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REVIEWING SOME CLINICAL MANIFESTATION FEATURES OF DRY EYE SYNDROME IN GLAUCOMA PATIENTS UNDERGOING A CONTINUOUS HYPOTENSIVE REGIMEN

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Abstract. *This article presents observations of ocular surface clinical condition in patients with primary open-angle glaucoma who had been receiving antihypertensive drugs containing preservatives over an extended period. The study comprises a total of 74 eyes, with patients categorized into three groups. The initial group consists of individuals who had been on a long-term regimen (up to 18 years) of antihypertensive medication containing benzalkonium as a preservative. The second group encompasses 12 patients (24 eyes) who were administered prostaglandin drugs via disposable dropper tubes, devoid of preservatives. The treatment duration for this group ranged from 2 to 2.5 years. Lastly, the third group comprised individuals exhibiting symptoms of conjunctivitis, chosen for the diagnosis of dry eye syndrome based on their subjective complaints. This group includes 10 patients, totaling 20 eyes. Upon analysis, approximately 40% of patients in the main group exhibited symptoms indicative of dry eyes. In the control group that received the preservative-free drug, the occurrence of dry eye symptoms was notably lower at 16.6%, while in the other control group, this frequency stood at approximately 30%. Consequently, the group consistently receiving drugs with a preservative showed a slightly higher percentage in the detection of dry eye.*

Keywords: *dry eye syndrome, Schirmer test, Norn test, glaucoma.*

Relevance. In recent years, clinical ophthalmology has placed significant emphasis on the issue of dry eye. Our region, characterized by hot and dry summers, elevated dust levels, low annual precipitation, and abrupt temperature changes, provides an advantageous setting for monitoring this patient demographic. The impact of these environmental factors on mucous membranes, particularly those in contact with the external environment, contributes to various pathologies, notably affecting the eyes and upper respiratory tract. Clinicians are particularly intrigued by the influence of regularly used eye drops, specifically antihypertensive ones, the majority of which contain preservatives, on the state of the ocular surface.

In collaboration, L.L. Arutyunyan and co-authors highlight the benefits of preservative-free prostaglandin drugs, emphasizing their non-deteriorating effect on the ocular surface condition. [1]

V.P. Erichev and colleagues have introduced an innovative approach to address artificial dry eye syndrome in glaucoma patients undergoing a continuous hypotensive regimen. It is recognized that the majority of anti-glaucoma drops incorporate a preservative essential for averting bacterial contamination in the bottle. By extending the shelf life of the drops, the preservative prevents biodegradation, ensuring the sustained efficacy of the drug and enabling the utilization of a convenient and secure bottle. Presently, benzalkonium chloride (BC) stands as the most prevalent preservative; however, it is noteworthy that even in minimal concentrations, BC can exert a cytotoxic effect on all structures of the ocular surface. The toxic impact of the

preservative on the ocular surface and the symptoms of dry eye syndrome can be mitigated through tear replacement therapy. The initial tear replacement therapy suggested in the article is preservative-free, and the active ingredients in these medications have demonstrated efficacy in treating and preventing corneal-conjunctival xerosis. [4]

T.V. Gavrilova and L.I. Solovyov expressed a favorable view regarding the use of the ophthalmic lubricant "Okuhil C" in patients who had been consistently instilling antiglaucoma medications for an extended period (some up to 55 years). [3]

Study Objective: To assess the impact of preservative containing antihypertensive drops on the condition of the eyeball surface and tear film, considering the climatic and geographical characteristics of Uzbekistan.

Materials and Research Methods: Three patient groups were formed for the study. The first group comprised 15 patients (30 eyes) who had been on a long-term regimen of an antihypertensive drug containing benzalkonium as a preservative, with an observation period of up to 18 years. The second group comprised 12 patients (24 eyes) who received prostaglandin drugs via disposable dropper tubes without the preservative, with a treatment duration of 2–2.5 years. Lastly, the third group involved individuals with chronic conjunctivitis symptoms, chosen for dry eye syndrome diagnosis based on subjective complaints. This group included 10 patients, totaling 20 eyes.

All patients underwent a comprehensive ophthalmological examination, encompassing general clinical and laboratory analyses, instrumental and functional examinations. Specialized assessment methods included tear film disruption tests (Norna), Schirmer tests, and tear film meniscometry. Schirmer test was carried out in accordance with the universally accepted procedure. Evaluation of results categorized readings as follows: ≥ 15 mm denoted normal; 10 to 15 mm indicated moderate deficiency; 5 to 10 mm signified severe deficiency; and ≤ 5 mm represented a severe lack of tear production.

The evaluation of tear film stability, utilizing the Norn test, employed pre-packaged fluorescein test strips – FluoroTouch (Madhu Instruments Pvt. Ltd., India). Prior to inserting the fluorescein test strips into the lower conjunctival fornix, they were moistened with one of the ophthalmic lubricants. The procedure was timed using a stopwatch while the stained surface of the cornea was observed through a slit lamp under focal illumination with a cobalt blue filter. The location and characteristics of such defects as "spots," "cracks," or "holes" were determined in the cornea. A tear film breakup time of 7 seconds or more was considered normal, a moderate decrease was indicated by up to 5 seconds, and a decrease below 5 seconds was regarded as a significant disruption of tear film stability.

The properties of the inferior tear meniscus were evaluated through optical coherence tomography (OCT meniscometry), employing an optical coherence tomographic RTVue_4.0 by Optovue, USA. Measurements encompassed the determination of the height (h) of the lower tear meniscus, as well as the quantification of its width (b). Additionally, parameters such as the radius and degree of deflection were assessed. It is noteworthy that the standard ratio for the height and width of the tear meniscus is conventionally recognized as 1:1.5.

The symptoms of chronic conjunctivitis were evaluated utilizing the following grading system: (+++) – indicating persistent discomfort behind the eyelids, absence of lacus lacrimalis, and habitual blepharospasm; (++) – denoting the presence of lacus lacrimalis signs in the medial corner, with blepharospasm occurring primarily outdoors in the setting of bright light; (+) –

representing mild chronic conjunctivitis without pronounced blepharospasm, with periodic occurrences of discomfort behind the eyelids.

Results and discussion.

Based on our observations, 12 out of 30 eyes in the main group exhibited an accelerated tear film breakup time, measuring 3-4 seconds, while the remaining 18 eyes displayed a tear film breakup time of 6-7 seconds, compared to the normal standard of 10 seconds. The Schirmer test yielded positive results in 17 out of 30 eyes, where hydration of the filter strips was recorded at 6-7 mm. Conversely, in the remaining 13 eyes, the strips demonstrated hydration levels of 10-12 mm, considering the norm of 15 mm.

Within the main group, 12 eyes were classified as (+++), indicating a notable condition, while the remaining 18 eyes were categorized as either (++) or (+).

In the first control group patients, during the Norn test, 20 eyes exhibited a normal result, while in the remaining 4 eyes, the tear film rupture time was reduced to 4 seconds. In the evaluation of total tear production (Schirmer test), normal results were observed in 18 eyes, registering 15 mm within 5 minutes. Conversely, in the remaining 6 eyes of the group, a decrease in tear production was noted.

The ratio of tear meniscus height, width, and deflection degree of the tear film amounted to 0.7/1.0 in 12 out of 24 eyes. In the remaining 12 eyes, it was measured at 1/1.2, indicating a deficiency of tear fluid.

In the second control group (comprising individuals with chronic conjunctivitis), a tear film breakup time of less than 6 seconds was observed in only 6 out of 14 eyes. The average intensity of chronic conjunctivitis symptoms was noted in 10 eyes, and the Schirmer test indicated a decrease in tear production in only 4 out of 20 patients.

Table 1.

Features of clinical manifestations of dry eye syndrome in the main and control groups

Clinical signs	The main group i.e. hypotensive regimen with preservatives. 30 eyes	1 Control group - preservative-free prostaglandins) 24 eyes	2 control group (dry eye suspects without glaucoma) 20 eyes	Average normal values
Tear film break-up time	12 eyes – 3-4 s (40%) 18 eyes - 6-7 s (60%)	4 eyes – 8 s (16.6%) 20 eyes 10 s (83.3%)	6 eyes – less than 10 sec (30%) 14 chapters - 10 sec (70%)	10 Seconds
Schirmer test result	17 eyes 6-7 mm (56.6%) 13 eyes -10-12 mm (43.4%)	20 eyes – 15 mm or more (83.3%) 4 eyes – 10-12 mm (16.7%)	16 eyes – 12-15 mm (80%) 4 eyes – 10-12 mm (20%)	Hydration of strips in 5 minutes over 15 mm

Conjunctival hyperemia and discomfort (feeling of a foreign body under the upper eyelid)	(+++) 12 eyes (40%), (++) 8 eyes (26.7%), (+) 4 eyes (13.3%)	(+++) 12 eyes (50%), (++) 6 eyes (25%), (+) or absent in 6 eyes (25%)	10 eyes (++) (50%) 4 eyes (+) (20%) practically absent in 6 eyes (30%)	The degree of clinical manifestations was determined by the subject directly during biomicroscopy of the anterior part of the eye
Meniscometry (tear film height, width and deflection radius ratio)	In 18 eyes the ratio was 0.7/1.0 (60%), in the remaining 12 eyes -1/1.2 (40%)	16 eyes - 1/1.4 (66.7) 8 eyes 1 /1.7 (23.3%)	Anterior section OCT was performed only in 8 eyes. On all the 8 ones the norm of 1..1.5 was registered	Norm 1/1.5

Summary and conclusions. Thus wise, long-term use of benzalkonium-containing antihypertensive drugs resulted in an accelerated tear film breakup time in nearly all observed patients, with a significant acceleration observed in 40% of cases. General tear production exhibited a noticeable reduction in 56.6% of eyes, underscoring the impact of the preservative on the ocular surface condition. However, not all authors attribute a direct effect of the preservative in antihypertensive drugs to dry eye. Evidently, the more apparent influence in our findings is also associated with the climatic characteristics of our region.

In the control group administered the drug without a preservative, an anticipated negligible impact on the quality of the ocular surface was observed. Consequently, a noticeable acceleration of the Norn test was documented in only 16.6%, accompanied by a comparable reduction in total tear production observed in a similar proportion of patients.

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EXPERIMENTAL ASSESSMENT OF THE INFLUENCE OF ANTISEPTIC WITH A COMBINATION OF LASER ON PROTOSCOLEXES

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Abstract. *The article presents the results of experimental and morphological studies aimed at solving the issue of treating the cavity of an hydatid cyst with various antiseptics, and assessing the effectiveness of laser radiation. The main objective of the experimental study was to evaluate the effect of laser exposure in combination with treatment with various antiseptics on the germinal elements of echinococcal fluid and the fibrous layer of the capsule of parasitic cysts.*

Keywords: *microscopy, echinococcus, fibrous capsule, processing, laser irradiation.*

Actuality. Many studies have found that germinal elements occur in the fibrous layer of the capsule. This, in turn, leads to relapses of echinococcosis [2,5,7,9,10]. For this purpose, at present, during surgery for liver echinococcosis, it is recommended to treat the residual cavity with various chemical antiseptics (formalin solution, iodine, alcohol, hydrogen peroxide, etc.) and physical factors (ultrasound, laser radiation, thermal exposure, etc.). This in turn leads to an increase in the number of methods, but can lead to various conflicting opinions about which one is more effective [3,4,6,8]. But the exact conclusions of the above methods and their effectiveness can only be assessed using morphological methods.

The purpose of study. To study the effect of antiseptics on the fibrous capsule of the cyst cavity in a model of liver echinococcosis, treating their cavities with various antiseptics.

Materials and methods. The main objective of the experimental study was to evaluate the effect of laser exposure in combination with treatment with various antiseptics on the germinal elements of echinococcal fluid and the fibrous layer of the capsule of parasitic cysts. For this purpose, the study is divided into 2 large series.

Each series was carried out sequentially. In the first series we gave a macroscopic (visual) and microscopic assessment of each sample.

A. First series studies:

The purpose of this series: Macroscopic (visual) and microscopic assessment of the viability of scolex in the native fluid of echinococcal cysts under the influence of various antiparasitic antiseptics.

The influence of various antiseptics on the viability of scolex obtained from cystic fluid was studied. For this purpose, 5 test tubes with 3 ml of native echinococcus fluid were taken and antiseptics were added to them:

1st tube: 3 ml of native echinococcus fluid (control group);

2-tube: 3 ml of native echinococcosis liquid and 2 ml of solution FarGALS;

3-tube: 3 ml of native echinococcus liquid and 2 ml of 80% glycerol solution;

4- test tube: 3 ml of native echinococcus liquid and 2 ml of 3% alcohol solution of iodine;

5- test tube: 3 ml of native echinococcus liquid and 2 ml of 96% ethanol;

The liquid in each tube was examined macroscopically (visually) and microscopically after 3, 5 and 7 minutes.

Macroscopic (visual) assessment:

When each tube was placed with antiseptic and visually assessed, especially in tubes 2, 3 and 4 (antiseptic liquid FarGALS, glycerin and iodine antiseptic), scolex in the native fluid of echinococcus rolled into different aggregate forms and formed bundles in the upper part of the test tube.

Microscopic Evaluation: As mentioned above, the liquids in each tube were also microscopically evaluated at 3, 5, and 7 minutes. At the same time, changes in the shape of the scolex, changes in their external volume and mobility in native echinococcal fluid were assessed.

When examining the scolex in the test tube of the control group at the 3rd minute, the shape is round, the edges are smooth, contractile movements are preserved at intervals.

From the 7th minute, it was established that their wall was slightly curved, their movement was slow, the internal elements were eccentrically located, and in some samples the integrity of the wall was compromised, and initial internal cracks began to be detected.

During a microscopic examination of echinococcal fluid in the remaining groups treated with various antiseptics, significant changes in the morphology of the scolex were observed, especially in samples treated with antiseptics in test tubes 1, 2 and 3, and even more so in the sample treated with a solution FarGALS in test tube 1. In the first 3 minutes, the scolex began to lose shape and smoothness. At the 5th minute, the integrity of the wall was compromised, and eccentric placement and protrusion of the internal inserts began to be observed.

In the 96% ethanol solution group, such changes were microscopically noticeable after 7 minutes. In this case, the same changes were observed as above, the integrity of the form was violated, and the movement became invisible. In most cases, the scolex membrane remained intact.

B. Second series studies:

Purpose of the series: first measured the light absorption level of the antiseptic liquid FarGALS using a spectrophotometer and selected the laser beam accordingly. Then, using a selected light-emitting laser device, a solution was added to the liquid of the native echinococcal cyst. FarGALS and assessed changes in scolex under the influence of LILR (Low intensity laser radiation).

Absorption level and photosensitizing properties of antiseptic liquid FarGALS tested and confirmed by several previous scientific studies [1]. However, we checked this again using a spectrophotometer. In this case, local antiseptic liquid FarGALS showed a high absorption spectrum in the 330-550 nm mode. This once again confirmed the results of several previous scientific works.

Results and their discussions. Based on the obtained result, as a radiation source for PT (Photodynamic therapy) used a laser machine «LAKHTA-MILON» (Russia) with radiation in the green spectrum with a wavelength of 520 nm, power 0.5-1.0 mW in continuous mode.

Initially, we determined how long destructive changes last in the native fluid of an hydatid cyst containing an antiseptic fluid FarGALS.

In this case, 3 preparations were taken, 1 ml of native echinococcus liquid was added to each of them, and 1 ml of antiseptic liquid was added to them FarGALS and irradiated for 1, 3 and 5 minutes in conditions of the most reduced illumination.

At the 3rd minute of the experiment, their complete denaturation, a violation of the integrity of the wall, and the release of internal inclusions into the surrounding liquid were observed. These changes mean that they have completely lost their vital signs.

At the 5th minute of irradiation, this process continued without changes. This showed that LILR (Low intensity laser radiation) was the main effect mainly at the 3rd minute of irradiation and that it did not change at subsequent times.

Studies have shown that the effect PT (Photodynamic therapy) characterized by strengthening and acceleration of the antiparasitic effect of the antiseptic FarGALS under the influence of laser irradiation in the green spectrum. It should be noted that similar experiments with dilution of the native solution FarGALS in a ratio of 1:1, 1:3, 1:5, 1:6, 1:8 with water for injection showed indicators virtually identical to the primary results. This is important from the point of view of the pH of the solution; in its native form it has an acidic environment, but diluting the drug does not lead to the loss of its antiparasitic properties.

Conclusion. Macroscopic and microscopic assessment of the effect of various antiseptics and, in particular, domestic antiseptics FarGALS native hydatid fluid once again confirmed the primary results of our previous studies. In doctoral work of F.R.Yakubova “Medical and social aspects and improvement of surgical tactics for echinococcosis of the abdominal organs” the effect of the solution was studied FarGALS when treating the residual cavity after echinococcectomy from the liver. These studies were continued in this work and new data were obtained that were of both scientific and practical interest.

