive activity, not before 17th century in the Western culture of the New time.

The complexity of social forms of organization of science in the 20th century, due to the development of material and technical base of the scientific knowledge and the needs of social production in the effective use of scientific knowledge, gave rise to the myth, widely spread in public, about "multiple targets" of science. It seems to common sense that science is committed to a variety of goals: from economic benefit to the simplicity of the solutions of ecological problems, — and among these goals the pursuit of Truth isn't on the first place. In almost every University textbook or online resource one can find today the assertion (more or less strictly formulated) that knowledge has ceased to be the ultimate objective for modern science.

Meanwhile, science is committed not to the economic effect or to the decision of ecological problems *per se*, but to the obtaining of *knowledge* about the ways and means of achieving economically efficient policy and environmentally sound production. A scientific idea by itself, even developed to the level of formal theory, can't make a profit or improve human environment. No any result of a social activity is the direct result of scientific cognition, except of the results of scientific experimental activity in the field of science itself. Even speaking of science as a direct productive force, we must not forget that any kind of practical activity is based on the results of scientific research only in some degree. However, not these results are responsible for economically inefficient activities, but individuals whose actions may remain quite unscientific, even when in science there are knowledge the application of which leads to the achievement of the desired economic effect.

The only own goal of science has always been and will forever remain gaining knowledge about the world. Knowledge, only knowledge and nothing, but knowledge — that is the product of scientific cognition, whatever non-scientific objectives society tries to impose on science or in whatever own sins aspires science to blame.

The goal of any scientific research is to obtain new knowledge about certain phenomena of reality. Only this goal expresses the essence of scientific knowledge, since all that is already known can't be the object of scientific research, which is, primarily, a process of obtaining, receiving, producing of scientific knowledge and only then — of learning, assimilation, storage and so on of already received knowledge. Therefore, the key feature of scientific activity is its focus on solving scientific problems.

Scientific study exists only there and then, where and when scientific problems are set and solved. The presence of the problem field, in which there is at least one problem, is an essential feature of scientific research, so it's no exaggeration to say: where there is no scientific problems — there is no scientific research. The reason of this is that just through scientific problem as a form of perception of an object of inquiry this object appears before the subject of cognition

as unknown. It is this specific difference of a scientific problem from any other form of perception of an object of the study scientists mean, calling scientific problems "the knowledge about ignorance".

If from a logical point of view the problem is a variation of the question as a special form of thought which expressed the requirement to get missing (i. e., missing at the disposal of the cognizing subject) information about the object, from the epistemological point of view, the question turns into a scientific problem then and then only when the answer isn't contained in the available system of knowledge. This means that none of the questions, the answers to which can be found within already existing system of scientific knowledge, are scientific problems. And conversely, the perception of the object of research in problematic form determines the novelty of results produced in the process of scientific research, since the solution to any scientific problem carries new knowledge about the object.

In conclusion we ought to say that science can't and shouldn't perform functions, which at different stages of human history was performed and continue to be performed by common sense, myths, religion, art, or philosophy.

Area of moral, economic, political and any other responsibility of science as socially organized process is the production, development and improvement of inter-subjective knowledge about such aspects and laws of the world, which can't be known in any other forms of cognition, and the fundamental value, which is expressed the ultimate objective and the meaning of science, is the Truth. Burden of such responsibility is sufficient to ensure and justify the importance of the role that science has to play in human culture.

Section 17. Chemistry

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Basis of the obtained sodium sesquicarbonate carbonate and sodium bicarbonate

Abstract: We presented a theoretical analysis of the system Na_2CO_3-$NaHCO_3$–$2H_2O$ with the definition of optimal conditions for obtaining sodium sesquicarbonate. In the laboratory, studied the process of obtaining and study the kinetics of decomposition of sodium bicarbonate, and determined the rheological properties of suspensions. With the proposal stage process for producing synthetic electrons (sodium sesquicarbonate).

Keywords: sodium sesquicarbonate, system, eutectic point, isotherms, components, sodium bicarbonate, sodium carbonate

In literature there is a lot of information on advantage and wide consumer properties trones and its receiving from natural ore [1].

Trona (also sodium sesquicarbonate or one-and-a-half soda is called) $Na_2CO_3 \cdot NaHCO_3 \cdot 2H_2O$ meets in the nature and can be received by a crystallization from mix of hot solutions of a carbonate and sodium bicarbonate. But in literature the receiving question trones from the last is taken insufficiently up.

For the physico-chemical studies on the process of producing the tronas of carbonate and sodium bicarbonate by interpolating data in the literature [2–3], a chart of the isotherm at 25, 80 °C solubility in the $Na_2CO_3 \cdot NaHCO_3 \cdot 2H_2O$ (Figure 1 and Table 1).

The data show that in the studied system as a new phase formed sodium carbonate monohydrate and dihydrate double salt $Na_2CO_3 \cdot NaHCO_3 \cdot 2H_2O$ — sodium sesquicarbonate.

Table 1. – Characteristic of Na_2CO_3-$NaHCO_3$–$2H_2O$ system of nodal points

Nodal points	Composition of the liquid phase			Temperature, °C	Solid phase
	Na_2CO_3	$NaHCO_3$	H_2O		
A_1^{80}	31.23	0	68.77	80	$Na_2CO_3 \cdot H_2O$
E_1^{80}	30.84	2.63	66.53	80	$Na_2CO_3 \cdot H_2O + Na_2CO_3 \cdot NaHCO_3 \cdot 2H_2O$
E_2^{80}	17.65	9.82	72.53	80	$Na_2CO_3 \cdot NaHCO_3 \cdot H_2O + NaHCO_3$
B_1^{80}	0	16.14	83.86	80	$NaHCO_3$
A_1^{25}	22.63	0	77.37	25	$Na_2CO_3 \cdot H_2O$
E_1^{25}	22.25	1.14	76.61	25	$Na_2CO_3 \cdot H_2O + Na_2CO_3 \cdot NaHCO_3 \cdot 2H_2O$
E_2^{25}	17.82	4.24	77.94	25	$Na_2CO_3 \cdot NaHCO_3 \cdot 2H_2O + NaHCO_3$
B_1^{25}	0	9.2	90.8	25	$NaHCO_3$

Eutectic point of Na_2CO_3-H_2O composition corresponds to 22.63% Na_2CO_3 and 77.32% H_2O at 25 °C and 31.23% Na_2CO_3 and 68.77% H_2O at 80 °C and NaHCO$_3$-H_2O — 9.2% NaHCO$_3$ and 90.8% H_2O at 25 °C and 16.14% NaH-CO$_3$ and 83.86% H_2O at 80 °C. Figure solubility isotherms of Na_2CO_3-NaHCO$_3$-H_2O at 25 and 80 °C for three fields separated solid phase crystallization: NaHCO$_3$ and two new phase — $Na_2CO_3 \cdot H_2O$ and $Na_2CO_3 \cdot NaHCO_3 \cdot 2H_2O$.
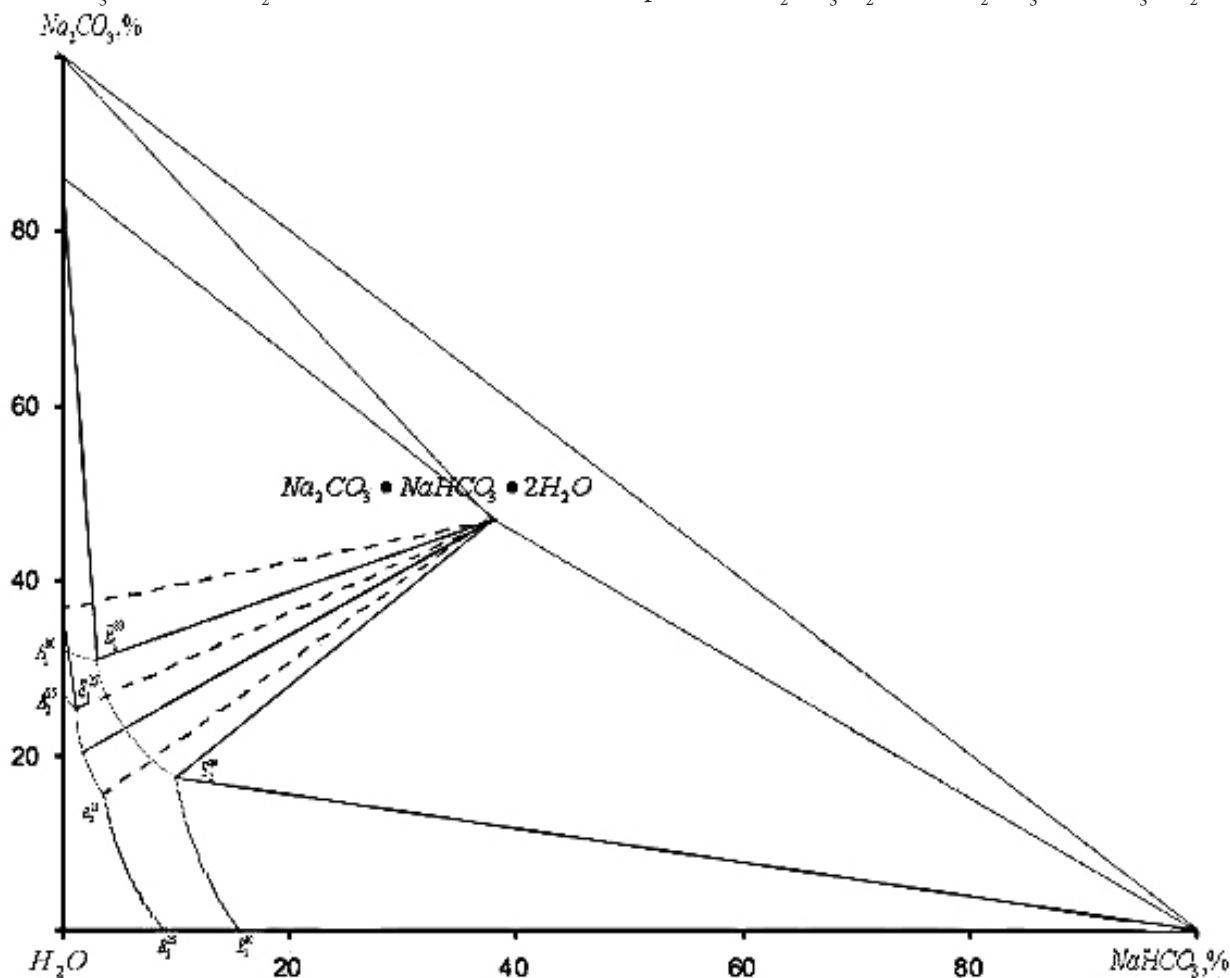
Figure 1. Diagram solubility isotherms of Na_2CO_3-NaHCO$_3$-H_2O

These fields converge in the two triple points of co-existence of three solid phases, which established the equilibrium solution formulations (Table 1).

Fields crystallization $Na_2CO_3 \cdot H_2O$ at 80 °C occupy a smaller portion of the chart than the field of crystallization NaHCO$_3$ and trones. This shows a good solubility in the system of sodium carbonate monohydrate, compared with sodium bicarbonate and trona. With decreasing temperature, the crystallization field $Na_2CO_3 \cdot H_2O$ and tronas narrowed while increasing the field of crystallization NaHCO$_3$.

Trone highlighted in the crystallization form and identify chemical, radiographic, and grav methods of physical and chemical analysis.

The chemical and physico-chemical analysis of solids extracted from the region of existence of the proposed $Na_2CO_3 \cdot NaHCO_3 \cdot 2H_2O$, confirmed the formation of the latter.

Chemical analysis of the isolated compounds gave the following result:

Found mass.,%: Na_2O-41.5; CO_2–39.0; H_2O-14.3;

For $Na_2CO_3 \cdot NaHCO_3 \cdot 2H_2O$ calculated mass.,%: Na_2O-41.8; CO_2–39.4; H_2O-14.41.

Education tronas confirmed by X-ray analysis that $Na_2CO_3 \cdot NaHCO_3 \cdot 2H_2O$ has an individual crystal lattice, which is not characteristic of the initial components and corresponds to the literature [4] (Fig. 2).