The main effect of the concentrated solution FarGALS on native echinococcus fluid begins within 3 minutes, and the germicidal effect is observed after 5 minutes.

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IMPROVEMENT OF THE METHOD FOR ANTIPARASITIC AND ANTI-INFLAMMATORY TREATMENT OF THE RESIDUAL CAVITY OF AN ECHINOCOCCA CYST

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Abstract. *The article presents the results of experimental and morphological studies aimed at solving the issue of treating the cavity of an echinococcal cyst with various antiseptics and assessing the effectiveness of laser radiation. Experiments performed in the laboratory of Republican specialized scientific and practical medical center for surgery named after V.Vakhidov. The main objective of the experimental study was to evaluate the effect of laser exposure in combination with treatment with various antiseptics on the germinal elements of echinococcal fluid and the fibrous layer of the capsule of parasitic cysts. For this purpose, the study is divided into 2 large series. Each series was carried out sequentially. In the first series, the authors gave a macroscopic (visual) and microscopic assessment of each sample.*

Keywords: *echinococcus, laser, residual cavity, treatment, laser irradiation, cyst.*

Relevance: Echinococcal disease is endemic in the Mediterranean, South America, the Far East, Central Asia and Eastern Europe. However, it is also commonly observed in non-endemic countries due to increased travel worldwide [1,3,7,9]. About 4000 diagnoses of echinococcosis are registered annually in Turkey [8].

F.A.Ikhamov analyzed the results of treatment of 34 patients with purulent residual cavities in the liver (RCL) after echinococectomy. In 31 patients, a new method of elimination was used RCL, which consisted of percutaneous puncture and drainage of the infected cavity, followed by transdrainage laser irradiation of its walls with nitrogen UV laser and a helium-neon laser in the visible spectrum. Transdrainage irradiation was carried out against the background of daily procedures of percutaneous laser irradiation of the liver (gallium arsenide infrared laser). The minimal trauma of percutaneous interventions and the pronounced antibacterial, anti-inflammatory and stimulating effects of low-energy lasers have significantly improved the results of treatment of patients RCL [1,2,4,5,6].

Target. Improve the results of surgical treatment by combining an antiseptic drug and laser radiation.

Materials and methods. The objective of the new method is to improve the results of surgical treatment of liver echinococcosis, complicated by suppuration, through combined intraoperative antiparasitic and anti-inflammatory treatment of the residual cavity.

In this context, the closest is the method of treating the cyst cavity with a defocused beam of a carbon dioxide CO₂ laser; a method of antiparasitic treatment with a solution is also known FarGALS. The disadvantage of treating a cyst cavity with a CO₂ laser is that radiation in this spectrum does not penetrate wet tissue, and when treated with a solution FarGALS, as well as other chemicals, it is possible to preserve the viability of scolex in daughter cysts, as well as in the fibrous capsule.

Taking into account the fact that morphological studies showed the presence of living germinal elements of the parasite not only in the echinococcal fluid, on the surface of the fibrous capsule, but also in its thickness, we decided to enhance the germicidal effect not only through photoactivation of the solution FarGALS, but also by manipulating another variant of physical impact on the entire surface of the fibrous capsule. Surgical laser LAKHTA-MILON, which was used in our study provides the possibility of using waves of different lengths, and therefore we recommend using this technology twice during treatment of the residual cavity. In this case, additional radiation delays the operation time by only 2-3 minutes.

The proposed method of eliminating an hydatid cyst complicated by suppuration is carried out by removing the remnants of the maternal membrane, as well as daughter and grandchild bladders, suturing biliary fistulas (if any) and treating the residual cavity of the cyst (fibrous capsule) with infrared laser radiation (surgical laser LAKHTA-MILON, Russia) with a wavelength of 910 nm, a power of 20 W in a pulse-periodic mode with a spot area of 1 to 2 cm² for 2-3 seconds per field, then the cyst cavity is treated with a solution FarGALS in a dilution of 1:3 for 3 minutes, after which the residual cavity is irradiated with the same laser in the green spectrum with a wavelength of 520 nm, a power of 0.5-1.0 mW in continuous mode with a spot area of 1 cm² for 3 seconds for each field (for each 1 cm² of fibrous capsule for 3 seconds), then the residual cavity is drained with a tube brought out through the skin.

Advantages of the method:

- laser radiation in the 910 nm spectrum penetrates deeply (up to 7 mm) into the fibrous capsule of the residual cyst cavity, especially in a humid environment;
- radiation with a power of 20 W and a duration of 2-3 seconds completely destroys the cellular structure of the parasite, even when located inside the daughter bladder or in the thickness of the fibrous capsule;
- FarGALS, has a powerful antiparasitic property and its effect is enhanced after laser treatment of tissues, which provides an additional antiparasitic effect;
- laser irradiation of the fibrous capsule of the residual cavity in the 520 nm spectrum after its treatment with a solution FarGALS provides increased local anti-inflammatory effect and microcirculation, as well as acceleration of reparative processes.

The method is carried out as follows. A patient with liver echinococcosis undergoes an upper-median laparotomy; after revision, the area of cavity formation is covered with gauze swabs, after which the hydatid cyst is punctured; if there is thick content and it is impossible to remove it through a puncture needle, the fibrous capsule is opened and the chitinous membrane is removed, and if all daughter parts are present and grandchild cysts in compliance with the recommended principles of aparasiticity. After removing all the contents, the residual cavity is treated with a 3% solution of H₂O₂ (hydrogen peroxide), after which bile fistulas are inspected and, if identified, sutured. Next, the entire internal surface of the residual cavity (fibrous capsule) is irradiated infrared spectrum of a surgical laser «LAKHTA-MILON» (Russia) with a wavelength of 910 nm, a power of 20 W in a pulse-periodic mode, while the laser spot area is from 1 to 2 cm², respectively, the entire surface of the capsule is irradiated for 2-3 seconds per field (laser spot area), then the residual cavity of the cyst is treated with a solution FarGALS in a dilution of 1:3 for 3 minutes (with a wide dissection of the fibrous capsule, it is possible to use a solution soaked FarGALS gauze swab), after which the remaining solution is removed by suction and the residual cavity is irradiated with a laser «LAKHTA-MILON» but already in the green spectrum with a

wavelength of 520 nm, a power of 0.5-1.0 mW in continuous mode with a spot area of 1 cm² for 3 seconds per field (for each 1 cm² of fibrous capsule for 3 seconds), then residual the cavity is drained with a tube brought out through the skin. The surgical wound is sutured in layers.

To perform the method, it is necessary:

- antiseptic drug FarGALS in its pure form, antiseptic drug FarGALS, diluted with water for injection in a ratio of 1:3.

- Surgical laser «LAKHTA-MILON» - laser device for resection and coagulation.

Conclusion. In case of liver echinococcosis complicated by suppuration, after the traditional stage of removing the parasite and treating the residual cavity using the proposed method, maximum excision of the fibrous capsule is recommended within acceptable limits in relation to the liver parenchyma, while if wide abdominal dissection is performed, then drainage of the residual cavity and adjacent space is possible with a single drainage.

The timing of drainage of the residual and abdominal cavity after operations for complicated echinococcosis of the liver should be limited and the indication for drainage removal is the absence of bile or purulent discharge, as well as a tendency, according to ultrasound data, to collapse or decrease in the residual cavity without the presence of hyperechoic liquid contents in it.

Thus, the proposed method of treating the residual cavity after surgery for liver echinococcosis with a combination of laser irradiation, complicated by suppuration, will reduce the duration of the postoperative hospital stage, the duration of drainage, and the overall incidence of complications.

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CHEMICAL CONTROL MEASURES AGAINST LOCUSTS

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Abstract. *The article studies and analyzes the types of swarming locusts, young and old larvae, the chemicals used against them and their biological effectiveness in the agroecosystems of the Fergana Valley.*

Keywords: *sarancha, dominiruyushchie vidy, rasprostranenie, agroecosis, regionaly, chemical preparations, normal consumption.*

Introduction. Dozens of species of locusts in the world pose enormous problems for food security. Their rampant development occurs on every continent except Antarctica, threatening the lives of 10 percent of the world's population. In particular, the desert locust is undoubtedly the most common and globally damaging agricultural pest, and in 2020, more than 25 million people in Africa and Asia faced a severe food crisis due to locust damage. As a result of their gross increase, solving environmental problems in agriculture at an unprecedented level is one of the urgent issues.

Research materials and method. Research was conducted in several districts of Andijan, Fergana and Namangan regions during 2020-2023. During the research, all observations, counting the number and density of locusts, collecting samples, were carried out by F.N.Pravdin, E.P.Tsyplenkov, F.A.Gapparov in areas where they are widespread, G.Ya.Bey-Bienko, L.L.Mishchenko, A.V.Lachininsky in determining species of locusts, calculation of biological effectiveness of preparations V.V. Kurdyukov. From the methods of Sh.T.Khojaev, F.A.Gapparov, economic efficiency was conducted based on the methods of N.R.Goncharov [1]. As a result of the increase in the population of local species of harmful locusts in the Fergana Valley and the introduction of some species from the territory of neighboring countries, their damage is increasing year by year. In the Fergana Valley, locust control is carried out seasonally during the periods of mass development of Moroccan and Italian locusts. In particular, every year in the valley regions, chemical preparations are used to control oasis and Moroccan locusts on an average of 13-15 thousand hectares. Some years, locusts, which live in swarms in the territories of neighboring countries, fly to the territory of our country as a result of a large increase. In such cases, the areas of fighting against locusts can be doubled. In the fight against it, the active substance is mainly used in drugs belonging to the pyrethroid and neonicotinoid groups. 2(09) [pp. 299-303].

At the moment (2023) in Andijan region, treatment with chemical preparations against harmful locusts is carried out on an area of more than 6000 hectares. During the years of massive breeding of the Moroccan locust due to its flight from neighboring countries, mainly from the Republic of Kyrgyzstan, the area of cultivation increases several times. [5]. In our experiments to determine the biological effectiveness of chemical preparations, we used preparations with the active ingredient lambda-cyhalothrin, alpha-cypermethrin and cypermethrin. We carried out our experiments in the mountain pastures of Markhamat district of Andijan province, in the border area with the neighboring Kyrgyz Republic. The main reason for our choice of Markhamat district

is that the Moroccan locusts, which live in swarms through the Ulug mountain ranges located on the border of the Kyrgyz republics of Uzbekistan, have been observed in these places. Quarantine and protection of plants during field experiments was carried out in cooperation with the staff of the anti-locust and mulberry moth control service of the Andijan regional administration. According to the generally accepted method in Uzbekistan, chemical treatment is carried out when the number of locust larvae exceeds 10-15 units per 1 m², depending on the state of vegetation and climatic conditions. OVX-600 and VP-1 tractor sprayers and gasoline-powered RUBIN-MM-909 hand-held sprayers are used to control locusts in the experimental field. Processing works were carried out mainly early in the morning in the desert and late, before sunset.

Field experiments Karat iks 20% sus.k. and Atilla Super, 10% em.c. (sample) preparations were conducted in order to determine their biological effectiveness against the larvae of Moroccan and Italian grasshoppers. The active substance of both drugs belongs to the group of pyrethroids - lambda-cyhalothrin. These preparations differ from each other in the concentration of the active ingredient. [8].

Analysis and results. During the experiments Karat iks 20% sus.k. the drug was determined at the rates of 0.0375-0.0625 l/ha against large and small larvae of the Italian grasshopper. Counting the number of larvae was carried out by counting the number of larvae in 1 m² area before treatment with the drug and 3, 24, 48 hours after treatment.

In the experiment Karat iks 20 % sus.k. drug was used against young and old larvae of the Italian locust in the amount of 0.0375 and 0.625 l/ha. According to the obtained data, the biological efficiency of 88.1% after 3 hours, 95.7% and 97.6% after 24 and 48 hours, respectively, was achieved when the drug was used against young locust larvae in the amount of 0.0375 l/ha (Table 1).

Karat iks 20% sus.k. when we used the drug in the amount of 0.0625 l/ha, biological efficiency was achieved 90.7% after 3 hours, 98.0% and 98.9% after 24 and 48 hours, respectively. According to the results of the experiment, the difference between the biological efficiency obtained from the use of the drug in the amount of 0.0375 and 0.0625 l/ha is less than 3%, and Karat iks 20% sus.k. it was concluded that it is appropriate to use the drug in the amount of 0.0375 l/ha.

1-table.

Biological effectiveness of the drug Karat iks 20% sus.k. against larvae of different ages of the Italian locusts (On 14.06.2023 in Andijan district, Andijan region, Uzbekistan)														
№	Variations	Consumption rate of the drug, l/ha	The average number of locusts per 1 m ² after n hours									after- n hours biological efficiency %		
			3			24			48			3	24	48
			Alive	Dead	Total	Alive	Dead	Total	Alive	Dead	Total			
Treatment against 2-3-year-old larvae 14.06.2023														
1	Karat iks 20% sus.k.	0,0375	4,7	35,1	39,8	1,6	36,3	37,9	0,9	37,2	38,1	88,1	95,7	97,6
2	Karat iks 20% sus.k.	0,0625	3,9	38,2	42,1	0,8	40,6	41,4	0,4	38,9	39,3	90,7	98,0	98,9
3	Atilla Super. 10% em.c. (template)	0,125	3,7	34,3	38,0	0,7	38,5	39,2	0,4	37,2	37,6	90,2	98,2	98,9
4	Control (idle)	-	38,2	0,1	38,3	37,3	0,4	37,7	34,6	0,3	34,9	0,0	0,0	0,0
Treatment against 4-5 year-old larvae 14.06.2023														
1	Karat iks 20% sus.k.	0,0375	7,5	27,2	34,7	4,9	28,1	33,0	3,0	33,2	36,2	78,3	85,1	91,7
2	Karat iks 20% sus.k.	0,0625	4,3	29,5	33,8	1,4	33,7	35,1	0,8	34,0	34,8	87,2	96,0	97,8
3	Atilla Super. 10% em.c. (template)	0,125	4,7	32,4	37,5	1,3	35,1	36,4	0,7	31,4	32,1	86,4	96,4	97,9
4	Control (idle)	-	31,9	0,0	31,9	32,2	0,3	32,5	32,9	0,3	33,2	0,0	0,0	0,0
EKF _{0.5}											1,0	1,3	0,8	

A similar experiment was conducted on adult larvae of the Italian grasshopper. According to the results of the experiment Karat iks 20% sus.k. 78.3% biological efficiency after 3 hours, and 85.1% and 91.7% after 24 and 48 hours, respectively, after treatment with the drug at a consumption rate of 0.0375 l/ha. In our experiment, at the consumption rate of 0.0625 l/ha, 87.2% after 3 hours of treatment, 96.0% and 97.8% after 24 and 48 hours, respectively, were achieved. Karat iks 20% sus.k. Due to the fact that the difference between the biological efficiency of the preparation in comparison with the adult larvae of the Italian locust at the rates of 0.0375-0.0625 l/ha is higher than 6% Karat iks 20% sus.k. it was concluded that it is appropriate to use the drug in the amount of 0.0625 l/ha in relation to adult larvae of the Italian grasshopper.

Conclusion. Experimentally tested Karat iks 20% sus.k for Italian grasshopper larvae. The biological efficiency of the drug was -97.6% when it was used at the rate of 0.0375 l/ha for 2-3 years old, and -97.8% when it was used at the rate of 0.0625 l/ha for 4-5 years old. Against Italian grasshopper larvae Karat iks 20% sus.k. (for young age - 0.0375 l/ha, for older age 0.0625 l/ha) it is recommended to use in norms.

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THE USE OF MEASURING CYTOKINE CONCENTRATIONS IN URINE IN MEDICAL PRACTICE

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Abstract. *The paper presents data on the study of the content of cytokines (IL-1 β , RAIL-1 β , IL-2, IL-4, IL-10, IL-17A, TNF- α , IFN- γ) in morning urine using enzyme immunoassay in healthy individuals (n=20) and in patients with acute glomerulonephritis (n=93). Determination of cytokine levels in patients was carried out at the onset of the disease and 12 months after the manifestation of the disease. The obtained indicators of cytokine content in urine are presented as absolute values in pg/ml and values normalized to creatinine, calculated using the formula: cytokine level (pg/ml) / urine creatinine (μ mol/ml). A study was made of changes in the content of cytokines in urine during glomerulonephritis relative to a group of healthy individuals, as well as the dynamics of cytokine content in urine over a 12-month observation period. The results of the study showed that absolute values of cytokines in urine can distort the true picture of the cytokine profile of urine in kidney pathology. Normalized values of the predominant number of pro- and anti-inflammatory cytokines (IL-1 β , IL-2, IL-8, IL-10, IL-17A and TNF- α) in patients with glomerulonephritis were significantly higher than the corresponding indicators in healthy individuals. Normalized cytokine values were shown to be more sensitive indicators than absolute values when analyzing differences in the cytokine profile in patients with glomerulonephritis depending on the acute and chronic course of the disease. These indicators influenced the outcome of glomerulonephritis, assessed, as a rule, 12 months after the manifestation of the disease. Thus, low levels of IL-1 β , IL-8 and IL-17A found at the onset of the disease in combination with a high level of RAIL-1 β determined the chronicity of glomerulonephritis. So, values of cytokine content in urine normalized by creatinine expand the possibilities of using assessment of the cytokine profile of urine to establish changes in the content of cytokines in urine in kidney pathology and predict the nature of the clinical course of glomerulonephritis.*

Keywords: *glomerulonephritis, cytokines, chronic glomerulonephritis, diabetes mellitus, chronic kidney disease.*

Introduction. In recent years, much attention has been paid to the study of the cytokine profile in patients with various pathologies, including kidney diseases [1–4]. At the same time, the authors were mainly involved in studying the content of cytokines in blood serum [1–3]. However, cytokines circulating in the blood can be blocked by their own soluble receptors or receptor antagonists [4], which limits the use of cytokine levels in the blood to assess cytokine status in various pathological conditions. There is no doubt that cytokines exert their effects at the site of their production, therefore, studying the content of cytokines in urine in kidney diseases may be more informative than determining their serum levels. In connection with the above, the present study was undertaken, the purpose of which was to assess the informativeness of indicators of the content of pro and anti-inflammatory cytokines in the urine in healthy

individuals and in kidney pathology, an example of which was the widespread glomerular disease - glomerulonephritis (GN).

Material and methods. During the study, urine samples were taken to determine the content of cytokines - IL-1 β (interleukin-1 β), RAIL-1 β (receptor antagonist of interleukin-1 β), IL-2 (interleukin-2), IL-4 (interleukin-4), IL-10 (interleukin-10), TNF- α (tumor necrosis factor- α), IFN- γ (interferon- γ) in apparently healthy individuals (20 people aged 23 to 60 years, average age 34.2 \pm 2.9 years) and in patients with post-infectious glomerulonephritis (PIGN) who received inpatient treatment in the nephrology department of the Republican Scientific and Practical Center of Nephrology in 2012 - 2017. (93 people, aged from 21 to 63 years, average age 36.4 \pm 2.1 years). Selected portions of urine were centrifuged for 10 minutes at 1000 g, then the supernatant was separated for study into plastic tubes. To study the relationship between urinary and serum levels of cytokines, in addition to the study of cytokine levels in urine, the content of cytokines above the specified spectrum in the blood serum was determined. The urine and blood serum samples selected for the study were stored at -70 C until the study.

In patients with PIGN (Post-infectious glomeronephritis), cytokine testing in urine was carried out twice - during the onset of the disease upon admission to hospital treatment (1-2 days from hospitalization) and 12 months after discharge from the hospital. The patients were retrospectively distributed after 12 months into 2 groups depending on the results of a general clinical examination. The first group included patients who were convalescents after suffering from acute PIGN, the second group included patients with chronic PIGN, who, a year after the manifestation of the disease, continued to have clinical symptoms and changes in urine characteristic of GN (hypertension, edema, decreased glomerular filtration rate - GFR - below 60 ml/min, proteinuria, hematuria, leukocyturia, in some cases cylindruria). For the next stage of the study, 30 people from each group of patients were selected. When selecting patients, we sought to randomize groups according to gender, age, social composition, and morphological forms of PIGN. Diagnosis of PIGN was carried out on the basis of an analysis of the clinical status of patients, anamnestic data, results of laboratory tests of blood and urine, examination of the kidneys using an SSD ultrasound machine from Aloka (Japan), and a morphological study of nephrobiopsy samples of patients using light and fluorescent microscopy. Quantitative determination of cytokines was carried out by enzyme immunoassay using test systems of Cytokin LLC (St. Petersburg) according to the methods of the manufacturer of laboratory reagents on the Immune enzyme immunoassay analyzer "Institute Virion/Serion GmbH", Germany).

Results. The results obtained during the study were processed using the statistical apparatus of the computer program "Statistica - v. 10.0". The distribution of the obtained values of cytokine levels in urine and blood was first checked for compliance with the normal (Gaussian) distribution using the Kolmogorov-Smirnov test with the Lilliefors correction. Provided that the achieved significance levels (p) were below the critical value of 0.05, the null hypothesis about the similarity of the studied characteristics with a normal distribution was rejected. The use of this approach made it possible to establish the asymmetry of the distribution of the total values of cytokine content in urine and blood serum in the studied groups of patients and in healthy individuals, and therefore the obtained data were presented in the form Me (P – P), where Me is the median, P is the value 10 -th percentile, P90 – 90th percentile value. To assess differences in indicator values in study groups, the non-parametric Mann-Whitney test (p) was used. When conducting a correlation analysis of the studied indicators, the Spearman

rank correlation coefficient (r) was calculated; the correlation was considered significant at $p < 0.05$

The absolute values of urinary content of 5 cytokines - IL-1 β , IL-2, IL-8, IL-10 and TNF- α - were increased in patients at the onset of PIGN relative to the values of healthy ones, while the absolute levels of IL-4, IL-17A, and IFN- γ were lower than those of healthy people (Table 2). The normalized values of the predominant number of pro- and anti-inflammatory cytokines (IL-1 β , IL-2, IL-8, IL-10, IL-17A and TNF- α) significantly exceeded the corresponding values of healthy individuals. The exceptions were IL-4, RAIL-1 β and IFN- γ , the urinary levels of which in normalized terms did not differ from those in healthy controls. In a retrospective analysis of the nature of the clinical course of PIGN 12 months after the onset of the disease, 2 groups of patients were identified - with acute PIGN and chronic PIGN, a comparative study of the urinary levels of cytokines in which revealed a number of differences (Table 3). It was noteworthy that the normalized values of cytokine content had more pronounced differences than their absolute values. Thus, the normalized levels of typical pro-inflammatory cytokines - IL-1 β , IL-8, IL-17A - in patients with chronic PIGN were lower at the onset of the disease compared to the corresponding indicators in patients with an acute course of the disease, and the level of RAIL-1 β was higher. At the same time, the levels of IL-8 and RAIL-1 β in absolute terms did not respond to the nature of the clinical course of the disease and had almost identical values in the acute and chronic course of PIGN. Levels of IL-2, IL-4, IL-10, and TNF- α and IFN- γ did not differ between groups of patients with acute and chronic PIGN. In patients with chronic PIGN, 12 months after the onset of the disease, the level of IL-1 β in the urine in absolute and normalized values became higher, while the level of RAIL-1 β (both in absolute and normalized terms) was lower than in patients with favorable outcome – acute course of the disease (Table 4). The levels of IL-2 and IL-4 began to exceed in patients with a chronic course of the disease similar indicators in acute PIGN. In patients with chronic PIGN, the absolute and normalized values of IL-10 became lower than those of patients with acute PIGN, while the normalized value of IL-17A became higher.

Discussion. As a result of a correlation analysis in healthy individuals, the existence of direct connections between urinary and serum levels of RAIL-1 β and IL-2 was revealed. For the remaining cytokines, there was no correlation between serum and urinary levels. The total number of correlations between urinary levels of cytokines was 14, which is much greater than the number of those between serum levels, equal to 8, which indicates a closer connection between urinary levels than serum levels. This may be due to the fact that cytokines excreted in the urine are formed locally in the kidneys and obey the general laws of cytokine production, one of the principles of which is the cascade of activation of their production, when some cytokines induce the synthesis of others [5, 6]. In addition, the existence of many correlations between the levels of cytokines excreted in the urine may reflect the dependence of urinary cytokine levels on the state of renal excretory function. However, correlation analysis did not reveal an association between urinary levels of most cytokines and urinary creatinine; only the absolute value of urinary RAIL-1 β was positively associated with urinary creatinine levels. The lack of association of other cytokines with serum and urinary creatinine levels can be explained in part by their small absolute values, short lifetime, and rapid utilization in the liver and kidneys. The excess of urinary levels of cytokines in practically healthy individuals and in patients with PIGN compared to the corresponding serum levels also suggests that the source of cytokines excreted in the urine is the kidneys. This position is confirmed by data from other authors on the local production of cytokines in the affected organ [7, 8]. The results of the study

showed that absolute values of cytokines in urine can distort the true picture of the cytokine profile of urine in kidney pathology. Thus, in the group of patients with PIGN at the onset of the disease, a decrease in the levels of IL-4, IL-17A and IFN- γ was found relative to healthy levels, which does not fit into the picture of activation of the cytokine network characteristic of kidney damage. At the same time, an increase in the levels of most pro- and anti-inflammatory cytokines normalized by creatinine was detected, which is consistent with the data of other authors on increased levels of pro-inflammatory cytokines in the urine in glomerular pathology [4], as well as a simultaneous increase in the urine content of both pro-, and anti-inflammatory cytokines in various forms of GN [10]. Quite a lot of work has been published indicating the important role of pro-inflammatory cytokines in damage to the renal glomeruli [11-18]. It has been shown that one of the main pro-inflammatory cytokines, IL-1 β , is produced by glomerular macrophages and mesangial cells activated as a result of the interaction of pattern recognition receptors (PRRs) of these cells with pathogen-associated molecular patterns of infectious pathogens (PAMPs) or products of damage to their own tissues (DAMPs). Under experimental conditions, IL-1 β produced in the kidneys promoted glomerular necrosis, glomerular crescent formation, and renal tubular damage [19]. IL-8 (chemokine CXCL-8) caused an increase in glomerular basement membrane permeability and proteinuria in rats by reducing the synthesis of heparan sulfate proteoglycans [20]. TNF- α produced in the kidneys initiated damage to glomerular podocytes and also activated the renin-angiotensin system [21,22]. IL-17A is considered one of the main proinflammatory cytokines in GN; it is produced by T lymphocytes, is a chemoattractant for neutrophils, promotes the accumulation of macrophages in glomeruli, and blocks the suppressive effect of Treg cells on autoimmune processes [23–25]. There are no data on the direct damaging effect of IL-2 on the kidneys, but positive results have been published on the use of high doses of methylprednisolone and cyclosporine in the treatment of patients with GN, which are known to suppress the production of IL-2 [26, 27]. IFN- γ contributed to the development of oxidative stress, mesangial cell damage, accumulation of extracellular matrix, and ultimately the development of nephrosclerosis [18, 28, 29]. IL-4 induced kidney damage and proteinuria in mice [30]. Two other cytokines, IL-10 and RAIL-1 β , have pronounced anti-inflammatory and nephroprotective properties.

In previous experiments, administration of RAIL-1 β to laboratory animals with different forms of GN inhibited the development of the inflammatory process in the kidneys, reduced proteinuria, and restored renal function [31, 32]. IL-10 prevented the formation and deposition of immune complexes in the renal glomeruli, and also prevented the progression of GN [33–35]. Normalized cytokine values were shown to be more sensitive indicators than absolute values in the analysis of differences in the cytokine profile in patients with PIGN depending on the nature of the clinical course - acute or chronic. Thus, already at the onset of PIGN during the chronic course of the disease, certain features could be noted in the cytokine profile of urine - low levels of pro-inflammatory cytokines - IL-1 β , IL-8 and IL-17A against the background of a high level of RAIL-1 β . Low levels of IL-1 β and IL-17A were indicated by both absolute and normalized values of urinary cytokine levels. A decrease in the level of IL-8 and an increase in the level of RAIL-1 β were detected only through the use of normalized values, since the absolute values of these cytokines did not respond to the nature of the clinical course of the disease at the onset of PIGN. After 12 months of observation, there was an inversion of the nature of the identified differences in the levels of IL-1 β , IL-17A and RAIL-1 β : thus, the

absolute and normalized values of the initially low level of the proinflammatory cytokine IL-1 β became higher in chronic PIGN, and the normalized value of IL-1 β also became higher. IL-17A, and the level of the anti-inflammatory cytokine RAIL-1 β is lower than in patients with a favorable outcome – acute course of the disease. The persistence of high levels of cytokines with pro-inflammatory and nephrotoxic properties (IL-1 β , IL-2, IL-17A and IL-4) in patients with PIGN against the background of a decrease in the levels of anti-inflammatory cytokines – RAIL-1 β and IL-10, apparently contributes to chronic the course of glomerular damage. The literature has previously described changes in the content of cytokines in the blood serum of patients at the onset and dynamics of GN, depending on the nature of the clinical course of the disease [2, 36]. In particular, in children with chronic GN, a decrease in the level of RAIL-1 β was found relative to healthy individuals, with an unchanged value of this indicator in patients with acute GN. At the same time, the latter showed an increase in the level of IL-4 in the blood serum, while maintaining it at the level of healthy people in patients with chronic GN. The formation of chronic GN was associated with an increase in the content of pro-inflammatory cytokines circulating in the blood - IL-1 β , TNF- α and IL-8, in the absence of dynamics in the content of anti-inflammatory cytokines. In the literature, we did not find data on the study of differences in urinary levels of cytokines in patients with acute and chronic PIGN. Our data suggest that the chronic course of PIGN is associated with an initially reduced functional activity of innate immune cells - a decrease in the ability to produce the “early” pro-inflammatory cytokine - IL-1 β and associated other pro-inflammatory cytokines - IL-8 and IL-17A against the background of increased RAIL-1 β production. As a result, the immune response turns out to be ineffective, the pathogen is not removed, and the activity of innate immune cells remains almost at the original level, continuing to synthesize the pro-inflammatory cytokines IL-1 β , IL-17A, while in patients with a favorable outcome the absolute and normalized IL-17A value as well as normalized IL-1 β value.

Conclusion. So, the use of creatinine-normalized values of cytokine content in urine expands the possibilities of using assessment of the cytokine profile of urine to establish changes in the content of cytokines in urine in kidney pathology, as well as to predict the nature of the clinical course of PIGN.

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ACUTE AND CHRONIC TOXICITY STUDY OF MESH IMPLANT WITH NEW COMPOSITE COATING

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Abstract. *Based on the results of a study of the acute toxicity of a mesh implant with a composite coating, the authors came to the conclusion that a mesh implant with a new composite coating can be classified as a low-toxic drug with a single injection. Based on the fact that a single injection of a mesh implant into the abdominal cavity didn't cause death in animals, according to the currently accepted WHO classification, the toxicity of this composite coating can be classified as mild.*

Keywords: *hernia, mesh implant, toxicity, composite coating, experimental research.*

Introduction. More than 20 million abdominal hernia surgeries are performed worldwide every year, several million of which are combined with synthetic implants. Of these synthetic implants, polypropylene resin surgical kits are most commonly used. The method of implantation is commonly used to study the systemic toxicity of implantable devices and is described in ISO10993 Part 11. However, there is no standard for the amount of material to be implanted for a proper and acceptable assessment of the risk of systemic toxicity. It should be understood that if small amounts of material are implanted, systemic toxicity will not be detected and a false sense of security will be created. For a proper risk assessment, systemic toxicity should be investigated after implantation of an appropriate amount of material. The appropriate amount of material should be calculated based on clinical application, device surface area, and scaled allometrically to test species used for implantation.

Aim of the research is to study the acute and chronic toxicological properties of mesh implant with a new composite coating in experimental animals.

Materials and methods. The implant is a woven polypropylene mesh. Polypropylene has the ability to stimulate the growth of connective tissue, thereby strengthening the connective tissue frame at the site of the hernial defect. A negative property of the mesh made of propylene is an increased tissue reaction to propylene, as well as the presence of micro-slits in the places where the nodes of the mesh are formed, which contributes to the penetration of microbes and their long-term persistence with the development of chronic inflammation.

We have developed a composite coating of the stack, a state of three layers: the side of the mesh that is in contact with the tissues is a 200 micron thick film of a biocompatible absorbable material that has increased adhesiveness and antimicrobial action: Sodium-Carboxymethylcellulose, which is mixed with a 1% solution of methylene blue in the proportion of 1 g of crystalline powder and 0.5 ml of 1% methylene blue solution.

The second layer of a natural biocompatible polymer from cellulose derivatives is a woven polypropylene mesh impregnated with the composition: Sodium-Carboxymethylcellulose + calcium chloride + oxidized viscose in a ratio of 60:25:15. The upper - outer layer of the mesh is a film of cellulose derivatives and glycerin in the ratio of Sodium-Carboxymethylcellulose - 1 g, glycerin 20% 0.5 ml.

The experiments were carried out on 25 white outbred rats with an initial weight of 250-300 g. In accordance with the requirements of ISO 10993-2, under general anesthesia with isoflurane vapor, a median laparotomy 2-3 cm long was performed and a 1x1 cm mesh implant was placed on the diaphragmatic surface of the liver.

The laparotomic wound was sutured in layers. To study acute toxicity, the condition of the operated animals was observed for a week, in the specified order according to GOST ISO 10993-11-2011. Animals were withdrawn from the experiment 1 week after implantation by an overdose of anesthesia. Blood and biopsy material was examined according to the standard method.