Na_2CO_3; d1 = 3.21; 2.96; 2.58; 2.54; 2.37; 2.25; 2.18; 2.12; 2.03; 1.956; 1.884-A°;

NaHCO$_3$; d1 = 3.07; 2.58; 2.18; 2.03; 1,965; 1,904; 1,519-A°;

NaHCO$_3 \cdot Na_2CO_3 \cdot 2H_2O$; d1 = 9.83; 4.91; 3.18; 3.08; 2.76; 2.64; 2.47; 2.44; 2.25; 2.03; 1.78; 1.658-A°;

Study of thermal properties of the compounds $Na_2CO_3 \cdot NaHCO_3 \cdot 2H_2O$ shown that there is a DTA curve endotherm at 104.6 °C at a heating rate of 2 °C/min.

From the literature it is known that at a heating rate of 5, 15, 20 °C/min. minimum peak observed at 111.81, 132.41 and 138.46 °C, respectively.

This is due to the fact that with increasing heating rate of the temperature difference between samples increases. The degree of decomposition of the trona will be greater with slow heating (2 °C/min.) Than during rapid heating (5, 20 °C/min) (Fig. 3).

Figure 2. XRD patterns of samples of trona obtained: a) solid phase, b) a liquid phase method

Analysis of $Na_2CO_3 \cdot NaHCO_3 \cdot 2H_2O$ shows that to obtain a solution of carbonates and bicarbonates of sodium concentration must be maintained in the ranges of 18–26% and 6–15%, respectively. The process comprises the steps of

dissolving the starting components with the separation of the solid phase, the crystallization solution, the separation of sodium sesquicarbonate from the pulp and the circulation of the mother liquor at the beginning of the process.

To determine optimal process parameters of producing sodium sesquicarbonate Na_2CO_3 and $NaHCO_3$ liquid phase method, the kinetics of the decomposition process $NaHCO_3$ depending on the mass ratio $NaHCO_3$: H_2O, temperature, ratio Na_2CO_3: $NaHCO_3$:$2H_2O$ and rheological properties of the slurry formed in the preparation of sodium sesquicarbonate.
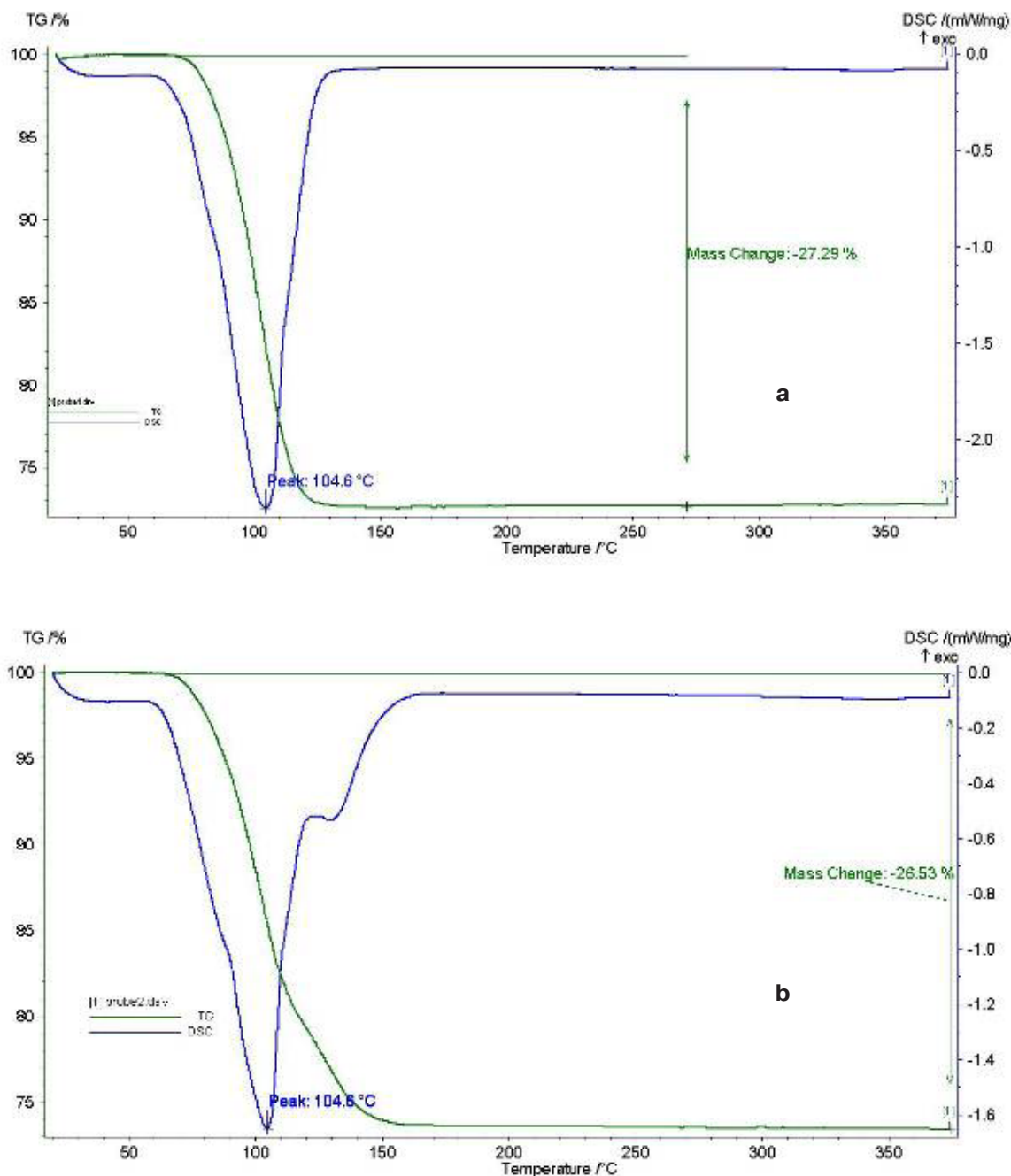
Figure 3. Thermograms samples at a heating rate of 2 °C/min.
a) a solid phase, b) a liquid phase

Table 2 shows that with increasing mass ratio of $NaHCO_3$: H_2O and temperature from 60 to 90 °C, the degree of decomposition increased from 12.4–13.8 to 28.2–30.5% within 6 minutes. With an increase in the duration of up to 20 and 160 minutes it rises from 16.57–17.33, 37.17–39.96 to 24.3–24.5, 65.56–81.84 respectively; degree of degradation with increasing duration of the expansion from 5 to 160 minutes with increasing temperature from 60 to 90 °C increases 1.27–2.25, 2.7–3.34 times. Therefore, the dissolution process takes place within less than 20 minutes at a temperature of 90 °C. And $NaHCO_3$: H_2O ratio in intervals 3÷7–4÷6 practically does not influence process.

Table 3 shows the results of a study of obtaining sodium sesquicarbonate in the laboratory.

The data shows that with increasing amounts of additives to soda $NaHCO_3$ solution increases the solid phase in the system by 15% at 80 °C.

For example, when using 18% strength sodium solution produced 8.17% solids, consisting of a mixture of sodium hydrogen carbonate and trona.

Table 2. – Speed of decomposition of sodium bicarbonates in suspension

№	$NaHCO_3 : H_2O$	Temperature, °C	Significative	Time, min					
				5	10	20	40	80	160
1			Na_2CO_3	4.10	4.90	5.81	6.81	7.51	11.90
2	30:70		$NaHCO_3$	15.90	15.60	14.60	12.10	11.10	4.50
3			Degree of decomposition	28.20	33.70	39.96	46.84	51.65	81.84
4			Na_2CO_3	4.90	5.80	6.54	7.20	8.15	12.30
5	35:65	90	$NaHCO_3$	15.60	15.40	15.30	15.20	14.40	7.50
6			Degree of decomposition	28.86	34.16	38.34	42.40	48.00	72.44
7			Na_2CO_3	5.91	6.50	7.20	7.60	8.50	12.70
8	40:60		$NaHCO_3$	15.36	15.30	15.20	15.00	14.80	10.10
9			Degree of decomposition	30.51	33.56	37.17	39.24	43.88	65.56
10			Na_2CO_3	2.20	2.51	2.60	3.10	4.60	6.20
11	30:70		$NaHCO_3$	14.50	14.20	14.20	14.00	13.80	13.00
12			Degree of decomposition	15.13	17.26	17.88	21.32	31.64	42.64
13			Na_2CO_3	3.30	4.00	4.10	5.12	5.20	6.50
14	35:65	80	$NaHCO_3$	14.20	14.00	13.90	13.50	13.30	12.90
15			Degree of decomposition	19.43	23.56	24.15	30.15	30.62	38.28
16			Na_2CO_3	3.40	4.34	4.74	5.51	6.50	6.80
17	40:60		$NaHCO_3$	14.10	14.00	13.70	13.00	12.90	12.70
18			Degree of decomposition	17.55	22.41	24.47	28.45	33.55	35.11
19			Na_2CO_3	2.00	2.40	2.52	2.80	2.85	3.50
20	30:70		$NaHCO_3$	12.50	12.00	11.80	11.60	11.50	11.40
21			Degree of decomposition	13.76	16.51	17.33	19.26	19.81	24.07
22			Na_2CO_3	2.27	2.59	2.87	2.90	3.75	4.16
23	35:65	60	$NaHCO_3$	12.30	11.80	11.50	11.50	11.30	11.00
24			Degree of decomposition	13.37	14.90	15.14	17.08	22.08	24.50
25			Na_2CO_3	2.40	2.80	3.21	3.47	3.80	4.70
26	40:60		$NaHCO_3$	11.70	11.40	11.00	10.94	10.81	10.70
27			Degree of decomposition	12.39	14.46	16.57	17.91	19.62	24.26

With increasing concentration of soda solution to 26% solids content of the image in the system reaches up to 20.5% (S: L=1:0.256).

The composition of the solid phase formed from a soda solution with a concentration of more than 22% of additives of 10–15% sodium bicarbonate, sodium sesquicarbonate occurs only with the insoluble residues of the starting components.

Soda and bicarbonate solutions and/or suspensions prepared at 80 °C after separation of the solid phase is cooled to 30 °C. In the system, a new solid phase consisting of trona and mixed with sodium bicarbonate. With increasing concentration of the soda solution amount of the solid phase solid phase increases from 8.3 to 11.52%. Pure trone formed in 18–22% soda solution misfit adding 5% sodium bicarbonate, and the latter with the increase in the solid phase in the system consists of trona and sodium bicarbonate.

Table 3. – Influence of technological parameters on the analytical performance of the process producing sodium sesquicarbonate in the liquid phase method

№	Concentration of the soda solution, mass.%	Dopant $NaHCO_3$,%	Process of preparation of the suspension at a temperature 80 C					Process of preparation of the suspension at a temperature 30 C				
			Ratio S:L in suspension	Chemical composition of a liquid phase			Phase structure of a solid phase	Ratio S:L in suspension	Chemical composition of a liquid phase			Phase structure of a solid phase
				Na_2CO_3	$NaHCO_3$	H_2O			Na_2CO_3	$NaHCO_3$	H_2O	
1	18	5	–	18.5	4	77.5	–	0.090	18.6	3.8	77.6	$Na_2CO_3 \cdot NaHCO_3 \cdot 2H_2O$
2		10	–	18.4	8.7	72.9	–	0.094	18.0	4.0	78.0	Trona+ $NaHCO_3$
3		15	0.089	17.9	9.9	72.2	Trona+ $NaHCO_3$	0.105	17.9	4.1	78.0	Trona+ $NaHCO_3$
4	20	5	–	20.4	4	75.6	–	0.048	19.8	2.0	78.2	$Na_2CO_3 \cdot NaHCO_3 \cdot 2H_2O$
5		10	0.021	20	8.2	71.8	$Na_2CO_3 \cdot NaHCO_3 \cdot 2H_2O$	0.108	18.0	4.4	77.6	Trona+ $NaHCO_3$
6		15	0.190	17.9	9.9	72.2	Trona+ $NaHCO_3$	0.105	17.9	4.1	78.0	Trona+ $NaHCO_3$
7	22	5	–	22.4	4	73.6	–	0.069	21.5	1.9	76.6	Trona
8		10	0.043	21.6	7.3	71.1	$Na_2CO_3 \cdot NaHCO_3 \cdot 2H_2O$	0.124	18.5	4.2	77.3	Trona
9		15	0.176	19.2	9.2	71.6	Trona	0.123	17.9	4.1	78.0	Trona+ $NaHCO_3$
10	24	5	–	24.6	–	75.4	–	0.078	22.4	1.7	75.9	$Na_2CO_3 \cdot NaHCO_3 \cdot 2H_2O$
11		10	0.071	23.4	5.8	70.8	$Na_2CO_3 \cdot NaHCO_3 \cdot 2H_2O$	0.124	20.6	2.4	77.0	Trona
12		15	0.228	20.8	7.9	71.3	Trona	0.122	17.9	4.1	78.0	Trona
13	26	5	–	26.8	4	69.2	–	0.104	22.4	1.7	75.9	$Na_2CO_3 \cdot NaHCO_3 \cdot 2H_2O$
14		10	0.101	25.1	5.5	69.4	$Na_2CO_3 \cdot NaHCO_3 \cdot 2H_2O$	0.126	22.8	1.9	75.3	Trona
15		15	0.256	22.6	6.8	70.6	Trona	0.134	20.4	2.2	77.4	Trona

Table 4 shows the density of the slurry. It can be seen that with increasing concentrations of soda solutions under the same conditions (temperature and sodium bicarbonate content) increases the slurry density.

Table 4. – Density and viscosity of suspension

H$_2$O	Na$_2$CO$_3$	NaHCO$_3$	Density, g/cm^3				Comment
			20 °C	40 °C	60 °C	80 °C	
74	26	5	1,290	1,287	1,283	1,279	jellification
		10	1,300	1,296	1,292	1,289	jellification
		15	1,319	1,313	1,310	1,307	jellification
76	24	5	1,270	1,265	1,261	1,259	
		10	1,280	1,270	1,650	1,630	jellification
		15	1,301	1,290	1,280	1,276	jellification
80	20	5	1,232	1,225	1,224	1,222	
		10	1,245	1,23	1,227	1,231	
		15	1,262	1,260	1,252	1,244	
82	18	5	1,216	1,210	1,201	1,194	
		10	1,220	1,214	1,212	1,217	
		15	1,230	1,220	1,225	1,230	

For example, with increasing concentrations of soda solutions from 18 to 24%, 5% sodium bicarbonate at 20 °C, the system density increases from 1.216 to 1.270 g/cm^3. With increasing content of sodium bicarbonate and a 10% solution of soda concentration of more than 20%, the system becomes thick. Thus, on the basis of the above, we can conclude that for pure trones with high output is necessary to maintain the content of sodium bicarbonate in 18–24% strength soda solution is not more than 15%.

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Copper surface etching in the donor-acceptor systems

Abstract: Etching solutions based on the donor-acceptor systems containing aprotic solvent and organic ligands — Shiff bases - have been developed to remove scale and corrosion products from copper and its alloys. To increase the rate of dimensional etching a surfactant (tetra-n-butylammonium iodide) was introduced in the ligand non-aqueous solution at concentrations exceeding the critical concentration of micelles (CMC).

Keywords: non-aqueous solvent, a surfactant, a micelle, a ligand, etching thickness.

Introduction

Etching is of dimensional etching of the surface of transition metals in donor-acceptor systems has been a process which has found wide use in various industries. Etching is often used to remove products of scale and corrosion. This is a requirement before committing a number of technological processes. At etching with sulfuric or hydrochloric acid there occurs a partial dissolution of the iron surface layers. Accumulation of divalent iron (ferrous iron) in the pickling salt solution leads to a decrease of etching rate.

Out-etching of metal and increased roughness should be considered in terms of disadvantages of this method. Sorption of hydrogen on metal at acid pickling seriously worsen its strength characteristics. To reduce the etching rate organic inhibitors are used. Etching of copper and copper alloys is carried out in two stages. The disadvantages of etching copper should include elevated temperatures (50–80 °C) and the use of nitric acid. To exclude these shortcomings the process of dimensional etching of the surface of transition metals in donor-acceptor systems has been developed.

The experimental part

In this study, dimethylformamide which was proved in the development of technologies for the extraction of transition metals from industrial waste was used as a aprotic solvent [1, 1418–1423]. The structure of the ligands used in this study is shown in Fig. 1.
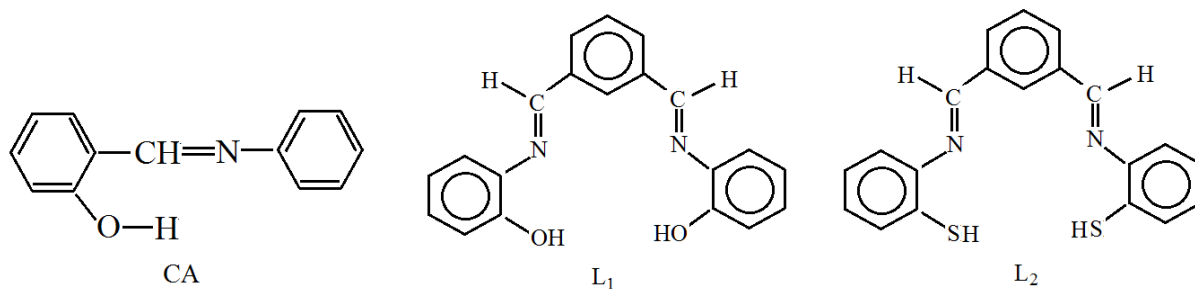
Fig. 1. The structure of the ligands used for the preparation of pickling solutions

Salitsilalanilin (CA) was successfully used earlier. The process of etching a copper plate (30x20x1 mm).was carried out in ligand solutions at temperature of 25 °C and at stirring of 600 rp·h⁻¹. After processing in the ligand solution the samples were washed in ethanol and dried. After that they were weighed. Etching thickness calculations were performed according to the formula:

$$H = \Delta m / Sd,$$

where Δm — weight loss of the copper plate in the etching process; S — area of the plate surface; d — copper density.

The etching process was carried in air, because the copper dissolution process ceased due to absence of contact of the etching solution without with oxygen. Surfactant was introduced in the ligand non-aqueous solution at concentrations over CMC in order to increase the etching process rate. Under these conditions the micelles accumulate ligand then they are adsorbed by metal surface and destroyed afterwards. This ensures delivery of ligands in high concentrations onto the metal surface, thereby increasing the rate of donor-acceptor interaction [2, 55–56].

Result

Fig. 2 shows the etching thickness change of the copper surface as a time for dimethylformamide solution containing CA ligands, L_1, L_2.
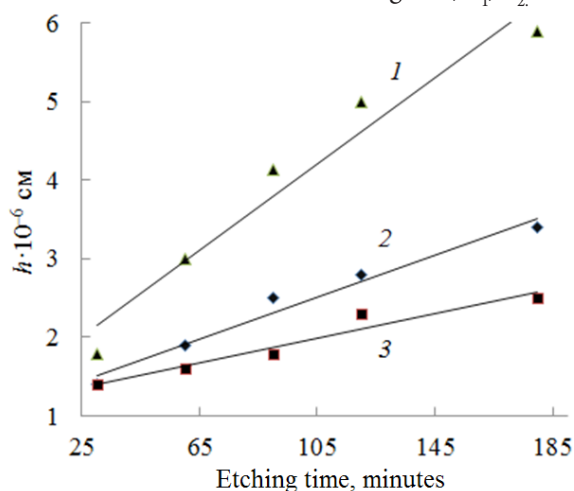
Fig. 2. Dependence of the etching layer thickness h on the processing time

Ligands and the correlation coefficients R:
$1 - L_2$, $R = 0{,}975$; $2 - CA$, $R = 0{,}986$; $3 - L_1$, $R = 0{,}970$

Surfactant tetra-*n*-butyl ammonium iodide was introduced into the dimethylformamide to increase the etching rate. Table 1 shows the etching thickness change of the copper surface related to the time of sustaining in the etching solution.

Table 1. – Changing of the etching layer thickness by10⁻⁶ cm

Etching time, min				
30	60	90	120	150
without surfactant				
1,79	5,39	7,19	14,30	16,10
Surfactant concentration of 0,02%				
8,98	12,50	14,30	16,17	21,50
Surfactant concentration of 0,05%				
3,59	10,70	16,10	19,70	28,70
Surfactant concentration of 0,10%				
3,59	16,10	19,77	28,76	41,34
Surfactant concentration of 0,20%				
7,19	14,30	21,50	26,90	28,70
Surfactant concentration of 0,30%				
12,50	19,70	28,00	35,00	41,00
Surfactant concentration of 0,40%				
12,50	19,70	26,00	34,00	41,00

The critical concentration of micelles being reached, a noticeable increase of donor-acceptor interaction rate is observed in the aprotic solvent. The high quality of the surface can be determined by measuring wetting interfacial angle of the processed surface which remains constant at different points of the copper plate surface. The etching process proceeds at a constant rate, being testified by the linear character of dependences presented in Fig. 2.

Conclusions

The decision of dimensional copper etching of copper in donor-acceptor systems eliminating the shortcomings of traditional etching methods is provided.

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Financial and Economic Consequences of Argentina Crisis of 2001/2002

Abstract: The article analyses the consequences of the financial crisis on Argentina's economy, the severity of which was disproportionately magnified by the problem of unbalanced sheets as well as difficulties faced on the political level.

Keywords: financial crisis, economic and political factors, balance of payments.

Argentina experienced one of the biggest economic shocks in its history in 2001–2002. Argentina's output fell by nearly 20% over 3 years, the financial sector got paralyzed, inflation soared and the government had to default on its debt. In the early 2003, some signs of recovery appeared but it was still a long path to stability and sustainable growth. (IMF)

Similarly to other financial crises in emerging countries, such as Russia (1998), Mexico (1995) and Brazil (1998),

Argentinian crisis was a result of a combination of fragility in balance sheets and the inability to mount an effective policy response. (IMF) Fragility was a critical determinant in Argentina as a result of public sector debt dynamics. The recession was even stronger because of the difficulties of rolling over the debt. Argentina was unable to make a sufficient policy response due to economic constrains and political factors. (Blustein).
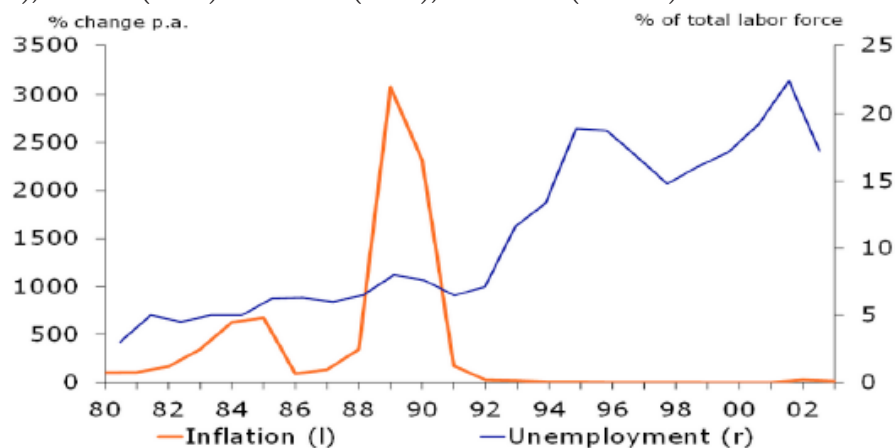
Figure 1. Inflation and Unemployment in Argentina

This work will examine the factors, which caused the crisis. Most of the analysis will be based on the effects on the real sector of the economy. It is important to mention the historical features of Argentina in order to understand the background of the ongoing economic difficulties within the country. At the beginning of 20th century the economic outlook was very positive. It was one of the wealthiest countries not solely in Latin

America but also in the rest of the world. (Glaeser) Argentina's GDP per capita was higher than in Germany and in France at that time. However, everything changed with the World War I and Argentina's economic growth decreased substantially. The bad policy-making and political gridlock were the reasons of the low economic growth. Nevertheless, it got even worse after the 1970s Oil crisis that has led Argentina to a period of

long downturn. The government got heavily indebted and was unable to get enough tax revenue in order to match its spending. Consequently, Argentina was highly dependent on monetary expansion policies. By 'feeding' the Money Market by infinite Quantitate Easing, they got heavily 'inflated'. (Rabobank)