To study chronic toxicity, a 1x1cm implant was placed in the abdominal cavity on the diaphragmatic surface of the liver and observed for 1-3 months. After 1, 2, 3 months after implantation, the animals were taken out of the experiment, blood was taken for general and biochemical analyzes. A biopsy of organs and tissues was sent for histological studies.

Results. During the entire observation period, no significant signs of changes in the clinical condition and behavior of the experimental animals were observed. No delayed death of animals was noted during the observation period. In our study group, there were no significant changes in the amount of food and water consumed compared to the rats in the control group. Throughout the experiment, the dynamics of body weight growth of animals was positive.

The rates of body weight gain in groups with a mesh implant with a composite coating compared with the control group (intact animals) did not differ significantly and were not statistically significant (Table 1).

To assess the state of the internal organs, an integral indicator used in toxicology was determined, the mass coefficient (MC) - the percentage ratio of the mass of the organ to the body mass.

The analysis of this indicator in toxicological studies makes it possible to detect a toxicant in the organs, to identify signs of endocrine-related effects. The mass coefficient determines the state of the internal organs.

Table 1

Dynamics of body weight in rats after implantation of a mesh with a composite coating into the abdominal cavity.

Group of animals	Initial data (gr)	7 days	1- month	2- month	3- month	Body weight gain, %
Control group	280±0,05	288±0,05	322.5±0,05	344±0,05	355±0,05	+ 26,7
1 group acute toxicity	330±0,05	335.4±0,05	-	-	-	+ 1,5
2 group chronic toxicity	331±0,05	338.4±0,05	370,5±0,05	390±0,05	400±0,05	+ 20,8

P <0.05

From the results presented in Table 2, it follows that the introduction of a mesh implant into the abdominal cavity of rats did not lead to a significant change in the mass coefficients of their internal organs compared to control animals.

At the same time, in rats of the studied groups, a significant increase in the ratio of liver weight to body weight was established, however, the mass coefficients for the kidneys and spleen did not differ from those of intact animals, and quantitative changes were not statistically significant.

Table 2

Mass coefficients of the internal organs of rats after the introduction of a mesh implant into the upper part of the liver sac of the abdominal cavity

Organ	Groups				
	Control	Experience			
		7 days	1 -month	2 -month	3 -month
Kidneys	2,3±0,05	2,5±0,05	2,3±0,05	1,9±0,05	2,6±0,05
Spleen	0.9±0,05	1.16±0,05	1.16±0,05	0,8±0,05	1,3±0,05
Liver	9±0,05	10±0,05	11,4±0,05	9±0,05	12,8±0,05

P < 0.05

At the end of the experiment, blood samples were taken from animals from each group for morpho- and biochemical studies. Changes in morphological parameters of blood are shown in Table 3.

Table 3

Morphological parameters of the whole blood of rats after the upper part of the hepatic sac of the abdominal cavity introduced a mesh implant

Indicators	Groups				
	Control	Acute toxicity	Chronic toxicity		
			1- month	2- month	3- month
Hemoglobin	156±31.51	146,4±24.54	136,6±65.9	110±13.9	133±15.5
Erythrocytes	8.2±0.57	7,7±0.61	7,76±0.46	7±0.59	7,8±0.55
Thrombocytes	826±32.1	945,2±27.8	750±30.5	806±35.2	961±32.5
Leukocytes	5.4±0.55	7,8±0.64	9,5±0.49	7,35±0.43	7,2±0.5
Band neutrophils	1±0,2	4,8±0,35	11±0,45	14±0,68	4,6±0,3
Segmented neutrophils	15±0,2	18,2±0,36	19,6±0,4	22,5±0,65	12,3±0,15
Eosinophils	1±0,2	1±0,2	1±0,2	0	1±0,2
Monocytes	3±0,45	6,4±0,66	5,2±0,58	0	4±0,5
Lymphocytes	80±0,69	69,8±0,55	63,4±0,5	63,4±0,5	80±0,69

P > 0.05

No significant differences in hematological parameters (erythrocytes, hemoglobin, leukocytes, lymphocytes, monocytes, eosinophils) in comparison with the control group of animals were registered in acute and chronic experiments with implantation of a mesh with a composite coating in laboratory animals. The level of the studied parameters corresponded to the parameters comparable with the physiological parameters in the control group of animals.

Table 4

Biochemical parameters of blood serum of rats

Indicators	Control	Experience			
		Acute toxicity	Chronic toxicity		
			1 -month	2 -month	3 -month
ALT, U/l	43.5±2	53.6±2.8	52.8±2.5	71.5±3.3	79±3.6
AST, U/l	70±4.3	61 ± 3.5	24±1.5	24.6±1.56	26.2±1.8
Chol, mM/l	1.4±0.14	1.4±0.14	1.6±0.2	1.5±0.18	1.4±0.14
GLU, mM/l	4.4±0.4	8.6±0.66	6.6±0.5	6.2±0.49	5.9±0.45
TP, gr/l	77.5±1.46	65.9±1.25	70.7±1.34	79±1.49	76.6±1.45
BIL-T, mkM/l	6±0.5	7.3±0.66	6.4±0.52	10±0.85	6.3±0.48
BIL, mkM/l	6±0.5	7.3±0.66	6.4±0.52	10±0.85	6.3±0.48

P > 0.05

In the biochemical assessment of blood serum (Table 4), the difference in the animals of the experimental and control groups in the content of total protein, glucose, cholesterol, total bilirubin, as well as the activity of AST, ALT enzymes was insignificant, the level of the studied parameters corresponded to the parameters of the physiological norm for this type of animal.

Conclusion. According to the results of the study of acute toxicity of a mesh implant with a composite coating, toxicometry data, observation of experimental animals in the post-intoxication period of acute poisoning, as well as necropsy results were obtained, which made it possible to attribute the above-mentioned agent to the class of low-toxic drugs with a single injection. Based on the fact that a single introduction of a mesh implant into the abdominal cavity did not cause the death of animals, according to the current WHO classification, the toxicity of this drug can be classified as non-expressed. In accordance with GOST 12.1.007-76, according to the degree of toxicity, the study drug belongs to the IV class of hazard - substances of low hazard.

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OCCASIONS AND DEVELOPMENTS OF THE EMERGENCE OF PHARMACY

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Abstract. *The era of primitive society is the longest in the history of mankind. According to Professor Yu. P. Lisitsyn, it lasted hundreds of thousands of children, and the entire history of civilization in comparison is no more than one percent. The history of medicine (and pharmacy E. Elyashevich), starting with the first signs of civilization, the transition from the primitive communal to the slave system, and the formation of cities, dates back only a few thousand years. The state of pharmacy of this period was studied using archaeological methods: during excavations of burials, medicines and labor items were found, which may have been used for grinding medicinal herbs and minerals) objects of art.*

Keywords: *amulets, figurines, rock carvings of people, animals, treatment, preparation, medicines, monument, oral folk art.*

In the ancient Indian sacred book “Ayur Veda” (Science of Life) there is the following saying: “In the hands of an ignoramus, medicine is poison and, in its action, can be comparable to a knife, fire or light. In the hands of knowledgeable people, it is likened to the drink of immortality”. This idea runs like a red thread through the entire history of pharmacy and the organization of the pharmaceutical business, both in our country and abroad. It defines many of the deontological and ethical positions of the modern pharmacist. And the word “pharmacy” itself comes from the Egyptian word “pharmaki”, which means “the bestower of safety or healing.”

This is also evidenced by the inscription under the image of the Egyptian god of healing art, Thoth. From here, obviously, came the Greek word “pharmakon” - “medicine”, which then passed into all languages of the world.

The term "pharmacist" appears in Ancient Rome, starting in the 3rd century BC. This was the name given to persons involved not only in the preparation of medicines, but also in the treatment of patients. At the same time, the word pharmacology came into use - people involved in the preparation of medicines and the sale of raw medicinal materials. One of the outstanding doctors of Ancient Greece, Hippocrates (461–337 BC) formulated the basic principles of medical ethics that also apply to medicine: “Medicines and their simple properties, if they are described, you must carefully keep in mind.

From them you must learn everything that relates to the treatment of disease in general, and finally, how much and how they act in certain diseases. For this is the beginning, middle and end of the knowledge of medicines”. Modern medical deontology, considering the problems of debt and the activities of medical and pharmaceutical workers, proceeds from the specifics of their work. It covers the social and ethical aspects of responsibility, social significance, vocation, and purpose of the profession.

The same questions worried doctors and pharmacists in ancient times. Hippocrates, in his famous “Oath,” substantiated one of the main professional and moral requirements of medical deontology - to help people strengthen and protect their health, regardless of social and property status, social, national and racial background.

This “Oath” has been the main ethical document in medicine for more than 2 thousand years, and it also became the basis of the oath of pharmacists. Centuries of experience, recorded in the annals of traditional medicine, testify to the keen observation, great ingenuity and remarkable talents of the people.

Traditional medicine is the predecessor of scientific medicine and feeds it with its experience and observations. Modern doctors widely use traditional medicine such as marshmallow root, calamus root, arnica, elderberry, valerian, gentian, adonic, oak bark, elderberry, datura, sweet clover, serpentine, cranberry, viburnum, coriander, buckthorn, lavender, licorice, lily of the valley, linden blossom, flaxseed, raspberry, coltsfoot, almond, rhubarb, chamomile, etc.

The famous ancient Greek physician and thinker Hippocrates attached great importance to medicinal science. He argued that in nature, medicines are already given in a ready-made form, in an optimal state and combination. He used medicines without mixing.

Hippocrates paid special attention to herbal treatment, clearly defining the methods and conditions for their storage. Among the herbal medicines that he used were henbane, elderberry, pomegranate, melon, St. John's wort, centaury, iris, castor bean, hellebore, chilibuha, garlic, sage and others - a total of 230 plants. Of the medicinal products of animal origin, fats were especially popular: for example, sheep fat, ox fat, goose fat, duck fat, and fish oil. Metals and precious stones were used externally.

Hippocrates formulated the basic principles of medical ethics, also related to medicine: “Medicines and their simple properties, if they are described, you must carefully keep in mind. From them you must assimilate everything that relates to the treatment of the disease in general, finally, how much and in what way”. “In this way they act in certain diseases. For this is the beginning, middle and end of the knowledge of medicines”.

The development of ancient Roman medicine is directly related to the activities of the outstanding ancient Roman physician and naturalist Claudius Galen (131-201 AD). He adhered to the following principles: to treat “like with like”, “opposite with opposite”, “help nature”. In accordance with these views, medicines were used, which were divided into three classes: simple, complex, specific.

Galen introduced the concept of active substances, according to which he widely used extracts from natural materials, as well as wines and syrups, in practice. Galen described in his writings the preparation of powders, pills, lozenges, soaps, ointments, and plasters. He had a pharmacy in Rome, where he himself prepared medicines for the sick.

The thousand-year practice of using the most rational healing techniques and the most effective medicines of plant, animal and mineral origin, which arose in the era of the primitive communal system and were passed down orally from generation to generation, is called traditional medicine.

The ability to support a patient morally and spiritually, not to ignore his requests, to take care of every person who turns to a pharmacy for help - this is the high mission of a modern pharmacist.

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CHARACTERISTICS OF QUALITY TRAITS OF COTTON GENETIC COLLECTION AND THEIR INTERRELATION

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Abstract. We discuss the problems of genetic qualitative traits of the cotton *G. hirsutum* L. The regularities of inheritance and splitting in F_2 in 23 variants of joint inheritance of 9 qualitative traits are determined and it is found that within the species *G. hirsutum* L., the presence of an anthocyanin spot at the base of flower petals is controlled by two non-allelic genes with complete dominance of the presence of an anthocyanin spot and joint inheritance and cleavage in F_2 of five variants of the sign "presence - absence" of an anthocyanin spot at the base of the petals of a flower with such signs as the shape of the leaf and bracts. Plant coloration, color of flower petals, "presence - absence" of leafy nectaries are observed both trigenous and tetragenic control. In the functioning of their genes, inter-allelic and non-allelic gene interactions (polymerization) are observed.

Keywords: cotton, qualitative traits, genotype, phenotype, inheritance, genetic collection, polymeria, epistasis, genetic analysis, self-pollination, inter-allelic and non-allelic gene interactions, monohybrid and dihybrid crosses.

1. INTRODUCTION

Investigations on genetic control of number qualitative characters by means of genetic analysis of the hybrids from crossing of isogenic for these characters cotton *G. hirsutum* L. stocks are of fundamental and practical importance in cotton science.

Considerable effort has been spent earlier for such studies [1-4]. In particular, the phenotypic and genotypic characteristics of our multiple marked with the genes qualitative signal characters are given in the paper [1,5-8].

In this paper we present results of multi-years research on the study of the genetics of qualitative traits in hybrid generations, obtained using also new lines of the genetic collection in various combinations with not only monohybrid, but also their dihybrid crosses.

Unlike the earlier studies on the ordinary varieties and samples of cotton, which, due to the optional self-pollination cotton, are characterized to a certain extent by pronounced heterogeneity and heterozygosity, the results present here some novel issues.

2. MATERIALS AND METHODS

As the initial materials for the investigations, we choose the isogenic stocks with homozygous genotype and alternative phenotype for the follows qualitative characters: sympodia type, leaf shape, plant coloration, fiber coloration, bract shape, petal coloration, presence-absence of an anthocyanin pigment spot in the base of a petal, pollen coloration, presence-absence of leaf nectary's and gossypol glandules on the cotton plants. Genetic analysis was carried out on the hybrids got from monohybrid, dihybrid and polyhybrid crosses of the stocks.

As it is known, cotton on its flowering biology is not obligate but facultative self-pollinator. Therefore, the flower self-pollination both on parental stocks and their hybrids has been carrying out on the all stages of the research.

Genetic analysis of the self-pollinated progeny has been proceeding to actual revealing theoretically expected stocks with different homozygous genotype of gene alleles of abovementioned characters. We used the gene markers for these characters proposed by our predecessors and us.

3. RESULTS AND DISCUSSION

According to our investigations for genetic analysis of the hybrids got from monohybrid crosses of the isogenic stocks for qualitative characters and literature data the isogenic stocks for studied qualitative characters are obtained using the self-pollination. The selection have the following genotypes and phenotypes:

Sympodia type: non-ultimate (SS) – ultimate (ss). It inherits as incomplete dominance.

Leaf shape: okra (O_1O_1) – broad 5-lobed (o_1o_1). It inherits as incomplete dominance.

Plant coloration: anthocyan ($RpRp$) – green (rprp). It inherits as incomplete dominance.

Fiber coloration: brown ($Br^{Fr}Br^{Fr}$) – white ($br^{Fr}br^{Fr}$). It inherits as incomplete dominance.

Petal coloration: yellow (Y_1Y_1) – cream (y_1y_1). It inherits as complete dominance.

Anthocyanin pigment spot in the base of a petal: presence of an anthocyanin pigment spot ($R_2R_2R_2^1R_2^1$) – absence of the spot ($r_2r_2r_2^1r_2^1$). It inherits as complete dominance.

Pollen coloration: yellow (P_1P_1) – cream (p_1p_1). It inherits as complete dominance.

Bract shape: cordate ($FgFg$) – narrow (fgfg). It inherits as complete dominance.

Leaf nectaries: presence of leaf nectaries ($Ne_1Ne_1Ne_2Ne_2$) – absence of leaf nectaries ($ne_1ne_1ne_2ne_2$). It inherits as complete dominance.

Gossypol glandules: presence of gossypol glandules on stem and boll (Gl_1Gl_1) – absence of gossypol glandules (gl_1gl_1).

According to the research results the Genetic Collection of multiple marked with the qualitative signal genes isogenic stocks was developed.

The first stage of the research provided the creation of 16 isogenic stocks for first four alternative qualitative characters (see, Fig. 1).

On the next stage the genetic analysis with the involvement of subsequent group of stocks (5-10) with alternative phenotype and homozygous genotype of 6 alternative qualitative stocks was carried out in the broad scale. The phenotypic and genotypic characteristics of a number of isogenic multiply marked stocks are presented in Table 1 (inheritance and relationship of qualitative traits of cotton *G.hirsutum* L.).














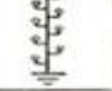








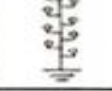

















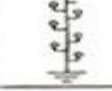


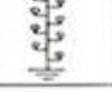




Isogenic stocks marked with genes of qualitative characters are used:


as model objects for molecular genetics, biochemical and ecological investigations;


as model objects for cytogenetic marking of chromosomes and construction of gene maps;


as valuable initial material for study of genetic correlations between marker and economic characters;


for breeding of new cotton varieties with semidominant marker characters that is favourable for seed-growing work for support of variety homogeneity.


Genotype	Phenotype			Genotype	Phenotype		
	Plant coloration and leaf shape	Symptodia type	Fiber coloration		Plant coloration and leaf shape	Symptodia type	Fiber coloration
$\frac{R_p O_2 S BrLi}{R_p O_2 S BrLi}$				$\frac{r_p O_2 S BrLi}{r_p O_2 S BrLi}$			
$\frac{R_p O_2 S BrLi}{R_p O_2 S BrLi}$				$\frac{R_p O_2 s BrLi}{R_p O_2 s BrLi}$			
$\frac{R_p O_2 s BrLi}{R_p O_2 s BrLi}$				$\frac{R_p O_2 S BrLi}{R_p O_2 S BrLi}$			
$\frac{R_p O_2 S BrLi}{R_p O_2 S BrLi}$				$\frac{R_p O_2 s BrLi}{R_p O_2 s BrLi}$			
$\frac{r_p O_2 S BrLi}{r_p O_2 S BrLi}$				$\frac{r_p O_2 s BrLi}{r_p O_2 s BrLi}$			
$\frac{r_p O_2 s BrLi}{r_p O_2 s BrLi}$				$\frac{r_p O_2 S BrLi}{r_p O_2 S BrLi}$			
$\frac{r_p O_2 S BrLi}{r_p O_2 S BrLi}$				$\frac{r_p O_2 s BrLi}{r_p O_2 s BrLi}$			
$\frac{R_p O_2 s BrLi}{R_p O_2 s BrLi}$				$\frac{r_p O_2 S BrLi}{r_p O_2 S BrLi}$			



1



2


3


4


5


6


7



8

FIG. 1. Cotton Genetic Collection for qualitative characters: 1 – okra leaf and anthocyan plant coloration; 2 - okra leaf and green plant coloration; 3 – broad 5-lobed leaf and anthocyan plant coloration; 4 - broad 5-lobed leaf and green plant coloration; 5 – brown fiber; 6 – white fiber.

The main results of the investigations on genetic control of number qualitative characters by means of genetic analysis of the hybrids from crossing of isogenic for these characters cotton *G. hirsutum* L. stocks are presented in the paper. We supported the research results of our predecessors during our investigations [2-4]. The phenotypic and genotypic characteristics of our multiple marked with the genes qualitative signal characters are given in the paper [1,5-8].

Our work is essentially a continuation and further expansion of the results of studying the genetics of qualitative traits in hybrid generations, obtained using also new lines of the genetic collection in various combinations with not only monohybrid, but also their dihybrid crosses.

TABLE 1. Phenotypic and genotypic characteristics of a number isogenic stocks from Cotton Genetic Collection

Genotype	Phenotype
RpRpr ^v _{st} r ^v _{st} in ¹ in ¹ O ₁ O ₁ SSBr ^{Fr} Br ^{Fr}	Anthocyan plant coloration; okra leaf; nonultimate sympodia type; brown fiber
RpRpr ^v _{st} r ^v _{st} in ¹ in ¹ O ₁ O ₁ SSbr ^{Fr} br ^{Fr}	Anthocyan plant coloration; okra leaf; nonultimate sympodia type; white fiber
RpRpr ^v _{st} r ^v _{st} in ¹ in ¹ O _i O _i SsBr ^{Fr} Br ^{Fr}	Anthocyan plant coloration; okra leaf; ultimate sympodia type; brown fiber
RpRpr ^v _{st} r ^v _{st} in ¹ in ¹ O ₁ O ₁ SSBr ^{Fr} Br ^{Fr}	Anthocyan plant coloration; broad 5-lobed leaf; nonultimate sympodia type; brown fiber
RpRpr ^v _{st} r ^v _{st} in ¹ in ¹ O ₁ O ₁ SSbr ^{Fr} br ^{Fr}	Anthocyan plant coloration; okra leaf; ultimate sympodia type; white fiber
RpRpr ^v _{st} r ^v _{st} in ¹ in ¹ O ₁ O ₁ SSbr ^{Fr} br ^{Fr}	Anthocyan plant coloration; broad 5-lobed leaf; nonultimate sympodia type; white fiber
RpRpr ^v _{st} r ^v _{st} in ¹ in ¹ O ₁ O ₁ SSBr ^{Fr} Br ^{Fr}	Anthocyan plant coloration; broad 5-lobed leaf; ultimate sympodia type; brown fiber
RpRpr ^v _{st} r ^v _{st} in ¹ in ¹ O ₁ O ₁ SSbr ^{Fr} br ^{Fr}	Anthocyan plant coloration; broad 5-lobed leaf; ultimate sympodia type; white fiber
rprpr ^v _{st} r ^v _{st} in ¹ in ¹ O ₁ O ₁ SSBr ^{Fr} Br ^{Fr}	Green plant coloration; okra leaf; nonultimate sympodia type; brown fiber
rprpr ^v _{st} r ^v _{st} in ¹ in ¹ O ₁ O ₁ SSBr ^{Fr} Br ^{Fr}	Green plant coloration; okra leaf; nonultimate sympodia type; white fiber
rprpr ^v _{st} r ^v _{st} in ¹ in ¹ O ₁ O ₁ SSBr ^{Fr} Br ^{Fr}	Green plant coloration; okra leaf; ultimate sympodia type; brown fiber
rprpr ^v _{st} r ^v _{st} in ¹ in ¹ O ₁ O ₁ SSBr ^{Fr} Br ^{Fr}	Green plant coloration; broad 5-lobed leaf; nonultimate sympodia type; brown fiber
rprpr ^v _{st} r ^v _{st} in ¹ in ¹ O ₁ O ₁ SSbr ^{Fr} br ^{Fr}	Green plant coloration; okra leaf; ultimate sympodia type; white fiber
rprpr ^v _{st} r ^v _{st} in ¹ in ¹ O ₁ O ₁ SSbr ^{Fr} br ^{Fr}	Green plant coloration; broad 5-lobed leaf; nonultimate sympodia type; white fiber
rprpr ^v _{st} r ^v _{st} in ¹ in ¹ O ₁ O ₁ SSBr ^{Fr} Br ^{Fr}	Green plant coloration; broad 5-lobed leaf; ultimate sympodia type; brown fiber
rprpr ^v _{st} r ^v _{st} in ¹ in ¹ O ₁ O ₁ SSbr ^{Fr} br ^{Fr}	Green plant coloration; broad 5-lobed leaf; ultimate sympodia type; white fiber
rprpr ^v _{st} r ^v _{st} In ¹ In ¹ O ₁ O ₁ SSbr ^{Fr} br ^{Fr}	Green plant coloration; integrin leaf; nonultimate sympodia type; white fiber
rprpr ^v _{st} r ^v _{st} in ¹ in ¹ O ₁ O ₁ SSbr ^{Fr} br ^{Fr}	Anthocyan stem and vein coloration; okra leaf; nonultimate sympodia type; white fiber
RpRpR ^v _{st} r ^v _{st} in ¹ in ¹ O ₁ O ₁ SSbr ^{Fr} br ^{Fr}	Anthocyan plant coloration; okra leaf; ultimate sympodia type; white fiber
rprpr ^v _{st} r ^v _{st} in ¹ in ¹ O ₁ O ₁ SSbr ^{Fr} br ^{Fr} Y ₁ Y ₁ p ₁ p ₁ R ₂ R ₂	Green plant coloration; 5-lobed leaf; nonultimate sympodia type; white fiber; yellow petal coloration; cream pollen

	coloration; anthocyanin pigment spot in the base of a petal
rprpr ^v st ^v in ¹ in ¹ o ₁ o ₁ SSbr ^{Fr} br ^{Fr} y ₁ y ₁ P ₁ P ₁ r ₂ r ₂	Green plant coloration; 5-lobed leaf; nonultimate sympodia type; white fiber; cream petal coloration; yellow pollen coloration; anthocyanin pigment spot in the base of a petal absents

4. CONCLUSION

Thus in this study we found that within the species *G.hirsutum* L. the presence of an anthocyanin spot at the base of flower petals is controlled by two non-allelic genes with complete dominance of the presence of an anthocyanin spot. The second gene of the anthocyanin spot was designated by us - R₂^{PS}. (R₂R₂R₂^{PS}R₂^{PS}).

Also, is found that in the joint inheritance and splitting in F₂ of five variants of the trait "presence - absence" of an anthocyanin spot at the base of flower petals with such traits as the shape of the leaf and bracts, plant color, color of flower petals, "presence - absence" of leaf nectaries is observed both trigenic and tetragenic control. In the functioning of their genes, inter-allelic and non-allelic gene interactions (polymerization) are observed.

As a result of the study of the patterns of inheritance and splitting in F₂ in 23 variants of joint inheritance of 9 qualitative traits, we established that in the allotetraploid species *Gossypium hirsutum* L. genetic control of a qualitative trait can have not only monogenic, but also digenic character. In their F₂ hybrids, obtained from crossing lines with different qualitative traits controlled by digeno, a complicated type of gene interaction is observed (allelic and non-allelic gene interactions - polymerization + epistasis). Moreover, depending on the genotype, according to marker characters, the parental lines in their F₂ have trigenuous and tetragenic cleavage.

The results of genetic analysis of F₂ and F_b hybrids with 23 variants of different paired combinations of the 9 qualitative traits studied by us show that they are inherited and recombined independently. Consequently, their genes are located in different linkage groups.

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HEALTH&LIFESTYLE: SLEEP, HOW IT AFFECTS OUR PERFORMANCE AS MEDICAL STUDENTS

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Abstract. *Firstly, before I delve into the subject let us understand what does it mean to be healthy and how does one's lifestyle affect a person's health. Health according to the World Health Organization (WHO) is "a state of complete physical, mental, and social wellbeing and not merely the absence of disease or infirmity". The specifics of a healthy lifestyle may vary from person to person. Generally, it will include a balance diet, physical exercise, time for family and important relationships, hobbies and downtimes, vacations and a good quality sleep. All of these must harmoniously exist to generate a sense of contentment and satisfaction.*

Keywords: *health, lifestyle, sleep, affects, performance, medical, students.*

Introduction. Sleep is known to be "the natural periodic suspension of consciousness during which the powers of the body is restored" (Merriam-Webster Dictionary). Basically, sleep is a moment where we go into a state of unconsciousness in order for the body to regenerate and rejuvenate itself. The medical profession as we all may know is highly demanding and those who are in it must be competent to tackle all the challenges it brings.

Competence requires our main cognitive center, the brain to be functioning at its best and this can only be achieved through an adequate amount of sleep. Studies have shown that humans need between 6 to 8 hours of sleep [1]. Deprivation of sleep otherwise known as insomnia, may increase the probability of health issues such as cardiovascular disease, depression, obesity, neuronal disease and other harmful health complications to occur. Statistically, it is shown that 25% of Americans suffer insomnia and 10% of adults in the USA suffer from long term insomnia and these figures are showing an increasing trend [2]. While no concrete statistical data can be brought forward to show the occurrence of insomnia in other countries worldwide, it is estimated to be between 20%-50% of the world's population. Moreover, prevalence of insomnia in medicine is fairly high and sadly it has widely been accepted that being sleep deprived is normal once you enter the medical field [3].

Now let us discuss briefly how a good night's sleep can help increase productivity and efficiency of a medical students' daily life. Studies done by scientists in humans and animals have shown that sleep plays a critical role in ensuring a rigid immune system, efficient metabolism, sharp memory, enhanced learning and a general sense of wellbeing [4] all of which is needed in order for the med student to be successful. As a medical student myself I can relate to the long sleepless nights every thriving med student endures. We need the hours to read, complete tasks and prepare ourselves for the following day of learning and practice. To reach an exceptional standard of excellence, med students who would later on graduate to become a doctor is expected to sacrifice their sleep and time to study and acquire knowledge that someday would save another person's life. However, without balance nothing can exist in peace and harmony.

As medical students we need to be able to balance our hours of studying with adequate amount of sleep to give time for our brains to recover and process the acquired information, for our body to regenerate itself removing the aches and pain it endures daily. How does sleep help us

with our learning and memory? because in the end, medicine is all about understanding and memorizing. Learning and memory has been described in terms of three steps: acquisition (gaining new information), consolidation (process by which a memory becomes stable) and recall (ability to access information voluntarily or involuntarily). These steps are essential for proper memory function. Acquisition and recall occur in the state of wakefulness, consolidation on the other hand takes place during sleep through the strengthening of neural connections formed in the brain. In addition, researchers have suggested that specific brainwaves during different stages of sleep are associated with the formation of specific types of memory [5].

The earliest sleep and memory research focused on declarative memory, which is the knowledge of fact-based information, or "what" we know (for example, the capital of France, or what you had for dinner last night). In one research study, individuals engaged in an intensive language course were observed to have an increase in rapid-eye movement sleep, or REM sleep. This is a stage of sleep in which dreaming occurs most frequently. Scientists hypothesized that REM sleep played an essential role in the acquisition of learned material. Further studies have suggested that REM sleep seems to be involved in declarative memory processes if the information is complex and emotionally charged, but probably not if the information is simple and emotionally neutral.

Researchers now hypothesize that slow sleep-wave which is deep, restorative sleep, also plays a significant role in declarative memory by processing and consolidating newly acquired information. Studies of the connection between sleep and declarative memory have had mixed results, and this is an area of continued research. Research has also focused on sleep and its role in procedural memory the remembering of "how" to do something (for example, riding a bicycle or playing the piano). REM sleep seems to play a critical role in the consolidation of procedural memory. Other aspects of sleep also play a role: motor learning seems to depend on the number of lighter stages of sleep, while certain types of visual learning seem to depend on the amount and timing of both deep, slow-wave sleep (SWS) and REM sleep.[5] Now that we have some understanding of sleep and why it plays a crucial part in our lives as medical students, let us see what happens when we are sleep deprived for extended periods of time and the consequences it may bring.

When we have been awake for a certain period, it is normal for us to lose our concentration easily, decrease in our motivation to do something, and experience an increasing difficulty to receive new information. This can be easily explained as a result of fatigue or tiredness. Being chronically tired to the point of fatigue or exhaustion means that we are less likely to perform well. Neurons do not fire optimally, muscles are not rested, and the body's organ systems are not synchronized. Lapses in focus from sleep deprivation can even result in accidents or injury. Low-quality sleep and sleep deprivation also negatively impact mood, which may hinder learning. Alterations in mood affect our ability to acquire new information and subsequently to remember that information. In the research or clinical setting, scientists measure sleepiness using a variety of methods.

After a period of sleep deprivation, there are noticeable changes in brain activity, as measured by an electroencephalogram (EEG). These changes correspond to a lower level of alertness and a general propensity to sleep. Any period of continual wakefulness beyond the typical 16 hours or so will generally lead to these measurable changes.[6] Now that we know chronic

sleep deprivation affects different individuals in a variety of ways, it is clear that a good night's rest has a strong positive impact on learning and memory.

Conclusion. To conclude, it is hoped that through this humble writing of mine and compilation of opinions and researches from various sources, we may understand our purpose, objectives and mission as medical students and more importantly realize the significance of sleep and how delicate the balance is between adequate hours of sleep we need and the amount of hard work sacrifices our noble profession demands. To put it simply, we need good amount of sleep to be able work hard and we are required to work hard to perform. It is like a cycle and we need to be aware of the components that allows the cycle to revolve properly to help us achieve our dreams of becoming a great doctor.

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CAUSES OF PNEUMONIA IN CHILDREN

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Abstract. *Pneumonia is an acute infectious inflammation of the lungs of various etiologies. The disease occurs with the appearance of cough, respiratory failure, shortness of breath, signs of intoxication. A high incidence and mortality rate in pneumonia is observed among newborns and children under 5 years of age. This article discusses the causes of pneumonia in children. Untreated pneumonia is aggravated by the development of pulmonary and extrapulmonary complications.*

Keywords: *pneumonia of children; respiratory organs; infection; treatment.*

Pneumonia in children is somewhat more severe than in adults. The reason is that their immune system is not well developed, so children's body temperature may not rise. In such cases, caution is required from parents. Also, due to the fact that mucociliary clearance in children is not well developed, a dry cough appears first, and then cases of rapid transmission of infection to the lungs are observed.

The causes of pneumonia largely depend on the age of the child. This is due to the fact that the community-acquired form can be provoked by various pathogens. At the age of 6 months, pneumonia usually occurs when a hemophilic infection, pneumococci, staphylococci or E. coli enter the child's body. In more rare cases, the disease develops due to infection with chlamydia and other bacteria during childbirth. Pneumonia can result from cystic fibrosis or immunodeficiency, as well as other pathologies. The disease often affects children after intubation and those with congenital malformations. Children from six months to 4-5 years old usually suffer from hemophilic or pneumococcal pneumonia. Very rarely, they are found to have staphylococcal infection. The etiology of inflammation of the lung tissue depends on the conditions of infection, the age of the child. Congenital pneumonia is associated with the presence in the body of herpes simplex virus type 1 and type 2, cytomegalovirus infection, pathogens of chickenpox, chlamydia. With intrauterine and hospital-acquired infection, the importance of viruses changes: group B streptococcus, Staphylococcus aureus, klebsiella, E. coli dominate. In premature infants, inflammation of the lung tissue is caused by the influenza virus, parainfluenza, and measles. The main causative agent of pneumonia in children under one year old is pneumococcal infection. Less often, inflammation is provoked by hemophilic and Pseudomonas aeruginosa, Enterobacteria, protea, Klebsiella, legionella, mycoplasmas. The infection is transmitted by airborne droplets: by breathing, coughing, sneezing. A contact-household route of infection is possible, hemocontact through blood, transplacental. Initially, pathogenic microorganisms affect the mucous membrane of the respiratory tract, disrupt the barrier function of the epithelium, increase mucus production and reduce immunological protection. All these conditions facilitate the penetration of infection in the alveoli and bronchioles. There, microorganisms begin to actively multiply, poison the body with the products of their vital activity, trigger an inflammatory process in which the lung tissue is gradually involved. When coughing, infected mucus enters other parts of the respiratory tract, which leads to the formation of new foci of inflammation.