Although Phillips claimed that high inflation goes hand in hand with high levels of employment and increasing levels of production, it is not the case with Argentina. With the level of unemployment of 5%, it had over 500% inflation. (Blanchard, Amighini and Giavazzi)

In 1989, the biggest priority of Argentina was to put down the extremely unusual inflation rate. Argentina experienced hyperinflation reaching 3080% that year. There was a growing political support of radical economic reforms to prevent such an unsystematic growth in price level. When Carlos Menem became a new president of Argentina, his government introduced an innovative set of measures that cured the inflationary pressure. (IMF)

First and foremost, the liberalization policy has been implemented. The reforms included deregulation of the capital account on the balance of payments, privatization of government owned assets, partial trade liberalization and other different market-friendly reforms. (Frenkel and Rapetti)

Second big policy was the Convertibility plan dated 1991. It fixed the Argentinian peso one-to-one to the US Dollar. That was a very successful policy in the short term, as it provided stabilization of the exchange rate. The expectations of the economy were very bright. However, the Mundell-Fleming model suggests that an economy cannot maintain exchange rate stability, free capital movement, and an independent monetary policy. Such a principle is called the 'Impossible Trinity'. Therefore, Argentina fixed its exchange rate with free capital movement at the expense of the monetary policy autonomy. (Feenstra and Taylor) The new legal monetary framework left little space for the central bank of Argentina to finance banks or the government. Due to that reason, the Bank of Argentina ability to change the monetary base and the domestic liquidity got fully dependent on the results of BoP (balance of payments). (Frenkel and Rapetti)

Evolution of Money, Domestic Credit, and International Reserves in Real Terms (Deflated by CPI, 1991=1)

* Including dollar deposits in local banks.
** Central Bank and bank reserves, excluding public sector deposits in the Central Bank.
Source: Authors' calculations based on Central Bank data.
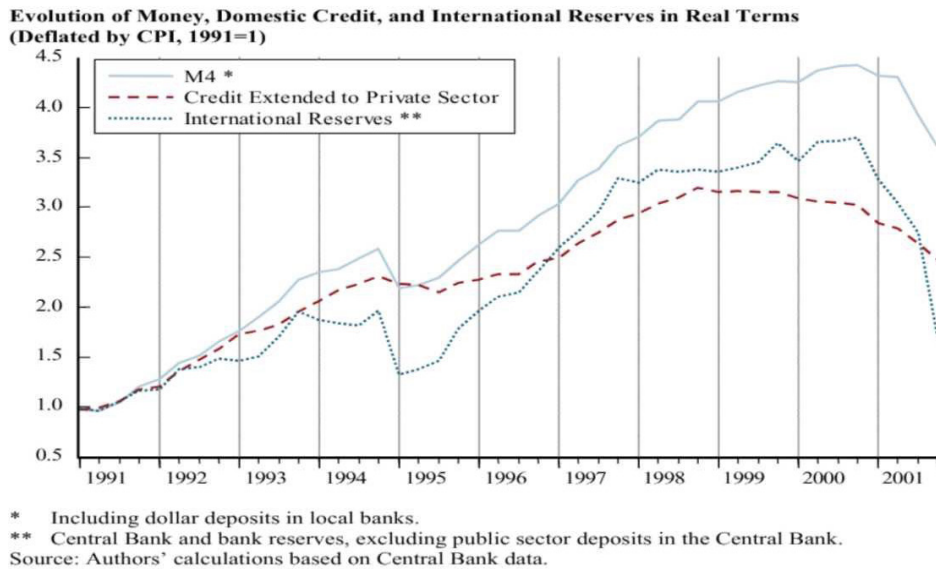
Figure 2. Evolution of money and domestic credit

SOURCE: WWW.TRADINGECONOMICS.COM | INSTITUTO NACIONAL DE ESTADÍSTICA Y CENSOS (INDEC)

Figure 3: Argentina Balance of Trade
Balance of Payments (Four Quarters Monthly Average, in Millions of Dollars)

It is also important to mention two significant economic features of the convertibility period. Firstly, real exchange rate has already appreciated in the US, while the nominal exchange rate of Argentina was pegged to USD and such an appreciated level was kept throughout the 1990s. Therefore, Argentina's exports were more expensive and less competitive. In contrast, imports were cheaper, which deteriorated the trade balance. Moreover, labor productivity of manufacturing sector did not increase for the period. Unit labor costs of production failed to fall for both tradable and non-tradable markets due to an increase in nominal wages at the start of the convertibility period. That was both for the tradable and non-tradable goods market. Therefore, the competitiveness of Argentinian

exports decreased during the period. Such a decrease caused a growing external gap. (Feldstein) The combination of trade openness with appreciated exchange rate induced growing trade balance deficit. We can see from Figure the trend of BoP Debt accumulation for the period of 1992–1995.

Secondly, although the credibility of peso was high, many private sector savings were in the US dollars and many banks were hedging their balance sheets against exchange rate risks by offering dollar denominated credits. There has been a trend of dollarization of the economy since the Convertibility period started. Therefore, Argentina has obtained a burden of exchange risk placed on numerous local bank debtors who had peso-denominated income. (Frenkel and Rapetti)

Figure 4: Balance of Payments, Net Capital Inflows, Reserves Variations

The decrease in competitiveness of exports was a very big concern when Brazil pegged its currency to US dollar as well in 1998. That helped Brazilian economy to perform well but it reduced the competitiveness of Argentinian goods on world market. Argentina got out of the market, as its export prices were too high. Because of the price rigidities, it was unable to respond growing economic problems, as it was unable to use monetary policy or devalue its exchange rate. It could not adjust nominal prices and wages, which questioned the credibility of Arentina's fixed rate regime. That caused the revaluation of riskiness of Argentinian's portfolios for foreign investors as they have lost their confidence. (Frenkel and Rapetti) That has led to an outflow of net capital that can be also seen in Figure 4.

Some sources call 30th November 2001 'point of no return' for Argentina. The rising worries about peso devaluation and deposit freeze were too high. Interest rates on Argentine government bonds rose sharply. The spread between Argentinian government bonds and US Treasury bonds became 5,000 basis points. Both citizens and investors were worried about their peso-denominated investments. The 'Convertibility Law' allowed to exchange pesos into dollars and then to take the dollars out of the country. That caused a bank ran, leading to the end of currency peg and sharp peso depreciation (over 75% in a few months). Many

companies based in Argentina had to go bankrupt because of dollar-denominated loans that were common since the start of Convertibility period. (Blustein)

On the 1st of December 2001, the Minister of the Economy of Argentina announced a freeze on bank deposits meaning that the Convertibility plan and 'one-to-one' of 1991 was untenable. The Argentinian citizens did not have an access to their bank accounts so they could not exchange their currency to dollars in order to prevent devaluation of any savings left in pesos. Later, in 2001, IMF stopped any support of Argentina, as it could not match the conditions of the rescue problem. That caused a cut in in foreign capital inflow. By the end of 2001 Rodriguez Saa, a new president of Argentina, announced a default on 93bn USD of sovereign debt of Argentina.

The economic outcome of the crisis was gigantic. The economy was contracting every year since 1998 and by 2002 it totaled 11%.

It is possible to see from the Figure 5 that GDP per capita in absolute terms in 2002 was of the same size as 20 years before that. Unemployment has increased substantially from 14.8% in 1998 to 22.5% in 2001. (Data.worldbank.org) Such a severe shock affected the amount of people living below the national poverty line. It mounted from 25.9% in 1998 to 57.5 in 2002. (IMF).
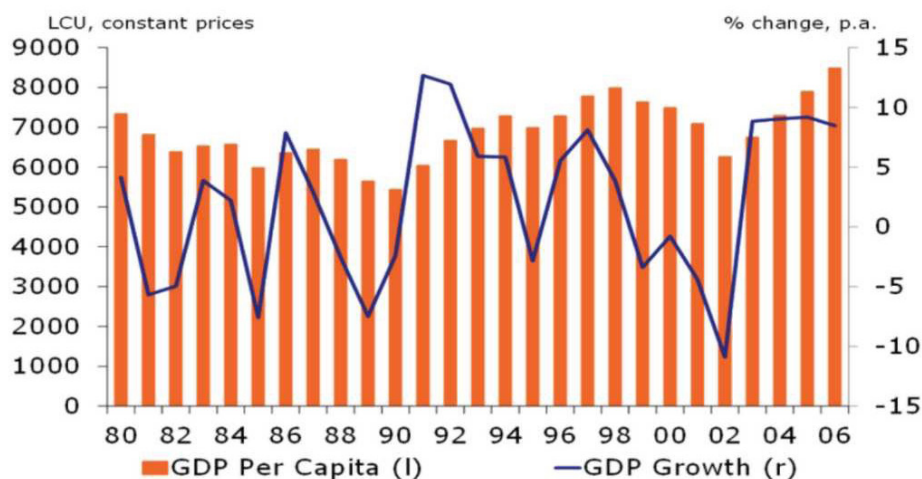
Figure 5: GDP Per Capita, GDP Growth in Argentina

To conclude, Argentinian economic crisis was caused by a numerous internal political factors such as allowance of hyperinflation in the end of 1980s and external economical factors such as unpredictable hard currency peg, currency overvaluation, external shocks caused by trading partners, sudden stop of capital inflow and etc. The aforementioned reasons together with the social unrests and political events made this crisis one of the most severe among emerging market crises in history. The world economic growth was strong enough in 2000 to allow Argentina's export to benefit with its devaluated peso, so it was able to recover quickly.

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Organizational aspects of management education in Russia

Abstract: The article examines the main organizational aspects of the education sector in Russia. Organizational management is concerned, above all, the quality of education and methods of evaluation. The analysis of national education policy.

Keywords: the sphere of education, management, accreditation, licensing, state standard.

Organizational aspects of management education in Russia are aimed primarily at the organization providing quality education. The effectiveness of the quality of education depends largely on the interpretation of its definition.

In this situation, there are three main approaches to the evaluation of the quality of education. The first — the theoretical, in which the study of the problem is on the way of theoretical and methodological research.

Second, practical approach means that its representatives are on the way of creation tools (eg monitoring) to evaluate the training of students, not thinking about the conceptual components of the research.

Representatives of the third pillar combines ongoing research theoretical and methodological and practical components. They go on the most difficult path, but it is an approach to this problem is most acceptable.

So far not developed and approved by a single science-based system of indicators of quality of training of students, as well as there is no single accepted and approved system of education quality assessment.

In considering the concept of "quality education" should take into account a number of points. By "quality" in the general sense means the totality of the properties of the object to meet specific needs. [6] Many authors define the quality of education as the quality of the education system. However, some experts interpret it as an achievement of learners given (statutory) level of training (fitness).

Hence, one of the major problems of higher education, developers of modern Russian state policy in the field of education is associated with the need to achieve and exceed the requirements of the federal state educational standards of higher professional education. Moreover, the finality of the standardization process in higher education is directly linked to the certification of compliance of educational services given to state standards. [3]

In this regard, it should be noted that the requirements for graduates and evaluation criteria should be contained in the federal state educational standards (GEF). However, if the minimum requirements (set of disciplines and approximate their content) to what extent they are formulated, the criteria for assessing compliance with those requirements is no graduates.

The regional system of education quality management can be represented as a hierarchy of management levels: regional — sub-regional — local.

The need to control the quality of education at the regional level based on the following postulates. The region continues to operate the outdated principle of governance, where the administration to solve problems, not trying to correct the processes that give rise to these problems.

Strategic management of quality must change the situation, directing managers of the education system in the region to improve the driving dynamics to the set objectives. By focusing on the processes, you can improve the quality of education for a long time. It is necessary to compare the performance of the quality of these processes every year.

Organizational management education of the Russian Federation is carried out by the accreditation and licensing of educational institutions, which carries FSI "National Accreditation Agency in the field of education (NAA)."

Licensing of educational activities in the Russian Federation is carried out in accordance with the RF Government Decree of 31.03.2009 № 277 "On Approval of Regulations on the licensing of educational activities."

It establishes the procedure for the licensing of educational activities of educational institutions and educational institutions created in other organizational and legal forms, as well as scientific organizations implementing in accordance with the legislation of the Russian Federation, the main and (or) additional educational programs and training programs.