At risk are:

- children with congenital and chronic diseases;
- HIV-infected;
- living in unfavorable living conditions;
- premature babies;
- weakened and exhausted;
- with insufficient body weight gain;
- receiving radiation or chemotherapy;
- after organ transplantation;
- long-term bed rest;
- after local and general hypothermia;
- with a psychoemotional load.

It is possible to spread the causative agent of pneumonia with blood flow from foci of chronic infection with sinusitis, carious teeth, tonsillitis. The incidence increases in the autumn-winter period. There are various viruses and staphylococcal infection, as well as viral and bacterial pathogens. If the expected result does not occur during antibiotic treatment, then the situation is serious. This is especially true for yeast infections caused by several types of bacteria. Its frequent occurrence in young children is associated with anatomical and physiological features of the respiratory system.

Because pneumonia is a long-term disease compared to SARS. In order to determine the inflammatory process in the lungs, various examinations are carried out: among them, blood, urine, S-reactive protein in the blood, procalcitonin determination, chest X-ray. Medications used for pneumonia are different and complex in nature, they are used to overcome the causes of the disease (etiotropic therapy), eliminate the symptoms of the disease (symptomatic therapy), as well as to restore the body's organ system (supportive therapy).

Most healthy children are able to fight infection with their natural defenses, but children with weakened immune systems are at increased risk of developing pneumonia. A child's immune system may be weakened as a result of malnutrition or malnutrition, especially in infants who are not exclusively breastfed. Pre-existing diseases, such as symptomatic HIV infection and measles, also increase a child's risk of developing pneumonia.

The following external factors also contribute to increasing the child's susceptibility to pneumonia:

- Indoor air pollution from the use of biofuels (e.g. wood or manure) for cooking and heating;
- living in crowded conditions;
- smoking by parents.

At the same time, a hypoallergenic diet, oxygen therapy, humidification and ventilation of the room, vitamin D, immunosink, antiviral, mucolytic and expectorant drugs, antibacterial treatment according to the instructions, drugs to improve peripheral blood circulation, such as immunoglobulin G in severe cases, are used to treat the disease. procedures are being carried out.

Pneumonia is an inflammation of the lungs, which belongs to the category of acute infectious diseases. Pneumonia can be caused by viruses, bacteria and fungi. There are also types such as aspiration pneumonia and paraneoplastic pneumonia, which develops around the center of a cancerous tumor in the lung tissue.

Some microorganisms responsible for the development of pneumonia are always present in the human body. When the level of immune protection is normal, it successfully fights such infections, with a decrease in the level of protective forces (hypothermia, primary diseases), an inflammatory process develops in the lungs. Most often, the etiology of pneumonia includes diseases of the upper respiratory tract. The inflammatory process can develop in the lungs against the background of respiratory diseases such as flatulence, tracheitis, acute or chronic bronchitis. The cause of the disease may be acute diseases of other organs and systems, complications after surgery and other factors that have a negative effect on the immune system.

Worldwide, pneumonia is the leading cause of morbidity and mortality among children under 5 years of age. Although most deaths from pneumonia in children occur mainly in developing countries, the burden of disease is significant, and there are significant health costs associated with pneumonia in developed countries. This exercise examines the causes, pathophysiology, and manifestations of childhood pneumonia, and highlights the role of an interprofessional team in its treatment. In many cases, pneumonia-related complaints are non-specific, including cough, fever, tachypnea and difficulty breathing. Small children may experience abdominal pain.

Proper nutrition, including exclusive breastfeeding during the first six months of life, is key to improving the natural protection of children. In addition to its effectiveness in preventing pneumonia, it also helps to reduce the duration of the disease in the event that the child does get sick. Eliminating external factors such as indoor air pollution (for example, by providing affordable, environmentally friendly cooking stoves) and following proper hygiene rules in overcrowded homes also contribute to reducing the number of children contracting pneumonia.

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EXPLORING THE BIOGENIC SYNTHESIS OF BRANCH-CHAIN AMINO ACIDS BY DIVERSE LACTIC ACID BACTERIA STRAINS

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Abstract. *The study focused on the capacity of indigenous strains of lactic acid bacteria to synthesize branched-chain amino acids, a pivotal factor in determining the formulation of a biopreparation designed for the prevention and treatment of obesity. Notably, within the array of strains examined, *L. casei* K7/3 demonstrated a remarkable twofold increase in branched-chain amino acid production when cultivated in MRS-bouillon medium. Specifically, there was a significant elevation in leucine content, a deficiency or absence of which in the human body can precipitate a decline in body weight, impede development and growth, and lead to metabolic disturbances.*

Keywords: *lacto- and bifidobacteria in homeostasis, "ProbiokolAWL", "LatopropolisAWL", produced by "AllWellLab" LLC, and "Probiokolit".*

The proven importance of lacto- and bifidobacteria in homeostasis and health maintenance of the human body determines the relevance of the development of new technical and technological solutions in the design of food products and biopreparations [1]. Currently, the pharmaceutical industry of Uzbekistan presents a range of domestic biologic supplements - "ProbiokolAWL", "LatopropolisAWL", produced by "AllWellLab" LLC, and "Probiokolit" (Institute of Microbiology, Academy of Sciences of Uzbekistan) [2, 3].

Achievement of the specified concentrations of bacteria in the active form leads to an increase in the mass fraction of protein in the product and changes in its amino acid composition. The accumulation of amino acids of bacterial origin is an important criterion for estimating the amount of microbial biosynthesis products - biologically active substances produced by bifido- and lactoflora [4]. The study of changes in amino acid composition and assessment of biological value of dairy fermented products with high content of probiotic microflora biomass is an actual scientific task.

The three branched-chain amino acids (BCAAs) are valine, leucine and isoleucine. They are part of the 20 amino acids the body needs to make proteins and essential amino acids. These amino acids are considered branched because they have a "branched" side chain consisting of one carbon atom and three hydrogen atoms. Supplements containing leucine can inhibit the activation of AMP-activated protein kinase (AMPK), which is a signal transducer for maintaining energy homeostasis [5].

BCAAs even in small amounts inhibit fatty acid synthesis and improve β -oxidation of fatty acids by modulating hepatic lipogenic gene expression in female broiler chickens, and this modulation is probably through the AMPK-mTOR-FoxO1 pathway [6].

Addition of glutamine (a metabolite of BCAA) to liraglutide regimen in diabetic rats enhances insulin production and hence glycemic control, which is associated with increased

expression of sodium-dependent neutral amino acid transporter-2 (which transports glutamine for insulin regulation and glucagon secretion) in the pancreas [7].

Further results show that different ratios of BCAAs can regulate synthesis, transport, oxidation, lipolysis and secretion of fatty acid adipokines, which is associated with the expression of adipose tissue function genes such as AMPK α , mTOR, silent information regulator transcript 1 (SIRT1) and peroxisome proliferator-activated receptor-G receptor coactivator-1 α (PGC-1 α) [8].

The aim of this work is to investigate the ability of local strains of lactobacilli to form branched-chain amino acids and to design bioproducts based on them for the prevention and treatment of obesity.

Quantitative analysis of branched chain amino acid (BCAA) in the culture fluid of lactobacilli by HPLC. We quantitatively analyzed 3 branched-chain amino acids (BCAAs) in the culture fluid of *Lactobacillus* strains. Uncultured MRS-bouillon medium was used as control. 50 μ l of reconstituted *Lactobacillus* culture was inoculated in 5 ml of MRS-bouillon and incubated at 37° C for 18 hours. The proteins and peptides of the test samples were precipitated by adding 1 ml of 10% trichloroacetic acid (TCA) solution to 1 ml of the test sample and further centrifugation at 8000 rpm for 15 minutes. 0.1 ml of the supernatant was lyophilically dried and free amino acid derivatives of FTC (phenylthiocarbamyl)-derivatives were synthesized according to the method described in Steven A. et al. (1988).

Identification of amino acid derivatives was carried out by HPLC. HPLC conditions: Agilent Technologies 1200 chromatograph with DAD-detector, 75x4.6 mm Discovery HS C18 column, 3 μ m. Solution A: 0.14 M CH₃COO-Na + 0.05 TEA, pH 6.4; B:CH₃CN. Flow rate 1.2 mL/min, detection at 269 nm. Qualitative analysis and quantitative calculation of the concentration of the free amino acids under study were performed by comparing the retention times and peak areas of standard and FTC derivatives of amino acids under study [9].

Quantitative analysis of the content of branched-chain amino acids (BCAAs) in the culture fluid of lactobacilli. The change in the amino acid composition of essential branched-chain amino acids for the strains under study is presented in Table 1.

The experimental results presented in Table 1 show that the change in the amino acid profile is specific for the studied consortium and for the studied *Lactobacillus* strain, which indicates the unique metabolic activity of the studied microorganisms in the fermentation process. Changes in the amino acid profile of the studied fermented systems entail changes not only in their functional properties, the study of which is difficult due to the variety of corrected functions, but also changes in the biological value of fermented products (Table 1).

The obtained results indicate that as a result of peptone fermentation in MRS-bouillon medium there is an uneven accumulation of amino acids, which are part of protein substances synthesized by microorganisms and possessing different biological value and functional effect on the organism. During fermentation, preferential synthesis of all 3 amino acids was established in the culture liquid of *L.casei* K7/3 strain.

Thus, in the culture liquid of strain *L.casei* K7/3 the content of free amino acids amounted to 2.78mg/mL, which is 2 times more than the amount of amino acids in the control medium MRS-bouillon (1.28mg/mL). In the culture fluid of strain *L.plantarum* AB-1, the content of free branched-chain amino acids was 2.01 mg/ml; the culture of *L.plantarum* ET-2 synthesized amino acids in the amount of 2.02 mg/ml. The presented data show that the amino acid composition of the cultivation medium is highly dependent on the metabolic activity of the studied strains.

Table 1

Quantitative content of free amino acids in Lactobacillus culture fluid

№	Aminoacids	Quantitative analysis (mg/mL)					
		MRS- bouillon	<i>L.casei</i> K7/3	<i>L.plantarum</i> AB-1	<i>L.plantarum</i> ET-2	<i>L.casei</i> CO1	<i>Product B</i>
1	Valine	0,26	0,44	0,42	0,40	0,31	0,25
2	Isoleucine	0,33	0,78	0,49	0,74	0,61	0,67
3	Leucine	0,69	1,56	1,10	0,88	1,01	1,22
	Total	1,28	2,78	2,01	2,02	1,93	2,14

L.casei CO1 culture synthesized BCAAs in the amount of 1.93 mg/mL, which is 1.5 times more than in the control medium.

The change of amino acid composition of the culture fluid of the strains under study due to proteolytic properties of lactobacilli is a very valuable property. The final dairy product is enriched with essential amino acids, which are very necessary for the human body.

Thus, the obtained data indicate that as a result of fermentation of MRS-bouillon by local strains of lactobacilli it is possible to obtain different amino acid composition of products with different biological value and functional properties. The difference in amino acid activity of the studied strains of lactobacilli can be expressed in the formation of functional properties of biopreparations proposed for use in the diet of athletes and obese patients. The difference in amino acid activity of the studied strains and products based on them can be expressed in the formation of different functional biocorrective properties of bioproducts produced with the use of these microorganisms, which necessitates the development and implementation of complex schemes for the use of fermented products for therapeutic purposes, taking into account the metabolic amino acid activity of different consortia.

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MEDICO-ECOLOGICAL FACTORS INFLUENCING THE LEVEL OF PHYSICAL DEVELOPMENT IN CHILDREN AT THE PRESENT STAGE

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Abstract. *In this article, the authors analyze literature data regarding the impact of medico-ecological factors on the physical development of children. An analysis of the structure of medico-ecological factors influencing the physical development of the examined children is conducted, and significant factors are identified. A considerable amount of research indicates that children living in areas with a high level of environmental pollution exhibit a low level of physical development. Moreover, their development is characterized as disharmonious. This is explained by the manifestation of protective-compensatory reactions of the body aimed at its optimal adaptation to the surrounding environment.*

Keywords: *anthropometry, height and body weight, physical development of children, medico-ecological factors.*

RELEVANCE: Physical development is an integral indicator of a child's health, reflecting the processes of growth and development in changing environmental conditions. The indicators of physical development are influenced not only by age and genetic predisposition but also by national and regional characteristics, lifestyle, environmental conditions, and the presence or absence of diseases [4,9].

A comparative assessment of the physical development of children living in conditions of sanitary and hygienic adversity in the living environment and children in relatively favorable environments has revealed that children in unfavorable conditions exhibit shorter body length compared to their peers in favorable areas. Additionally, there is a higher prevalence of variations in disharmonious physical development due to excess body weight and weight deficiency. Individual anthropometric indicators are evaluated by comparing them with age norms represented in the form of percentile growth charts or curves of standard deviations [7]. Measurements taken over time allow for determining how consistently and harmoniously a child is developing. Knowledge about a child's physical development is essential not only for correctly tracking their growth and nutritional status but also for assessing the body's ability to adapt in stressful situations (intellectual, emotional, physical, psychological). Additionally, this information is crucial for predicting future health problems, morbidity, mortality, intellectual development, work capacity, reproductive function, and the risk of chronic disease [16].

The climatic and geographical conditions of residence, which exert a pronounced influence on morpho functional indicators in children, hold particular significance. Acting on the essential functions of the body, natural factors can have both positive and negative effects. Many authors consider climate to be one of the most important natural factors influencing the growth and development of the human body, the occurrence of various developmental deviations in children, diseases, as well as the course and outcome of illnesses.

The aim of this study is to analyze works dedicated to the medico-ecological factors influencing the physical development of children and adolescents residing in different regions. Scientific papers by leading specialists in child and adolescent hygiene, focusing on medico-ecological factors influencing the formation of physical development in contemporary children and adolescents, were studied and analyzed using search electronic databases (Web of Science, PubMed, eLIBRARY, and Research Gate).

In recent years, a direct correlation has been established between morphological characteristics and the concentration of trace elements in the environment, particularly in soils. Elevated concentrations of calcium, aluminum, iron, and phosphorus in soils generally contribute to growth processes, while decreased concentrations, on the contrary, suppress them [15,20]. V.M. Meshchenko suggests that the geochemical features of each region are a significant factor determining the physical development of children, necessitating the development of zonal standards for their physical development [3].

It is generally accepted to consider the following definition of physical development: it is the combination of morphological and functional characteristics, interdependently influenced by surrounding conditions, characterizing the maturation process at any given moment in time. This definition encompasses both aspects of the concept of "physical development": on one hand, it characterizes the developmental process and its correspondence to biological age, and on the other hand, the morpho functional state at each specific point in time [4].

Physical development, in relation to environmental factors, serves as an expression of adaptive processes occurring in a child's body. The consequence of biological adaptation in humans is the geographical variability of morpho functional characteristics within human populations. Individual variability is determined by both internal factors (constitutional, hereditary) and various external factors (nutrition, living conditions, and others). Therefore, individual variability should be understood not only as hereditary plasticity, the reserve of previously accumulated resources but also as an adaptation for the better functioning of the organism in specific conditions [12].

The impact of adverse factors, especially during the intrauterine period, can lead to pronounced, sometimes irreversible disruptions in physical development. The main anthropometric indicators of newborns largely depend on the burden of the somatic and obstetric-gynecological history of the mother, especially the course of pregnancy and childbirth, and the use of medications during pregnancy [18].

Nutrition is a key factor in the harmonious physical and psychoemotional development of a child. An unbalanced diet in terms of macro- and micronutrients can lead to both immediate and delayed adverse consequences regarding the physical and intellectual status of the child, as well as a decrease in the body's resistance to aggressive external environmental factors [14]. The most severe consequences of the impact of inadequate nutrition on the physical development and health of a child are observed during their active growth period in early childhood [5, 6]. The main criteria for evaluating physical development include body weight and length (height for children over 2 years old), chest circumference, head circumference (for young children), as well as the ratio of these indicators, static functions (motor skills of the child), and timely eruption of milk teeth (for children under 2 years old) [9]. Each of these criteria, while having independent significance, cannot be a marker of the overall development of a child if considered in isolation, rather than in connection with other indicators [18]. It is considered that the most stable indicators of children's

physical development are the dynamics of weight (weight component) and body dimensions (linear component) [11].