The licensing authority shall verify the completeness and accuracy of any information presented on the license applicant, as well as checking the possibility of the license applicant's licensing requirements and conditions. The license is issued by the licensing authority on the advice of the expert committee.

State accreditation is carried out by the federal executive authority responsible for the control and supervision in the field of education, or the executive authority of the Russian Federation, engaged in management education, in accordance with their competence at the request of state accreditation, presented the educational institution or scientific organization agreed with the founder (s).

State accreditation of educational institutions and research organizations, including their branches, is over all they implement basic and (or) additional educational programs.

The accreditation body of the Russian Federation is the state accreditation of educational institutions and scientific organizations and their affiliates, except for educational institutions and research organizations, state accreditation within the competence of the authorized federal executive body.

State-accredited educational institution or scientific organization includes the legislation of the Russian Federation of conformity assessment content and quality of training of graduates of the educational institution or scientific organization the federal state educational standards or federal government requirements, conformity assessment implemented by the educational institution of educational programs at different levels and orientation of the federal government requirements, as well as the examination performance of the educational institution, needed to determine the type or category.

In addition to organizational management in education in the Russian Federation elaborates federal state educational standards, which create the conditions for maintaining the quality of education in the Russian Federation following the international level through continuous correlation with educational standards in the country occupies a leading position in the international rankings.

Federal government standard — it rules and requirements governing the mandatory minimum content of core educational programs of education, the maximum volume

of an academic load of students, the level of preparation of graduates of educational institutions, as well as the basic requirements to ensure the educational process (including his logistics, teaching laboratory, information and methodical, staffing).

On the basis of the standard developed specific educational programs, educational complexes, which can implement educational programs; built control system.

State educational standards exist at all levels of education. They set the standards for general, secondary vocational, higher professional and postgraduate education.

State educational standards are not frozen once and for all entities. Time imposes new requirements, changing lives, changing the flow of information, so the need to develop new models of standard, future-oriented.

In modern conditions, management of education — is, above all, control of the process of its development, and not just institutions and people. Measures of state support for education must be combined with the strengthening of the role of government in ensuring that the needs of the educational activities of individuals and society [4].

The most important task and one of the priorities of modernizing the educational system — modernization of the existing sectoral management model of the system.

Conducting a unified state policy in the education system is an important task of management education, both in Russia and in many other countries. Only high priority to education in public policy can provide the necessary level of management in the sphere of education in the modern world. The priority of education should not only be proclaimed, but consistently implemented in political practice.

The global nature of the emerging educational system requires effective management of development processes at the international, internationally. This requires not just the international contacts of the ministries of education, and implementation of major interstate, global programs in the field of formation of a new educational system.

Education Management in modern conditions is focused mainly on solving problems:

– the organization of access to education, which would satisfy the educational needs of people in the XXI century (education should be available from early childhood throughout life);

– ensure equal access to education for all people at all levels of education;

– improve the quality of education and achieve a more complete its compliance with the needs of society;

– sharp increase efficiency, productivity of the education system [2].

These problems should be resolved in a increase in the number of students with almost universal reduction of public spending per student.

One form of implementation of the state educational policy, which has the legal and substantive in nature, may be an agreement on the delimitation of powers between the federal authorities and the authorities of the Russian Federation. These agreements are designed to implement a flexible policy, differentiating and individualizing work with the regions, while preserving a single educational space by the presence of agreements shared content blocks, combine efforts to improve the work of regional educational systems.

Agreements between federal authorities and state authorities of the Federation, creating a real basis of interagency coordination effort, the responsibility for solving the problems of education lies not only in education authorities, but also directly to the highest executive authority of the Federation. This should give clarity and validity of the prospects for the development of education in the regions.

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Problems and prospects of information technologies development in the banking sector

Abstract: Information technologies are playing an important role in banking business. These technologies are not only an integral part of the banking system, but also a significant competitive advantage. The use of information systems involves a number of difficulties.

Keywords: information technologies, banking, client service, information protection.

Electronic technologies development which has been very intensive in particular over the last 15 years has created new challenges and requirements for the financial sector on the whole.

Banks and other financial institutions have always played a key role in electronic technologies development and have pioneered application of many technological innovations. It is due to necessity of continuous interaction between banks and their contractors: clients, regulators, other banks, financial markets and so on. Since the earliest times interaction of enterprises and individuals with banks has been effected with the help of the most advanced communication systems. Moreover at present time banks are still involved in the process of money granting and transaction and consequently the role of information technologies applied in banks is steadily growing.

In the light of the above mentioned we claim that by this time information technologies represent not only a necessary component of a bank functioning. The information systems used for customer service are already estimated not as a must-have but as a competitive advantage to meet all requirements of both retail clients and enterprises duly and punctually.

Electronic technologies have been used in the bank sphere since their early introduction. With the advent of electric telegraph, banks started to apply it to maintain interaction with stock exchanges and transmit information about the prices. "Wire Transfers", one of the first means of funds transfers, was first carried out through telegraph in the 19th century. The first commercial use of a telephone also took place between two bankers. Since the first "online" technologies emerged banks have been obliged to use electronic networks to carry out clearing operations through the Federal Reserve System.

As electronic communication means (smartphones, laptops) are widely available at present, banks have started to pay special attention to customer service making use of various software programs and applications.

All modern means used for bank customer service are multifunctional and interconnected. But in general one can name four innovative directions for electronic banking:

1. Electronic bill payment. This term denotes the system based on the use of a personal computer, smartphone or interactive television with Internet-connection through which clients can remotely pay all their bills, fines, taxes and other charges. Electronic check payment may also be enlisted here.

2. "Home-banking". This term refers to communication between a client and their bank via Internet through the client's "online account" to fulfill various operations: opening or closing of accounts, money transfer, debt repayment (loan or mortgage). In addition nowadays many US and European banks include service of individual investment accounts and their analogs into the "Home-banking" programs.

3. Internet transactions. This term names all money transfers made by means of Internet.

4. Electronic payment cards. This term implies electronic credit or debit cards (with a magnetic strip or a microchip) used to pay for various goods and debts, take cash from ATMs and perform other monetary operations.

Despite the fact that the technologies listed above were used even more than 15 years ago, overwhelming number of bank clients prefer conventional service. There are some reasons of such attitude towards the given technologies. And the main ones are sociological. Major bank customers are people from 30 to 50 years old who do not trust these systems. While bank clients from 20 to 30 years old use the named systems rather often and consider them very convenient due to the time saved for bank operations. Therefore we can eventually claim that information technologies in the bank sphere intended for remote customer service, will get more popular.

Introduction of such technologies is very favorable for banks; besides it is a necessary investment project. The matter is that despite the high cost of the necessary software development and implementation, banks receive very essential benefits as a consequence. First, as in this case the computer does the job, the cost of service and processing of operations is reduced that leads to salary and collateral materials saving. In the long run, it leads to economy on scale allowing repaying these expenses rather quickly. Secondly, using electronic systems we facilitate a document flow that ensures more effective performance and mistakes minimization. Besides clients are attracted by this more convenient way of interaction with a bank that plays an important role and induces them to carry out as many operations through these programs as possible.

Standardization of information technologies is a very important aspect of their development. One can hardly imagine that it is impossible to withdraw money from a card in the ATM of another bank, or that the card of a certain bank is valid to pay only in certain shops. Due to these uniform standards such operations as payment of goods and services, money withdrawal and transfer can be executed virtually all around the world with no regard to technological barriers.

With uniform standards development a synergetic effect between information technologies is observed. For example, bank cards which earlier could be used to pay in the shop are now used to pay on the Internet or by phone. This effect allows creating very convenient multipurpose services which will attract new clients to use bank services and regular customers to use remote ways of service.

However the use of uniform information systems is not safe both for a bank and for its clients as they are subject to harmful influence of hackers who can intercept personal messages, operation information, bank cards numbers and other data which may result in writing off from accounts. Nowadays many bank and remote services users realize the danger of such interaction. But nevertheless they are completely satisfied with the quality of the service provided and are ready to

assume these risks and thus use very convenient programs and applications.

At present time there is a number of ways to ensure bank operations safety. They pay special attention to enhancing safe bank cards operation which is most strongly subject to risks because of unreliable contractors' participation in the majority of transactions. To ensure bank cards safe use they provide certain protection rating. Apart from a widely known magnetic strip most modern bank cards are equipped with a special microchip which represents an additional protection element.

Therewith many card holders presently use them not only for acquisition of goods in shops but also for various purchases and bill payment on the Internet. These operations disclose information on payments as no protection at bank card data input on the Internet is provided; at all rates reliability of the site security system can be very doubtful. If payments are made through Home-bank system, one needs to enter a special code to confirm the payment; it is sent to a card holder by SMS and is valid for some minutes. But using internal site applications puts payment safety under threat. Due to this reason many modern banks equip their cards with 3D-SECURE technology. In practice this technology represents a bank card operation check through an additional code which is sent by SMS to the card operator to allow a transaction. After the confidential password given to the card holder together with a PIN code is entered, restriction on transaction is lifted and the server gets permission to transfer the specified sum. This technology is effective as in this case swindlers need not only to have card data to carry out their frauds but also to intercept SMS messages and send them from the card holder phone number that complicates the manipulation.

But one cannot stop developing protection systems as hackers are also upgrading their technologies. Therefore banks and the processing centers constantly work on improvement of their product safety. One of the ideas to implement is a bank card binding to the smartphone by means of a geolocation. In this case the satellite identifies the smartphone and the bank card location and if they are separated, the server blocks the transaction. But many potential users of this technology treated it with skepticism. Firstly, many banks clients do not want anyone to know their location as well as their smartphones and bank card location. Secondly, geolocation systems are still not reliable enough; therefore even if a phone and a bank card are in one pocket, the transaction can be suspended until the satellite updates geolocation data. Thirdly, the smartphone can be discharged or simply left at home. In these circumstances it will be impossible to pay by card even if it is vital.

One more project which bank cards holders see in a more positive light is PayTouch system which was created by a group of young developers from Barcelona. The system is based on the payer's fingerprints verification. By means of a specially equipped POS terminal the card holder or the person having access to this card prints their two fingers which are verified with the prints stored in a bank database. If the prints coincide, the transaction is allowed. The technology was first applied in 2014 and is now widely used in many ATMs, petrol stations and supermarkets in Catalonia. The company owning the patent for this technology is planning to develop a network of biometric ATMs and terminals across the territory of Europe and America.

It is obvious that innovative technology use in banking has facilitated interaction of banks, both with their clients and with other contractors. But still there is a very high probability of hacking these technologies or their malfunction which can result in very serious consequences both for a bank and for other participants of the electronic interaction.

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Priority directions of development of the labor sphere in Ukraine in the context of social responsibility

Abstract: The article substantiates theoretical and methodological, organizational and managerial aspects of the labor sector. The importance of the value of work and the value of the employee in the modernization of the system of social relations. Revealed differences of values rationality and goal rationality and place decent work in these processes. Systematized advantage of subjects of public relations from the sale values of rationality in employment. Showing downward trend of state responsibility in employment due to the reduction structures, powers and competences in the labor sphere. Grounded priorities of modernization of public administration in the field of employment.

Keywords: decent work, responsibility, goal-oriented rational, value rationality, the state, society.

Actuality and problem statement. In Ukraine, during the years of independence there was a significant gap in the needs of the labor sector and the actual conversion. Steel traced negative trend in dropping the responsibility of the state to address labor issues. Legal and institutional support of not only developed, but to a certain extent given some setbacks since Labor Code of Ukraine and not adopted, and public institutions have removed their powers to solve the problems of labor and human labor not retain responsibility for employment potential and prospects of its development. Despite the considerable efforts of the Ukrainian science to uncover negative processes that occur in the management of labor, their efforts were in vain. An theorizing labor in the labor market, its control with target oriented to European standards. The subsystem of the world of work — the labor market began to transform itself without fundamental changes throughout the labor sphere and as a result is already expected and a significant shift in the entire labor system. The competitiveness of the country requires the preservation and accumulation of human capital should be a determining role in this process by public institutions. But they did not take on those obligations and is not responsible for the lack of implementation of these requirements. Analysis of recent publications and research. But despite the inertia of the system state and regional management, research on labor issues intensively developed. Formed several well-known scientific schools of labor under the direction of AM Batters, E. Grishnova, L. Lisogor, V. Bliznyuk, O. Novikova, G. Nazarova, Y. Marshavin, E. Varetskaya, I. Novak, G. Kosovo, S. Ukrainians, L. Shaulsky.