Alongside health indicators for both individuals and the community, physical development is considered, along with the health index, as its direct integral indicator reflecting the interconnection of the organism with its surrounding environment [17]. Indicators of physical development can serve as a reliable criterion for determining the readiness of the body for educational, occupational, and sports activities. Together with other health indicators, physical development acts as a reliable marker of the adverse impact of environmental factors on the child's body, mostly of anthropogenic nature.

Anthropogenic factors are crucial exogenous elements influencing human physical development and health [2, 19]. The impact of anthropogenic factors contributes to changes in morphometric development [5,8]. Various literature sources indicate that anthropogenic pollution of the living environment increases the likelihood of forming an asthenic body type and reduces the rate of body growth and development [4,9]. The child population is particularly sensitive to the adverse effects of anthropogenic factors, which is explained by the incomplete growth and development of the child [10,17]. A significant number of studies indicate that children living in areas with high levels of environmental pollution exhibit a low level of physical development. Moreover, their development is characterized as disharmonious [22]. This is explained by the manifestation of protective-compensatory reactions of the organism aimed at its optimal adaptation to the surrounding environment [2,20]. Among all indicators of physical development, body weight shows the greatest variability. Children exhibit both low and high gradations, corresponding to the concept of increased population polymorphism under the influence of anthropogenic stress [13,11].

In polluted areas, both low and high body weights are observed in children, indicating the variability of this characteristic. The authors found that air pollution adversely affects the growth and development processes of children. Comparative assessments of the physical development of preschoolers by Russian scientists revealed that in polluted city areas, children with above-average levels of physical development are 5.41 times more likely, and children with delayed physical development are 2.63 times more likely than in areas with a favorable environment. Russian researchers [6,8] studied the physical development of first-graders in Kirov and considered gender sensitivity to environmental pollution. The authors identified that air pollution negatively influences physical development, leading to a decrease in body weight and an increase in the rate of body length growth. However, boys showed a clear decrease in anthropometric parameters, such as body length and chest circumference, with children with pronounced deviations in physical development in industrial areas being almost four times higher than in the comparison group (29.8% and 7.7%, respectively). In industrial areas, the proportion of children with harmonious physical development is lower than in favorable areas [2,8]. A comparative analysis of the physical development of school-age rural children in the Nizhny Novgorod region, living in areas with different environmental conditions, showed that boys from areas with a tense environmental situation lagged behind their peers living in favorable areas. For girls, differences in total body parameters were less pronounced, indicating their greater adaptive capabilities and ability to withstand anthropogenic loads. However, girls showed a more pronounced variation in body weight than in body length. As a result, the authors concluded that variability in body weight is a response to the influence of environmental factors [3,21].

In the question of the interdependence of indicators of physical development and the health status of children, the opinions of the authors are extremely diverse. P.N. Bashkirov [3], V.G. Vlastovsky [5], G.L. Apanasenko [6] point out that high somatometric data may not always serve as criteria for good health. At the same time, a whole range of authors note that the higher the physical development of children, the higher their resistance. V.N. Kardashenko et al. [7] and others believe that poor physical development is the primary cause of morbidity, determining elevated levels of illness. V.N. Kardashenko and co-authors, through their numerous studies [1], demonstrate that deviations in age development and the disharmony of morphological status generally coincide with deviations in health. The more significant these deviations, the more serious developmental abnormalities are diagnosed in children.

According to L.Ya. Oberg [4,18], children with both low and high levels of physical development more often experience illnesses compared to those with average levels. V.V. Shiba [6] notes that signs of health issues in response to adverse environmental factors are more detectable and pronounced in individuals with decreased physical development.

There have also been scientific publications where a lag in morphometric characteristics of physical development in modern children compared to children of previous years was observed. This trend indicates a process opposite to acceleration - deceleration (a slowed pace of growth and development of the organism) [3,19].

As the most intensive growth and development of a child occur intrauterinely, factors relevant to this period play a crucial role.

Assessment of individual anthropometric indicators is conducted by comparing them with age norms presented in the form of percentile growth charts or curves of standard deviations [10]. Measurements taken dynamically allow determining how consistently and harmoniously the child is developing. Knowledge about a child's physical development is essential not only to understand how they are growing and how well-nourished they are but also to assess the body's ability to adapt in stressful situations (intellectual, emotional, physical, psychological). Additionally, this information is necessary for predicting future health problems, morbidity, mortality, mental development, work capacity, reproductive function, and the risk of developing chronic diseases [11].

There is an ongoing debate in the scientific literature about the preferable use of regional standards or WHO norms for assessing children's physical development. Most authors support the need for developing regional standards for physical development [21].

The establishment of standards for children's physical development and their periodic updates are part of environmental monitoring, which involves observing changes in the life processes of children in response to external factors. Numerous studies indicate that children living in areas with high levels of environmental pollution show low levels of physical development, characterized as disharmonious [7,8,21]. This is explained by the manifestation of protective-compensatory reactions of the body, aimed at its optimal adaptation to the environment.

The World Health Organization (WHO) defines physical development as one of the fundamental criteria in the comprehensive assessment of a child's health. Serving as a leading criterion for the health status of the younger generation, physical development reflects changes occurring in their social, environmental, and hygienic conditions of life [18].

In conditions of unstable environmental conditions, insufficient medical support for school-age children, and an increase in non-traditional teaching methods, monitoring physical development can be more informative, indicating the influence of the mentioned factors.

Conclusion. Physical development parameters, especially weight and height, can be considered as indicators of potential pathological processes in a child's organism. A wide range of factors influences the physical development of the child population. Each of these factors, individually and collectively, may lead to deviations from normal levels of physical development, subsequently resulting in health issues for children. The most significant medico-ecological factors impacting the deterioration of children's physical development in the region manifest during the intrauterine development period and continue to exert influence throughout their growth and development. Further research is needed to explore biological factors affecting the physical development of children after birth. The obtained results underscore the necessity of implementing a system of measures aimed at preventing deviations in physical development in areas with high levels of atmospheric chemical pollution.

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CAUSES OF ANEMIA AND MEASURES TO PREVENT IT

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Abstract. *The article discusses the causes of anemia, emphasizes the significance of iron in food, and explores measures to eliminate anemia.*

Keywords: *macro-elements, anemia, red blood cells, hemoglobin, carbohydrates, proteins, fats.*

Among the micro- and macro-elements essential for normalizing vital processes in the human body, iron holds particular significance. Approximately 57% of the body's iron is contained in hemoglobin within red blood cells, 7% in the form of myoglobin in muscles, 16% in metalloenzymes found in tissues, and the remaining 20% is stored in the liver, spleen, kidneys, and bone marrow. The recommended average daily intake is 10 mg for men and 18 mg for women. Insufficient iron intake in the diet can lead to quick fatigue and weakness, resulting in a deficiency of this vital element in the body. The primary cause of these symptoms is a reduction in hemoglobin, the substance responsible for transporting oxygen and carbon dioxide in the blood, due to iron deficiency. Hemoglobin cannot be produced without an adequate supply of iron and forms the foundation of red blood cells, or erythrocytes. Each erythrocyte contains approximately 250 million hemoglobin molecules, each containing one iron atom.

Erythrocytes are living cells, continuously generated in the bone marrow and typically surviving for 90-120 days before undergoing degradation, mainly in the spleen, during which the iron they contain is released. Hence, a constant intake of iron through dietary sources is necessary for the continual formation of new erythrocytes.

According to the World Health Organization, anemia affects approximately 20% of the global population, with 80% of cases attributed to iron deficiency.

The loss of blood from the body due to various reasons results in a decrease in iron levels. This phenomenon is particularly common in women, often occurring during menstruation, childbirth, and other related events. Therefore, it is crucial to pay special attention to ensuring an adequate intake of this essential substance in the diet of women. As mentioned earlier, their daily iron requirement is twice that of men, amounting to 18 mg. Pregnant and nursing mothers, on the other hand, need an even higher intake, ranging from 33 to 38 mg.

Children born to anemic mothers are more prone to diseases, exhibit capricious behavior, and may have a weakened nervous system. Such children often experience symptoms like headaches, restlessness, hair loss, and thinning. Cases of skin cracking around the mouth edges are also observed.

In specific geographic regions, notably the southern areas of our republic, including Karakalpakstan and Khorezm, a notable and concerning prevalence of anemia among women of childbearing age has been observed. This phenomenon serves as a poignant illustration of the intricate interplay between regional factors and the health challenges faced by a significant portion of the female population in these areas.

The primary contributory factor to the high incidence of anemia in these regions is closely linked to nutritional practices, revealing a complex web of dietary inadequacies. The multifaceted

nature of this issue is illuminated by a dual challenge: the insufficiency of iron content in the consumed food and the inadequacy of iron absorption within the stomach and intestines, even when a seemingly appropriate amount is ingested.

Delving into the nutritional landscape of these regions, it becomes evident that the dietary patterns prevalent among women of childbearing age are characterized by a deficiency in iron-rich food sources. This deficiency can be attributed to both limited availability of iron-rich foods and insufficient awareness regarding the importance of incorporating such foods into their diets. As a result, the foundational need for an adequate daily intake of iron remains unmet, contributing significantly to the heightened prevalence of anemia.

Beyond the challenge of insufficient dietary iron, the absorption of the available iron within the digestive system is hampered by various factors. Despite consuming an ostensibly appropriate amount of iron, the body may not effectively absorb this essential mineral into the bloodstream. One critical element contributing to this dilemma is the insufficient presence of vitamin C, a key facilitator of iron absorption.

Vitamin C acts as a catalyst in enhancing the absorption of non-heme iron (the form of iron found in plant-based foods) from the digestive tract into the bloodstream. Its deficiency in the diet of women in these regions creates a barrier to optimal iron absorption, exacerbating the existing nutritional challenges. The article delves into the crucial role of educating these communities about the significance of vitamin C-rich foods in tandem with iron sources to maximize the bioavailability of this essential mineral.

Furthermore, the intricate dynamics of iron absorption are further complicated by the interference of certain compounds, such as phosphatides, which can exert a negative impact on the assimilation of iron within the body. The presence of phosphatides in the diet of these women may impede the efficient absorption of iron, further perpetuating the cycle of anemia.

This multifactorial perspective sheds light on the intricate challenges faced by women in these regions, emphasizing the need for a comprehensive approach to address anemia. It extends beyond merely increasing the iron content in the diet to encompass nutritional education, raising awareness about the synergistic role of vitamin C, and fostering an understanding of the impact of various dietary components on iron absorption.

Educating the population about micro- and macroelements, including iron, their dietary requirements, and sources, as well as promoting awareness of digestive processes, is crucial. This need is particularly pronounced in rural areas where people may lack knowledge about the mineral content of the products they grow and how to consume them.

A similar situation exists among urban dwellers who often rely on highly refined flour, pastries, sugar, and various desserts in their diet, which are low in iron and may contribute to anemia. It is observed that some girls, aiming for a slim figure, consume minimal amounts of iron in their pursuit of a diet consisting mainly of sweets.

Approximately 10% of the iron derived from various food products is absorbed into the blood. It is noteworthy that iron from animal meat and liver is absorbed more efficiently (10-25%) compared to iron from plant products (1%). Certain nutrients, such as milk, eggs, and bitter tea, may have a negative impact on iron absorption. In our hot climate, green tea is widely consumed for its thirst-quenching properties.

However, it is evident that green tea is often consumed for pleasure, and sometimes even young children indulge in it excessively. In such cases, the absorption of iron from the intestines

decreases from 10-12 percent to 2 percent. Therefore, individuals with low blood sugar are advised to avoid consuming bitter green tea.

The demand for iron significantly increases during pregnancy. Unfortunately, many pregnant women continue their usual eating habits, neglecting the need for iron-rich foods. As a result, 30-70 percent of pregnant mothers develop anemia due to iron deficiency, leading to complications such as miscarriages, premature births, and stillbirths. This issue underscores the importance of organizing a well-balanced diet to address this concern.

To enhance the body's absorption of iron from various food products, it is recommended to include items rich in vitamin C in the diet. For example, consuming egg yolks with parsley, chives, and other greens maximizes the absorption of iron. Fruit juices like grapefruit, orange, and lemon also facilitate iron absorption. Elderly individuals experience slower iron absorption, so their diet should include more vitamin C-rich products. Drinking a cup of “*namatak*” juice daily is beneficial for the elderly.

Iron-rich foods include beef, liver, egg yolk, whole meal bread, wheat bran, cabbage, blackberries, plums, apricots, raisins, walnuts, sunflower and pumpkin seeds, wheatgrass, beans, and peas. The iron content in wheat flour significantly decreases when separated from the bran. For instance, if 1 kg of bran flour contains 30 mg of iron, this figure drops to 8.2 mg after separation. Enriching salads with iron is easily achieved by adding wheat bran. Sugar and molasses are also iron-rich products, along with apples, pears, cherries, strawberries, and strawberries. The use of rock salt in daily food preparation is more beneficial than ordinary table salt, with 1 kg of rock salt containing 450 mg of iron.

Nettle is another plant rich in iron, widely used by doctors in treating anemia. Mixing a small amount of honey with nettle juice satisfies the body's iron needs.

Iron deficiency anemia can lead to various diseases, disrupting the body's balance, reducing gastric juice acidity, and causing atrophy of the mucous membrane in the stomach and intestines. These conditions impair the digestion of carbohydrates, proteins, and fats in consumed food, resulting in decreased appetite, bloating after eating, and a tendency to consume foreign substances like chalk and clay. Consequently, the weakened body, compounded by anemia, necessitates addressing iron deficiency through proper nutrition and appropriate treatments.

In conclusion, the intricate balance of micro- and macro-elements in the human body, with a particular emphasis on the crucial role of iron, underscores the essential nature of maintaining optimal iron levels for overall well-being. The distribution of iron within the body, predominantly in hemoglobin, myoglobin, metalloenzymes, and storage organs, highlights its diverse functions and significance in vital processes.

Insufficient iron intake poses a direct threat, leading to fatigue and weakness due to a reduction in hemoglobin, the cornerstone of red blood cells. The perpetual renewal of erythrocytes, vital for oxygen transport, underscores the perpetual need for a consistent intake of dietary iron. Globally, anemia affects 20% of the population, with a staggering 80% of cases attributed to iron deficiency, especially prevalent in women, particularly during menstruation, childbirth, and related events.

The regional disparities in anemia prevalence, exemplified in southern areas like Karakalpakstan and Khorezm, spotlight the complex interplay of inadequate nutrition, deficient iron content, and absorption challenges. Dietary patterns lacking iron-rich foods coupled with insufficient awareness exacerbate the prevalence of anemia among women of childbearing age.

Challenges in iron absorption, influenced by factors like vitamin C deficiency and the interference of compounds such as phosphatides, add layers to the complexity of the issue.

Addressing this multifaceted challenge requires a comprehensive approach encompassing nutritional education, awareness promotion, and dietary adjustments. The call for education extends to rural areas, where knowledge gaps about mineral content in locally grown products persist, and urban settings where reliance on low-iron diets contributes to anemia, particularly among girls pursuing slim figures.

While iron absorption from various foods varies, emphasizing the role of vitamin C in enhancing absorption becomes crucial. Recommendations for pregnant women, the elderly, and the general population underscore the importance of including vitamin C-rich items in daily diets. A diverse range of iron-rich foods, including meats, vegetables, fruits, and even unconventional sources like nettle, can play a pivotal role in meeting iron requirements.

The consequences of iron deficiency anemia are far-reaching, disrupting the body's balance and impairing digestive processes, leading to a host of health issues. Addressing this complex challenge requires not only dietary adjustments but also proper treatments, emphasizing the critical role of proper nutrition in maintaining a healthy body. In the pursuit of well-being, awareness, education, and informed dietary choices emerge as the key components to break the cycle of anemia and promote holistic health.

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INVESTIGATING THE IMPACT OF VEHICLE EXHAUST GASES ON AIR QUALITY AND PUBLIC HEALTH IN THE URBAN CENTERS OF CENTRAL ASIA

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Abstract. *The Central Asia region has witnessed rapid industrialization and urbanization in recent decades, accompanied by a significant increase in the number of automobiles on the roads. This surge in vehicular traffic has led to a concerning rise in air pollution, primarily attributed to the emissions from internal combustion engines (ICEs) in automobiles. This scientific article investigates the pollution and toxicity of the environment resulting from exhaust gases emitted by automobile internal combustion engines in the Central Asia region. We analyze the composition and spatial distribution of key pollutants like PM2.5 and NOx, assess their impact on human health and ecosystems, and explore potential mitigation strategies through stricter emission standards, cleaner fuels, and alternative transportation systems. Our findings aim to inform policymakers and stakeholders in developing effective strategies to combat air pollution and ensure a healthier environment for the people of Central Asia.*

Keywords: *PM2.5, PM10, pollution, air quality index, exhaust gases, engines.*

Introduction. Amidst the dramatic industrialization and urbanization transforming Central Asia in recent decades, the roar of automobile engines has become a ubiquitous soundtrack. While mobility provides economic opportunities and personal freedom, a dark side lurks beneath the hood: the toxic fumes spewing from internal combustion engines (ICEs) are silently weaving a web of environmental pollution and human health risks. This article delves into the growing concern of exhaust gas emissions in Central Asia, meticulously dissecting their sources, unraveling their impact through real-life cases, and ultimately seeking solutions to navigate a cleaner future for the region.