Almost every year at the Kiev National Economic University. V. Getmana hosts international conference on the problems of labor in the twenty-first century, according to global and national challenges in the world of work with a focus on the science of labor, social and labor relations [1]. And representatives of science and education Ukraine, CIS countries, as well as representatives of the ILO and trade unions are active participants in discussions and debates on issues of labor, social policy, social innovation, and others.

The recommendations are sent to the conference of Ukraine and the Ministry of Social Policy Committee of the Ukrainian Parliament Social Policy, Employment and Pensions, and the Presidential Administration, and others. But expect a positive reaction from the organs and structures of power and no labor sphere does not go from a state of stupor.

The presentation of basic materials research. The value of work and the value of human work and their transformation in Ukrainian society is weakly researched, developed and not be claimed in practice. Roll on the quality issues of the labor market, which has a direct link with the characteristics of decent work must also be tied to the system of labor. Any market requires a product that is sold. What is the labor market subject to sale? Labour and its carriers, which have certain values, qualitative and quantitative characteristics. In Ukraine observed a steady downward trend in the value of work. The reasons for this are several. According to the corresponding member of National Academy of Sciences of Ukraine Shulga Nikolai loss of value of work and the working man is connected with a focus on success in life when a person becomes a strategy career growth, high social status, popularity, even contrary to the values of the family, due to the intensification of labor, and the failure of the rest even ignoring moral norms [2].

The loss of value of work turned him into a tool to obtain certain material benefits.

According to research conducted by the Institute of Industrial Economics of National Academy of Sciences of Ukraine on social responsibility, as set out in the monograph "Diagnostics status and prospects of the development of social responsibility in Ukraine (expert assessment)." Experts estimated the weight of threats to national security which are connected with the underdevelopment of social responsibility. The results of their assessment proved to be a confirmation of the results of theoretical studies [3].

A significant threat to national security has become the "Desocialize of labor relations in the sphere of" decline in the value of labor, poor quality of working life, poor labor relations.

"So say 59% of the experts. Thus, awareness of the importance of the value of work and the sorry state of his loss in the society there. But most of all anxiety about this can be traced in the scientific community and trade unions. Not all work can be valuable. Fortunately, we have, thanks to the International Labour Organisation in the modern arsenal of concepts and terms — decent work. Ukrainian specialists are well aware of the content of decent work and know that in Ukraine there is the Decent Work Agenda for 2012–2015. and it is realized on the basis of the Memorandum between the Ministry of Social Policy of Ukraine, All-Ukrainian trade unions and employers' organizations and the International Labour Organization. In summary, decent work — is the availability of employment in conditions of freedom, equity, security and human dignity. More advanced treats ILO Decent Work Agenda. It is in a decent job involves opportunities for work that provide a productive and fair income, security in the workplace, social protection of the family, the best prospects for personal development and social integration, freedom for people, organization and participation in decision-making, equal opportunities for women and men.

From methodological positions decent work is assessed as goal rationality we accept, understand, but very poorly implemented. Why is this happening? Yes, because the spirit of the Ukrainian mentality is not unique to goal, and the rationality of values.

Value rationality — is defined as an action based on a belief in the value of certain forms of behavior no matter how much they are able to ensure success. Value rationality is realized in human activity in the system requirements, in which the individual sees his duty. These values are the requirements of the **_spirit_** of human activity. They respect a person sees the meaning of life [6].

This is what we talked about the value of rationality. Soviet ideological position on the transformation of labor into a vital necessity that even many well-remembered, puts the value of work in the priority values of the society.

Decent work is a goal-oriented rational basis and not the value of rationality. Goal rationality effect arises when the purpose, means and results rationally weighed and counted. This includes consideration of alternative means of achieving the goal, the links between the purpose and side effects, the relationship of the various possible objectives for each other and others. Goal rationality is a means of implementing a system of values, and she focused on the principle of "marginal utility." Thus, decent work is a means for the formation of labor as a value, as well as enhance the value of human labor.

What are the subjects of the system of social relations that are interested to work in Ukraine went into the value system of the individual, society, business and government.

It is the state and society, and business and people and trade unions, which represent the interests of the working man. What are the benefits of each subject of public relations from the sale of value-rationality in employment.

Government primarily due to effective labor, the labor and entrepreneurial activity, receives economic growth, productive employment, a competitive employee, socially responsible entrepreneur civilized labor market with the elimination of shadow relations in employment, increasing interest in creating jobs, increasing innovation activity, an accelerated transition to a new technological order, etc.

Society gets for its members increasing opportunities dignified life, poverty reduction, constructive dialogue and social responsibility aspects of social and labor relations, reducing social tensions, high quality of working life.

The employer becomes highly, highly professional, conscientious worker, he is committed to working without shadowing the system of labor relations, reduced labor conflicts.

The employee has a high motivation to work, to high labor competencies to constructivism relationship with the employer. He has a high level of job satisfaction and high legal literacy in the workplace.

The trade unions achieve a constructive dialogue with government agencies and employers power to represent the interests of the working man, implemented initiatives of trade unions in the collective bargaining relationship in the implementation of the program in Ukraine decent work to protect the rights and interests of workers.

However, analysis and assessment of the state's role in the management of labor and the cultivation of its value shows quite disappointing results. Government consciously or unconsciously throws responsibility for labor sphere. So, since the independence of Ukraine is not passed the Labor Code. Legal provision regulating the labor sphere remains underdeveloped.

A special role is played by trade unions and employers in the fight for the regulation of the State's responsibility in maintaining and developing the labor potential of Ukraine. Within the General Agreement between the Government and the trade unions of Ukraine, signed by the parties of labor relations in the 90s, it was the obligation of the state to develop, adopt and implement a strategy for conservation and development of labor potential. But despite the importance of this document and the targeting strategy of obligations it has not been accepted.

Conclusions. Thus, the labor market, and employment is the individual design of the house, which stand on a foundation named work, which is necessary to make the value of a person, society and state. You can not change and do a completely separate building blocks without strengthening the foundations. What should be the management actions in this direction?

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Swedish Investments in sustainable development of Russian innovative corporations: opportunities or limitations? A case study

Abstract: The article considers Russian-Swedish cooperation in the sphere of innovations. A brief overview of main results of the study of large Swedish enterprises operating in the direction of development and implementation of innovations in the sphere of sustainable development in Russia is given. An analysis of major tendencies as well as problems and limitations in this sphere is presented.

Keywords: international cooperation, investment, innovation for sustainable development, SWOT - analysis, Russia, Sweden.

Scandinavian countries are traditionally viewed in the world community as an example of optimal organization of socio-economic system and successful innovative development [4, 20-48]. It is proved by the analysis of a global study of the rating of countries based on 84 indicators of innovative development – Global Innovation Index (GII). Herewith, the best indicators among Scandinavian countries are demonstrated by Sweden – the 2nd place in 2013 and the 3rd place in 2014 out of 143 studied countries [1]. GII recognizes the key role of innovations as a driving force of economic development and prosperity.

In the previous studies of the authors [2, 382-386; 3, 4-12], it is noted that Sweden plays a leading role in the promotion of principles of sustainable development and the place of business community in the financing of various programs related to it, including in Russia, is studied. As it is know from the theory of the question, sustainable development is based on three main components – economic progress, social development and environmental responsibility [7, 747-766]. In this respect, the relevance of the study of Swedish experience and development of Russian-Swedish cooperation grows every year, especially in the light of the outlined problems of political interaction of Russian and the EU.

The comparative analysis of the dynamics of innovative development indicators of different countries is of a certain scientific interest. Despite its potential, the Russian Federation took only the 62nd place in 2013. In 2014, the indicators improved and the RF rose to the 49th place in GII, finding itself between Thailand (48) and Greece (50) [1]. Imperfect institutions, low indicators of internal market development and activity results, and, lately, some economic sanctions, prevent the development of innovations.

The aim of the given research is to study key opportunities and limitations, current problems of cooperation of states in the sphere of innovative stimulation of Russian enterprises on the way to sustainable development. In this respect, the following appears possible: study of experience of large Swedish and Russian enterprises by way of a case study; performance of SWOT-analysis of the modern condition of Russian-Swedish investment cooperation in the sphere of innovations; identification of possible directions of development of innovations in the sphere of sustainable development.

Research results – a case study method

The collection of empiric material for the given research was done in the course of several Russian-Swedish Investment Forums during 2012-2014, as well as in the course of IV Rus-

sian-Swedish Investment Forum «Long-term projects: focus on innovations» in November 2014 in Stockholm. Russian Trade Representation in Sweden traditionally acted as an organizer of the Investment forums. The objects of research were large enterprises and organizations operating on the territory of Russia – Ericsson, Oriflame, Sweco, SCA, as well as Business Sweden (The Swedish Trade and Investment Council) and Swedish Chamber of Commerce for Russia & CIS. Moreover, the position of some Russian organizations presenting their projects for possible investments of Swedish business community such as «Vnesheconombank», «Agency for strategic initiatives», Ministry of Economic Development of the Russian Federation and OJSC «AVTOVAZ» was studied.

The analysis of the research results (Table 1) shows that both sides were interested in further cooperation on the way of development of ecological innovations in different spheres of the Russian economy. Particularly, a representative of Vnesheconombank expressed interest and even demonstrated the experience of co-financing of different projects in the sphere of ecological innovations (InterJet Project, Belorussian NPP Project, Termogaz Machala Project). Moreover, special economic zones (SEZ) function successfully in Russia. The Director of the Department for special economic zones and project financing of the Ministry of Economic Development of the Russian Federation noted the advantages of investments and work of foreign companies in these zones. An example of this is various tax benefits and facilitated process of acquiring the status of a resident for foreign enterprises (for instance, a Swedish company ABB). Also, a significant factor of successful development of long-term relations is the level of qualification and education of Russians, according to the representative of Business Sweden, Johansson M. [5, 10–14].

Table 1. – SWOT-analysis of the results of study of Russian-Swedish investment cooperation in the sphere of innovative development for sustainable development

Strengths	**Weaknesses**
• wide experience of Sweden in the sphere of innovations for sustainable development at different levels; • interest of Swedish enterprises in the Russian sales and production market; • presence of SEZ in Russia; • qualified labor	• cultural differences of conduct of business between the countries as well as between the regions of the RF; • language barrier; • difficulties in obtaining required financial information of the Russian enterprises; • different beuracratic obstacles; • high level of corruption
Opportunities (possible factors of positive external impact)	**Threats (negative external factors)**
• stabilization of the economic condition of Russia; • strict differentiation between business and political impact in Russia; • cooperation of Swedish companies with experts, consultants on conduct of business in Russia; • development of joint innovative projects in the sphere of eco-technologies and energy efficiency; • promotion of eco-innovative control of wastes; • investments in the development of agrarian sector in Russia	• Russia is a country of high risk, including high level of corruption; • unpredictability, drastically changing political situation in Russia; • stagnation of economic development of Russia; • inflation; • high rates on credits; • total currency control of the movement of currency return of foreign enterprises; • drain of Russian capital abroad

Therewith, many emphasized the reasons of endogenic character that prevent from sustaining a favorable investment climate in Russia. Primarily, these are cultural differences of conduct of business (both between the countries and the regions), language and bureaucratic obstacles. For instance, based on the Uppsala internationalization process model [6, 1411-1431], these obstacles do not appear serious in the long-term prospect of internationalization, because they will be overcome in the course of empiric study of peculiarities of the country's culture. However, the problems of non-transparency of the system, bureaucracy (especially, in the sphere of certification) and, consequently, corruption reaching 60-70% of cases according to the estimation of Sjögren H. [8] (a chairperson of the Swedish Chamber of Commerce for Russia & CIS), can become a significant factor stagnating long-term relations of Russian-Swedish enterprises.

Proceeding to the analysis of impact of exogenous factors, important for sustainable development of long-term character, let's consider constraining factors that pose threat. In the study of Johansson M. [5, 16], it is noted that the main obstacles are the fact that the number and depth of problems of conduct of business in Russia have deteriorated in the last two years due to unstable political situation and economic sanctions. According to Swedish experts, there is a drain of Russian capital to foreign countries; hence, Swedish companies refrain from expansion and even leave the Russian market. The consequences of economic crisis will be felt during many years and, with regard to this, many Swedish enterprises should develop a new strategy of behavior.

In spite of this, high economic return and potential of market growth are the main motivation factors for Swedish companies. In this respect, the analysis of factors of positive external impact is of interest. According to many respondents, it is important to fight corruption and bureaucracy in Russia. In the study of Luo Y. [7, 747–766], it is emphasized that corruption appears when a state constructs bureaucratic obstacles for business and there is a negative rapprochement, a binding of two subjects. A representative of AVTOVAZ notes that there is a need for a clear differentiation between the role of the state and processes of business development in Russia. Nevertheless, the state creates certain opportunities. For instance, the director of the «Agency for strategic initiatives» remarked the need for foreign investment in the sustainable development of the agrarian sector of economy. In the course of development of programs of import substitution of food stuffs, it is especially current for Russia.

Summarizing the study, one can note possible directions of creation of a favorable investment climate in Russia and definition of promising programs of innovative development of Russian enterprises:

• exchange of experience of realization of innovations (the study of the best practices of implementation of innovations in Sweden and their adaptation to modern conditions of the RF);

• implementation of progressive innovative technologies in daily life (energy and resource saving in different sectors of economy etc.);

• exchange of experience on implementation of the systems of ecological management and ecological certification;

• exchange programs of advancement of qualification in the innovative and ecological spheres, increase of the quality of education.

Thus, it is required to conduct further studies in order to find new formats of development of Russian-Swedish investment cooperation in the innovative sphere in modern conditions of economic crisis to ensure ecologically safe sustainable future.

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Section 19. Science of law

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Pecularities of afghanistan's criminal law

Abstract: This article addresses the peculiarities of Afghanistan's criminal law. It includes brief information about criminal law of Afghanistan, afghan penal code, the role of Shari'a and its relationship with the criminal law of Afghanistan.

Also, this article discusses the core components of the afghan criminal law: the elements of a crime, criminal liability, punishment, and crimes proscribed under Afghan law. Some recommendations are focused in the article to remove the weak points and problems of available criminal law of Afghanistan.

Keywords: Afghanistan, criminal law, crime, punishment, criminal responsibility, Shari'a, constitution, penal code.

Introduction

The legal system of Afghanistan is affected by Roman Germanic legal systems, Islamic law and common law. The criminal procedural law of Afghanistan is affected by Roman Germanic legal systems. For instance in the section of crime division, trial processes and types of imprisonment is perfectly following this system. But the substantive criminal law of Afghanistan is mostly Islamic and the principles of Islamic criminal law are observed in the criminal code of the country and the constitution also emphasizes on it.

In addition, that the third article of Afghanistan's constitution emphasizes that "No law shall contravene the tenets and provisions of the holy religion of Islam in Afghanistan, article 130, 131 of the constitution and the first article of Afghanistan's penal code also describes that courts must observe and implement the Islamic law. Therefore it is concluded that Islamic law is the main source of substantive criminal law of Afghanistan [4].

It means that, Islamic law guides all aspects of Afghan criminal law, from the Constitution to the Criminal Code and its individual statutes.

While codification plays an important role in defining and publicizing criminal law, all legislatives in Afghanistan, including the Penal Code, is consistent with Islamic law [2, 87].

Criminal charges based on both Shari'a and the Penal Code is prosecuted in the primary courts. According to Article 130 of AC and article 1 of the APC, the sharia law (Hanafi jurisprudence) is one of the sources of afghan criminal law. Article 1 of the 1976 Penal Code states, "This Law regulates the 'Ta'zeeri' crime and penalties" Those committing crimes of 'hodod,' 'qessas' and 'diat' shall be punished in accordance with the provisions of Islamic religious law (the Hanafi jurisprudence)" [3].

Therefore, it is extremely important that prosecutors, defense attorneys, and judges know both the law of the Penal Code and the provisions of the Hanafi School of Islamic jurisprudence [6, 3].

Whereas Penal code is the main content of criminal law of a country, the main principle of criminal law, types of crimes, criminal responsibilities and finally the criminal policy of a country is defined and described in penal code. In the article, a brief condition of available criminal law is considered and it's to be mentioned that also the challenges and weak points of the penal code is appointed.

History of criminal law in Afghanistan

To study criminal law of Afghanistan, it is important to understand the historical roots of crime and punishment in Afghanistan. Although the history of Afghanistan's criminal law is comprehensive and cannot be described in detailed in this topic but it is tried to overview the main points of the issue.

The history of Afghanistan's criminal law is studied in to two periods:

1. Before codification: During these periods there was not any penal code in Afghanistan and life in these periods had the tribal form, the governments were weak and the intervention of governments in criminal issues were rare or did not intervene.

On one hand, there were not modern legislations and from other hand the governments were weak, therefore the

solution of criminal issues was done by criminal interaction or Islamic law.

2. After codification: This period has been started with approving of judicial systems in the 18th century during the era of Ahmad Shah Durrani and was improved with approving of (general penal code 1923) during the governance of King Amanullah [11, 50].

3. In 1965, a comprehensive criminal procedure code was approved — a major step towards the standardization of the criminal justice system. The 1965 code covered all aspects of criminal investigation and adjudication: investigation, detention, interrogation, search and seizure, evidence gathering and prosecution, the treatment of witnesses and the use of experts, and the right to appeal. Other significant developments in the late 1960s included further substantive criminal law statutes (e. g., the 1967 Law on the Prevention of Hoarding) and institutional reforms (e. g., the 1967 Law of persecutory).

The other major development in the codification of criminal law in Afghanistan came in 1976, when the country's first penal code was approved. The Penal Code — published in Official Gazette No. 347— is an extensive document containing eight sections and 523 articles. For the first time, one unified document defined offenses and regularized punishments in all categories of crime except military law and crimes for which Islamic law provided specific punishment (i. e., Hudud, Qisas, and Diat crimes). From a codification perspective, the adoption of the Penal code was perhaps the most important development in criminal law in Afghanistan, and much of the Penal Code is still in use today.

Finally, following the 2001 fall down of the Taliban, Afghanistan began a new era of codification. Recent reforms in both criminal procedure and substantive criminal law have been codified through such documents as the 2004 Interim Criminal Procedure Code, the 2004 Law on the Campaign against Financing Terrorism, and the 2006 Counter-Narcotics Law and the 2009 law of violence against women.

Sources of Afghan Criminal Law

There is no single source of criminal law in Afghanistan. Rather, Afghanistan's criminal law draws on several sources, many of which have binding force and require criminal sanctions for violations. It should be noted, of course, that Islamic law guides all aspects of Afghan Criminal law, from the Constitution to the Criminal Code and its individual statutes. Yet, each of these individual documents plays a unique and important role in Afghanistan and in the criminal justice system. There are five major sources of criminal law: the Constitution, Shari'a, Penal Code, statutes, and legislative decrees [2, 9].

a. The Constitution: The Constitution of Afghanistan is the most important source of the Afghan penal law. In accordance with the hierarchy of laws, no statute or state regulation should be against the Constitution. Numerous articles of the Afghan Constitution (AC) deal with principles and matters related to criminal law which the legislators in the National Assembly and other law enforcers must obey. Some of these articles of the Constitution are: Articles 3, 7, 22, 40, 49, etc.

b. Shari'a: The primary source of criminal law in Afghanistan is the law of Shari'a. Under Shari'a, there are three types of crimes: hudud, qisas, and ta'azir. [8, 23].

In Afghanistan, the law of the Shari'a dictates the punishments for hudud and qisas crimes. The law of the Penal Code is accepted as defining the crimes and punishments for ta'azir crimes. Indeed, Article 1 of the 1976 Penal Code states, "This Law regulates the 'Ta'zeeri' crime and penalties. Those committing crimes of 'hodod,' 'qassas' and 'diat' shall be punished in accordance with the provisions of Islamic religious law (the Hanafi religious jurisprudence)."

c. Afghan Penal Code: The current Penal Code was written during the presidency of President Daoud after his successful coup against the monarchy (1976). One of the goals of president Daoud's in the beginning of his government was to embark on a program of law codification. It was during his time as president that most of the codes upon which Afghanistan now relies, including the Code of Criminal Procedure and the Civil Code, were written. The Penal Code was also a product of President Daoud's codification campaign. Although the Penal Code was not considered the law of the state during the Soviet era, the civil war, and the Taliban rule, the Bonn Agreement restored it as the governing law of Afghanistan in 2002. While there has been some discussion of rewriting the Penal Code, but for now, the 1976 Penal Code remains in force. The durability of the code is due largely to its completeness and to its thorough descriptions of criminal activity. The penal code of Afghanistan has 523 articles. It divides in tow main parts. The first part discusses the general principles of the application of the Penal Code. The second part focuses the foundation for what constitutes a crime, the elements of a crime and criminal responsibility, and what types of punishment are possible [2, 12].

d. Statutes: The statutes that have been approved by parliament are the main sources of criminal law, and are divided into criminal and civil laws. Among the former are the Penal Code, the Criminal Procedure Law, the Juvenile Code, the Anti-Narcotics Law, the Law on Organization and Jurisdiction of Courts, the Military Penal Code, etc. To enforce these criminal laws, it is then also occasionally necessary to refer to other laws including Civil Law, the Press Law, Law on Price Control and Prohibition of Hoarding, Government Employees Law, etc.

e. Legislative Decrees: All legislative decrees that have been issued in accordance with the Constitution of Afghanistan are equivalent to laws and are obligatory until they are annulled or amended by the National Assembly. Aside from laws that have been enacted through the legislative process, the President of Afghanistan also has the power to issue Legislative Decrees in accordance with the Constitution, which are equivalent to legislative acts and have the force of law. Examples of such laws include the

Police Law, the Law against Bribery and Official Corruption etc [1, 75].

Classification of Crime based on penal code of Afghanistan

The classification of crime is an appropriate method of identifying what qualifies as crime as well as better understanding the relevant legislations. Each category of crime thus has a set of particular legal considerations which apply to it. It is to be mentioned that the criminal law of Afghanistan has been classified crimes based on severity, occurrence and form which are as follow:

Classification of Crime in Terms of Punishment Severity

In Afghanistan's legal system, according to Articles 23 to 26 of the APC, crimes of this category are divided into three groups: felony, misdemeanor and Obscenity. According to Article 24 of the APC, a felony is an act for which the punishment could be execution, life sentence or long-term sentence. According to Article 25 of the APC a misdemeanor is an offence for which the punishment could be imprisonment of more than three months to five years, or a fine of more than 3,000 Afghanis. According to Article 26 of the APC, an Obscenity is a lesser offence that entails a punishment of imprisonment from 24 hours to three months or a financial penalty of up to 3,000 Afghanis.

Classification of Crimes in Terms of Occurrence Time

Some crimes only take place by doing or refusing to do an act, and therefore there is no gap between the criminal act and its result, e. g. insulting or stealing, etc. These are called immediate crimes. In some cases, alternatively, there is period of time between the criminal act and its consequences. In this case, the completion of the criminal act is not possible without continuation of the material component of crime, such as an illegal detention/confiscation. This category of crime is called continuous crime. Differentiating between immediate crimes and continuous crimes has some legal implications which include how long laws apply to the crime.

Classification of Crimes in General, Political and Military Terms

A political crime is an offence that aims to change the government as a whole or to bring about infrastructural reforms, but on the condition that no violence is involved. Political criminals, unlike conventional criminals, do not commit their crimes for personal benefit. They are therefore entitled to some privileges, which include a trial in the presence of a jury, the lack of application of the principle of recidivism, no compulsion to wear prison uniform, no extradition, etc.

A military crime is an act which is committed by those who are recruited in the armed forces, including the police, and in relation to their military duties. According to the constitution (Article 134), the prosecution and definition of this type of crime are conducted according to special sets of laws (the Law on Military Crimes). Crimes which are neither political nor military in nature are called general crimes [1, 79].

Also afghan penal code recommends some penalties against these crimes which are classified as follow:

Classification of Punishment based on Severity

In this case, the most famous classification is dividing the punishments into criminal cases, misdemeanors and moral cases. This division forms the basis of the classification of crime in the APC. Articles 23 to 26 of this law relate to this issue.

Classification of Punishment based on Islamic Jurisprudence

According to Article 1 of the APC, the shari'a law of Hanafi jurisprudence is one of the sources for the definition of crimes and punishments. In Hanafi jurisprudence, the punishments are divided into hudud (Islamic prescribed punishment), qisas (killing in retaliation), deeyeh (blood money) and taziraat (discretionary punishments).

The hodood punishments include execution, stoning to death, whipping, exile, amputation of hands, etc. These punishments are prescribed for crimes such as adultery, homosexuality, drinking, fighting against Islam, and corruption (fesad fil-ard). Punishment for qisas (retaliation) takes one of two forms: killing in retaliation and amputation. In implementing qisas, issues such as equality between individuals, similarity and proportionality between the crime and the qisas are considered. Deeyeh is property or money that will be paid to the victim or his/her guardians in case it is not possible to execute qisas (retaliation), or in the case of agreement between the two parties. Taziraat (discretionary punishments) are punishments which are defined by the judge. It is also the judge who defines which crimes invoke these types of punishments. However, in Afghan penal legislation as in some other Islamic countries, the government is involved in defining the type of crimes and the corresponding discretionary punishments. The APC is a clear example of discretionary penal law.

Classification of Punishment according to Importance

Punishments can be classified into three types: cardinal, ordinal or complementary.

Cardinal punishment is the main response or the reaction of law to a crime, such as qisas (retaliation) or execution for a premeditated murder. According to Article 97 APC, "Types of principal (cardinal) punishments are:

- Execution
- Life imprisonment
- Long-term imprisonment
- Medium-term imprisonment
- Short-term imprisonment
- Civil penalty.

Articles 98 to 111 of the APC define the duration and nature of each of these punishments. Ordinal punishment is "a punishment that will be applied to the convict according to the law, without being stipulated in the court's ruling" (Article 112 of the APC). Various types of ordinal punishment are defined in Articles 113 to 116 of the APC.

Complementary punishment is a punishment that is prescribed for a convicted person according to the law.

However, applying the punishment depends on what the court decides. According to Article 117 of the APC:

"Complementary punishments are:
• Depriving (the accused of some rights and privileges);
• Confiscation;
• Publicizing the ruling."

Therefore, issuing rulings for complementary punishments is optional for the court, while applying ordinal punishments to the convicted person is obligatory. Articles 118 to 120 of the APC concern complementary punishments.

Classification of punishment based on Subject

Punishments can be divided into various categories in terms of the type of suffering or limitations that can be applied to the criminal. The most important categories in this regard are:

• Punishments that take the convict's life, such as execution or qisas (retaliation);
• Punishments that take away the convict's freedom, such as various types of imprisonment (continued to short term);
• Civil penalties that can range from confiscation (Article 132 of the APC) to a fine [1, 110].

The criminal law of Afghanistan has the positive points of its own and can supply the justice and is caused to protect rights and freedom of citizens. And oppositely this law also has the following weak points, problems that cannot observe the full rights of citizens.

1-Despite the recognition of principle of legality of crimes and punishments in Afghanistan's new constitution (2004), there are some materials in the penal code of Afghanistan (1976) that is now also available right now, which are in conflict with this principle. For instance the materials 126, 231, 229, 224, 221, 197, 193, 247, 246 and 427 of penal code are issues in which have conflicts with the principle. General and vague expressions are used in this material that has several types of commentary and meanings, this defect may cause to offense the rights and freedom of citizens in which are known in new constitution [3:232].

2-One of the main principles of codification of the penal code is that the criminal actions and expression should be clearly and specifically defined so as to be prevented from ambiguity. Regretfully at some cases has not been paid attention in this principle in Afghanistan's penal code. and also some ambiguous and controversial expressions are existed in the penal code that are caused a lot of problems which are interpreted differently for instance no differentiation of abettor and person who assists the criminal [9].

3-Proportionality between crime and punishment is one of the accepted principles in penal code at some cases is also not observed in Afghanistan's penal code. For instance some laws have been wanted to be approved in penal code and criminal law of internal and external security in case of their own special aims. For example severe of punishments mostly have been predicted for crimes related to internal and external security such as continual imprisonment and execution.

4-Another weak point of the Afghanistan's penal code is that mostly using from imprisonment, especially short-term imprisonment, for instance even 24 hours imprisonment has been approved in penal code of Afghanistan, while there is not less than 3 months imprisonment in other countries but they recommend fines in such situations.

5-One of the main problems of Afghanistan's penal code is newfound crimes, such as cyber crimes and mass crimes in which are not predicted in penal codes of the country. Currently about three million people have access to internet in Afghanistan that among of them about 750 thousand people are members of social networks. Now in Afghanistan, internet as a communicational network is not without problem and people of the country are meeting the new phenomenon by the name of cyber crimes. As information security manager of ministry of telecommunication of Afghanistan has told that last year more than 100 complaints regarding the cyber crimes have been recorded that most of them belong to social network of Facebook [8].

It's hoped that available problems of the penal code of the country is considered and removed during the correction of the code. With consideration of the above mentioned problems, the followings corrections are recommended.

1-Judges and attorneys are facing to a problem and sometimes contradiction may appear among the laws and also public access is difficult to penal codes in case of sporadically insertion of penal code of the country in several laws. Therefore it is better to insert the penal codes of the country in a unit law in case of easy public access to them.

2-The penal code of Afghanistan does not match with the current situation of the country as it is an ancient law; it means that it has been approved during the government which was based on coup not on vote of people; however the slogans of the current government of Islamic republic of Afghanistan are freedom, democracy and human rights, moreover the current economically, socially and culturally situation of Afghanistan is different from the time of approving of the penal code, therefore it is necessary that the new penal code should be approved based on the current situation of the country.

3-After extensive evolutions and establishment of new government based on new constitution, this country has been committed to observe the international standards, therefore the legislators should be tried to observe the international standards and adopted principles in the penal code.

4-The current penal code of Afghanistan mostly based on imprisonment, even as it was mentioned that short term imprisonments up to 24 hours are also predicted, while criminology research shows that short term imprisonments do not have only amendment effects but have reverse and negative effect on criminals, therefore it is purposed that imprisonment should be decreased and instead of it alternative punishments should be inserted in to penal code. For example in 2012 Kazakhstan brought some changes in

the penal code of the country as humanizing the criminal law, that as a result about 20 crime components were decriminalized by means of their transferring to the category of administrative violations or to the civil law relations sphere and some of economic crimes were liberalized. (10)

It is recommended that from this experience and the same experience should be used for correction and humanization Afghanistan's penal code.

5-As it is mentioned above that based on authoritarian system of government, the proportionality between crime and punishment has not been considered so this defect causes that criminal justice is not supplied. In my believe, unfair dealing with criminals will not only decrease the crime and criminals on the contrary increases the crimes, therefore lawyers should pay attention to this point and correct this defect from new penal code.

6-We know that the views of the scholars are different in Islamic jurisprudence and according to the first article of penal code that Hudud, Qesas and Diat crimes are referred to Hanafi jurisprudence. For this reason, it should be tried that dominant views of scholars to be collected to use in the courts.

7-As recently the cyber crimes are happened in Afghanistan and the victims of the crimes are increasing day by day as a result of no awareness and lack of sufficient notification about these crimes, therefore it is necessary that as soon as possible these crimes should be criminalized and to be inserted into penal code so as to decrease the problems caused by them.

Every state should find own way of forming it's legal system and it can adopt some elements different legal systems. Criminal law of Afghanistan has own particular qualities and needs to be changed according to the requirements modern society. To improve upon criminal law they can use positive experience of countries such as Kazakhstan, which accept new criminal code, because of the new demands of society. We think, in future Afghanistan's legislator will pay more attention to the human rights on accepting new legislative Acts in this field.

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For the sake of others: the necessity to regulate the militarization and weaponization of outer space

Abstract: This article discusses the legality of militarization and weaponization of outer space from the perspective of the Outer Space Treaty 1967, explains the reasons for the growing future significance of these two issues, and highlights the long-term consequences in the form of creation of space debris. The article concludes that there are some loopholes in Article IV of the Outer Space Treaty and that space powers, especially the US, should give up their national interest for the sake of the creation of a binding document that would prevent from deploying weapons in space.

Keywords: militarization of outer space; weaponisation of outer space; nuclear weapons; Outer Space Treaty, space powers, national interest, space debris.

1. Introduction

The international law-making process is under pressure from political and economical circles, which automatically prevent consensus, especially around disputable issues to be solved at the international level. Both militarization and weaponization touch upon the sensitive issues of state sovereignty, national interest and defense. This results in the inability of creating international binding laws, for example as part of international air and space law, especially in the fields which governments care the most about, such as security. Worse yet, there is a massive influence of politics and economy on the international law-making process leading to its ineffectiveness. The purpose of article is to define militarization and weaponization of outer space, explain the legality for these two processes under the international space law regime, and present the destructive side of the process for the outer space environment — space debris. The title of the article, "For the Sake of Others", suggests that one side has to give up. The militarization and weaponization of outer space cannot be solved without restoring cooperation and mutual trust between states. The article ends with a conclusion presenting the most suitable form of international legal regulation and the most plausible outcome of the process.

2. Defining weaponization of outer space

Outer space is the common heritage of mankind, which means that belongs to all nations. That well-known rule is proclaimed by the Outer Space Treaty (OST) [1], especially, by article I [2]. Importantly, article IV OST highlights that "the Moon and other celestial bodies shall be used [..] exclusively for peaceful purposes" [3]. The problem lies with the fact that the word 菟 eaceful is not clearly defined. For some countries, such as the US, peaceful means non-aggressive, while for others, like Japan, it means non-military, although the latter countries form the minority. Article IV OST explicitly forbids placing "in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner" [3]. It should be noted that only nuclear weapon and weapon or mass destruction (WMD) are explicitly prohibited, while any other weapons are not. Space weaponization is, in accordance to Mueller, "a subset of space militarization" [4, 5] which includes "the deployment of space weapons such as ballistic missile defence (BMD), ground-and-space-based-anti-satellite-weapons or space-to-Earth weapons (STEW)" [4, 5], i. e. placing weapons according to the international space law. The weaponization of space is challenging, as "legal" does not mean "harmless". For example, as the consequence of China's ASAT test in 2007, when its own weather satellite Fengyun-1C was intentionally destroyed, more than 950 pieces of space debris appeared in outer space. It will take over 50 years for them to remove them completely from the outer space [5].

As of the current date, there is no consensus regarding creation of binding international law that would either regulate or prohibit the process of the weaponization of outer space. The US are strongly against any binding law and prefer to remain with softer laws. The reason the USA is reluctant to impose any further restrictions on military use of outer space is that this country heavily relies on space technologies in a way that is incomparable to any other nation. The Rumsfeld Commission stated in its report in 2001 [6, 486] that the political explanation, or rather an excuse, is often the same — the national security of the country is of the highest importance. That was clear in the US Air Force 痴 statement, in which it was outlined that offensive and defensive weapons have to be placed into outer space to protect the US [7, 1]. Dolman adds that any possible 斗 oss of space capabilities would prove disastrous for American military security and civilian welfare together with the crash in American and global economy 納 [8, 163].

Other space powers such as the Russian Federation or China and states of the European Union, see things differently. They prefer stricter regulations aimed at limiting the placement of weaponry in outer space. It is even considered that there is room for cooperation between China, Russia and the European Union due to their similar goals. They can possibly join together to create a binding treaty because of their similar political positions. Although the attempts of these states to regulate space weaponization have met with scepticism so far, this may change in the future. Trochetti notes that any form of destruction of valuable space assets, such as telecommunication satellites, will impact the economies around the world to such degree, that sooner or later it should facilitate legal regulation of the weaponization [9, 81] and perhaps even overcome American reluctance.

While cooperation between Russia, China and the EU in creation of space international law is, so far, nebulous, the bilateral cooperation between only China and Russia, has already become a fact. The most recent example of a close partnership between China and Russia is the Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force against Outer Space Objects (PPWT) [10].

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