Vehicle ownership in Central Asia has surged by over 60% in the last decade, with an estimated 17 million cars on the roads as of 2024 [1]. In Bishkek, Kyrgyzstan, traffic congestion has become a daily nightmare, with average commute times exceeding 2 hours, leading to a 25% increase in reported respiratory issues among commuters [2].

Urban air pollution levels in major cities often exceed World Health Organization (WHO) guidelines, with PM2.5 (particles with a diameter of 2.5 micrometers or smaller) concentrations reaching up to 5 times the recommended limit [3]. Almaty, Kazakhstan, experiences frequent smog episodes, with one particularly severe event in 2022 causing a 30% spike in hospital admissions for asthma and bronchitis [4].

Vehicle ownership in Uzbekistan has almost doubled in the last decade, exceeding 4 million cars in 2024 [5]. Tashkent, the bustling capital, faces the brunt of this surge, with daily traffic jams contributing to an alarming rise in PM2.5 levels. In a recent health study, residents

living near major intersections were found to have 40% higher rates of respiratory problems compared to those residing in green zones. Respiratory illnesses linked to air pollution account for an estimated 10% of all deaths in the region, costing billions of dollars in healthcare expenses annually. In Tashkent, Uzbekistan, lung cancer rates have risen by 15% in the last 5 years, with a significant proportion of cases attributed to air pollution exposure [6].

Ecosystems in the Tian Shan mountains and other sensitive areas are experiencing acidification and biodiversity loss due to exhaust gas deposition. In the Aksu-Zhabagly Nature Reserve in Kazakhstan, scientists have documented a decline in lichen diversity by 30% over the past decade, with exhaust gas pollution identified as a major contributor.

Sources of Pollution. For every gallon of gasoline burned in a car, only a measly 15% translates into forward motion. The remaining 85% evaporates as heat, noise, and a toxic cocktail of fumes that choke our cities and poison our lungs. This startling inefficiency not only drains our wallets, but also fuels a silent environmental crisis that demands immediate attention.

Instead of efficiently converting fuel into movement, a car's engine operates like a rogue chemical factory. It's hot, chaotic chambers churn out a toxic cocktail of substances, from fine particulate matter that chokes our lungs to nitrogen oxides that scar our ecosystems. This invisible output casts a long shadow on our health and well-being. Common pollutants include carbon monoxide (CO), nitrogen oxides (NO_x), particulate matter (PM), unburned hydrocarbons (CH), and volatile organic compounds (VOCs). The most direct source of pollution is the tailpipe of vehicles, where exhaust gases are emitted into the atmosphere [7].

The combustion process in internal combustion engines involves the intake of air from the atmosphere, and nitrogen, which makes up the majority of the Earth's atmosphere (approximately 78%), is present in significant amounts. While nitrogen itself is generally inert and harmless, the high temperatures and pressures inside the combustion chamber can lead to the formation of nitrogen oxides (NO_x), which are pollutants with environmental and health concerns.

Many vehicles in the Central Asia region lack proper emission controls, releasing high levels of harmful pollutants like PM_{2.5} and PM₁₀.

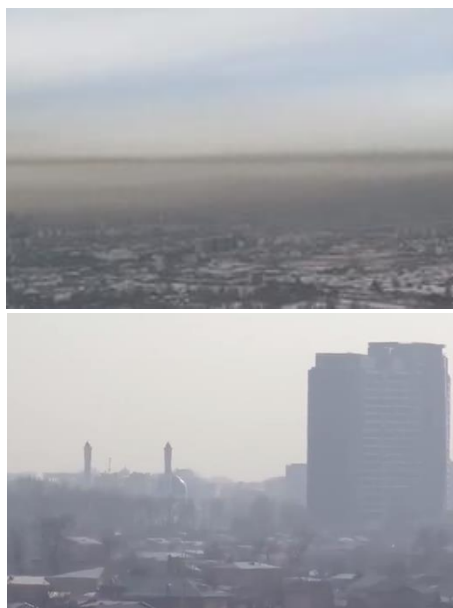


Fig. 1. Polluted air of Tashkent, beginning of December, 2023.

Beyond a simple mix of fumes, exhaust gases are a chemical cocktail of over 170 harmful compounds, 160 of them born from the engine's struggle to fully burn its fuel. This incomplete

combustion, far from a minor hiccup, unleashes a torrent of toxins, each with the potential to harm our health and environment.

Industrial processes, such as mining, metalworking, and construction, can generate significant amounts of PM10 through dust emissions and incomplete combustion of fuels. Coal-fired power plants are another major source of PM10, releasing fine particulate matter along with other pollutants.

Central Asia's arid climate and surrounding mountain ranges create conditions conducive to windblown dust storms, significantly impacting PM10 levels.

The Tashkent city's enclosed location within a valley can trap pollutants, hindering their dispersal and leading to higher concentrations of PM10. Traffic congestion and industrial activity within the city limits are significant contributors to local PM10 levels.

Table 1. Fuel consumption and emissions of transport system by sectors [7]

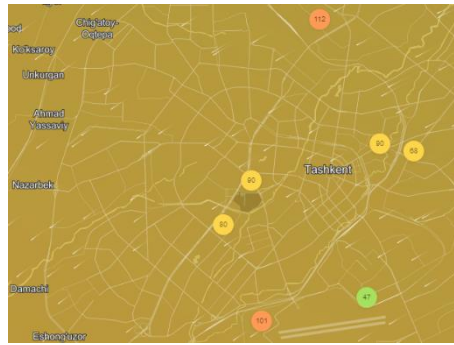
Type of transport sector	Share from total transport system, %	Fuel consumption		Release of exhaust gases into the atmosphere	
		%	million tons	%	million tons
Automobiles	50	56,5	65	71,3	21,7
Aviation	2	1,2	1,4	0,7	0,2
Agricultural and forestry machinery	20	23,5	27	17,8	5,4
Railway transportation	16	11,0	12,6	6,3	1,9
River transportation	8	5,9	6,8	2,6	0,8
Road construction transport	4	1,9	2,2	1,3	0,4
Total:	100	100	115	100	30

While 2019 recorded an 'unhealthy for sensitive groups' average of 41.2 $\mu\text{g}/\text{m}^3$, placing Tashkent at 219th globally, 2022 witnessed a concerning jump to 76 $\mu\text{g}/\text{m}^3$, solidifying its position as a city grappling with severe air pollution [8]. The 2019 data served as a wake-up call, and despite some initiatives, Tashkent's air quality has tragically worsened in 2022. This escalating trend underscores the urgent need for decisive action to safeguard public health and prevent further deterioration.

Examining the pollution data for the year 2019 in Tashkent reveals a distinct seasonal pattern in PM2.5 levels. The period from June to December stands out as having significantly higher pollution readings compared to other months. April emerges as the cleanest month with a PM2.5 reading of 19.9 $\mu\text{g}/\text{m}^3$. Although May data is missing, June marks a substantial increase in pollution, recording a PM2.5 level of 36 $\mu\text{g}/\text{m}^3$ [8].

From June onwards, pollution levels remain consistently high, showing incremental increases. July to December reports readings of 48.7 $\mu\text{g}/\text{m}^3$, 47.3 $\mu\text{g}/\text{m}^3$, 44.8 $\mu\text{g}/\text{m}^3$, 40.7 $\mu\text{g}/\text{m}^3$, 75.5 $\mu\text{g}/\text{m}^3$, and 39.1 $\mu\text{g}/\text{m}^3$, respectively. Notably, November stands out as the most polluted month of the year, falling into the 'unhealthy' category with a PM2.5 reading ranging from 55.5 to 150.4 $\mu\text{g}/\text{m}^3$. This signifies that the air during this period is extremely harmful to exposed individuals [8]. In summary, the months from June to December represent a period of heightened smoke, haze, and pollution levels in the air.

Around half of all anthropogenic emissions released into the atmosphere are organic



pollutants originating from surface vehicles. This includes not only the well-known exhaust gases, but also emissions from mechanical parts and tires, such as particulate matter from brake and tire wear, volatile organic compounds from tire off-gassing and fuel evaporation, and even harmful chemicals released from melting asphalt during hot weather. These non-exhaust emissions significantly contribute to smog formation, air quality concerns, and potential health risks.

Fig. 2. Air quality in Tashkent as Mid-January, 2023

According to the WHO, the annual average PM_{2.5} concentration in Tashkent, Uzbekistan, was 71 $\mu\text{g}/\text{m}^3$ in 2021. This exceeds the WHO's safe guideline of 5 $\mu\text{g}/\text{m}^3$ by a staggering 14 times. The most polluted months in Tashkent are typically November and December, with PM_{2.5} levels often exceeding 150 $\mu\text{g}/\text{m}^3$.

Exhaust gas emissions from internal combustion engines (both gasoline and diesel) are the most studied. In addition to nitrogen (N), oxygen (O), carbon dioxide (CO₂) and water, these emissions also include harmful substances such as carbon monoxide (CO), hydrocarbons, nitrogen and sulfur oxides, oil and gas particles, and solid nanoparticles.

Further adding to the noxious bouquet are solid wastes like lead and soot, microscopic carriers of danger. These particles not only irritate the respiratory system but also act as magnets, attracting and harboring cyclic hydrocarbons, some of which possess carcinogenic properties.

The fate of exhaust gas emissions is not a uniform one. Unlike their invisible gaseous counterparts, solid emissions paint a contrasting picture. Larger particles, exceeding a micron in diameter, become unwelcome guests on plants and soil near the emission source. They accumulate in the upper soil layer, potentially disrupting ecosystems and jeopardizing nearby organisms. Meanwhile, their smaller brethren, nimble particles less than a micron wide, take flight. They join the air masses, forming aerosols that can hitchhike on the wind, spreading the air pollution burden far beyond the immediate vicinity of the engine's roar. This contrasting distribution pattern underscores the diverse risks posed by exhaust emissions, demanding solutions that tackle both localized ground-level concerns and the specter of long-range pollution.

While there is overlap, gasoline and diesel engines have distinct emission profiles. Diesel engines typically emit more particulate matter (heavy metals (lead, chromium)) and nitrogen oxides (about 50%), while gasoline engines emit more hydrocarbons. CO₂ accounts for about 70% of gasoline exhaust gases, fine particulate matter (PM_{2.5}), black carbon and PAHs, ethers, and aldehydes.

Impact on Air Quality and Human Health. Carbon monoxide is silent killer binds with hemoglobin in our blood, starving our organs of oxygen and leading to respiratory problems, headaches, and fatigue. Unburned fuel molecules hydrocarbons contribute to smog formation, reducing visibility and further impacting air quality. Specific types like volatile organic

compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs) pose health risks and increase cancer risks. Reactive gases like nitrogen oxides (NO_x) play a key role in the formation of ozone (O₃), a major component of smog, and contribute to acid rain, damaging ecosystems and infrastructure.

Released primarily by diesel engines, sulfur oxides irritate the respiratory system and contribute to acid rain. Oil and gas particles: these tiny droplets and particles, including some in the ultrafine range, penetrate deep into our lungs, causing respiratory problems and potentially cardiovascular issues. Solid nanoparticles are microscopic particles, often containing metals like copper and zinc, can trigger inflammation and pose long-term health risks.

The harmful chemical elements and compounds present in exhaust gas emissions from cars and other vehicles are highly likely to contaminate our environment, permeating the soil, plants, and even irrigation water. These toxins can accumulate in various crops like radishes, tomatoes, cucumbers, and potatoes, ultimately entering the food chain through animals that graze on vegetation or drink contaminated water. As these toxins bioaccumulate, they pose significant risks to human health, potentially leading to diseases or developmental problems. The animal world, providing us with milk, meat, and other products, becomes an unwitting carrier of these harmful elements, highlighting the urgent need for cleaner solutions to protect our environment and our health.

The ingestion of water, grass, vegetables, and fruits by the animal kingdom results in the incorporation of various chemical elements, including potentially toxic substances. The animal world, in turn, serves as a primary source of nutrition for humans through the provision of milk, meat, and other derived products. Notably, these animal-derived consumables may contain residues of toxic chemical elements and harmful gases originating from the combustion of fossil fuels in vehicles, such as gasoline and diesel emissions.

Humans, both adults and children, consciously and affectionately incorporate these animal-derived products into their diets. However, the environmental safety and suitability of milk, meat, and related consumables for human consumption remain uncertain. The transfer of toxic substances from the environment to animals and subsequently to humans raises concerns regarding the potential health implications associated with the consumption of such products. The assessment of the environmental impact and the establishment of guarantees regarding the safety of these consumables warrant comprehensive scientific investigation and regulatory oversight.

Environmental and Ecological Consequences. The increasing prevalence of internal combustion engine vehicles, especially in the context of the growing number of vehicles in Uzbekistan, raises deep concerns regarding its environmental consequences. When fossil fuels are burned in vehicles, they release a variety of pollutants, including nitrogen oxides, particulate matter and volatile organic compounds. Long-term exposure to these pollutants can cause poor air quality, leading to respiratory disease, cardiovascular disease, and other adverse health effects in both humans and animals.

Emissions of greenhouse gases such as carbon dioxide from vehicle exhaust also play an important role in exacerbating global warming and climate change. This phenomenon has far-reaching environmental consequences, including changing weather conditions, rising temperatures, which have a negative impact every year and disruption of the Central Asian ecosystem.

Increased vehicle activity can lead to habitat fragmentation and destruction, posing a direct threat to native flora and fauna. Habitat fragmentation can impede the movement of wildlife populations, disrupt ecological balances, and contribute to the extinction of some species.

Vehicle emissions can lead to the deposition of pollutants onto soil and water bodies. This contamination can have adverse effects on soil quality, affecting agricultural productivity, and can also lead to the contamination of water sources, impacting aquatic ecosystems and posing human health risks through contaminated drinking water.

Another important point is that the increased presence of vehicles contributes to increased noise levels, which negatively affects both the urban and natural environment. Noise pollution can disrupt wildlife behavior, interfere with communication between species, and negatively impact the overall health of ecosystems. The environmental consequences of increased vehicle emissions are closely linked to public health. Respiratory disease, cardiovascular disease and other health problems may become more common, especially in urban areas with heavy traffic.

Dependence on fossil fuels for transport contributes to the depletion of non-renewable resources. The transition to sustainable and renewable energy sources is critical to mitigating these impacts and ensuring a more sustainable future.

If left unmitigated, this trajectory of increasing vehicular emissions could engender an ecological landscape in which the toxicity and carcinogenicity of the environment reach perilous levels. Urgent and comprehensive interventions are imperative to curb this trajectory and institute sustainable practices in transportation. Such measures may include the promotion of electric vehicles, the enhancement of public transportation systems, and the implementation of stringent emissions standards. Proactive efforts in this regard are crucial for averting the impending environmental crisis and safeguarding the health of both the human population and the broader ecosystem in Uzbekistan.

A single car engine emits a substantial number of pollutants annually, contributing to environmental air pollution. The emissions from this engine include 800 kg of carbon monoxide (CO), 40 kg of nitrogen oxide (NO_x), and 200 kg of various hydrocarbons. Carbon monoxide is particularly concerning due to its high toxicity [9].

In environmental standards, the permissible concentration of carbon monoxide in atmospheric air is set at a level that should not exceed 1 mg/m³. This limit is established to safeguard human health and prevent adverse effects associated with exposure to elevated levels of carbon monoxide, which can be harmful, especially in enclosed spaces or areas with poor ventilation.

The seemingly harmless act of starting your car in a closed garage can quickly turn deadly. Within just 2-3 minutes, the concentration of carbon monoxide in a single-car garage can soar to a perilous 1.5% to 4%, enough to induce fatal poisoning

Lurking around traffic lights are silent threats in the form of carcinogenic hydrocarbons, found in car exhaust gases at alarming levels – up to 6.4 µg/100m³, three times higher than in quieter areas [9]. These invisible dangers pose a significant risk of cancer, respiratory problems, and other health issues. This isn't limited to traffic lights; busy intersections and tunnels are equally concerning. We can't ignore this silent epidemic. Let's prioritize public transportation, embrace electric vehicles, and demand stricter emission standards. It's time to clear the air for a healthier future.

In urban settings characterized by confined spatial configurations, e.g., streets with limited width, surrounded by tall structures and vegetation, the dispersion of vehicular emissions faces substantial impediments. The intricate interplay of topographical and structural elements, including buildings and trees, exacerbates the confinement of air masses, hindering the efficient dissipation of pollutants. This spatial confinement fosters the localized accumulation of pollutants, significantly impacting the air quality experienced by urban inhabitants.

The occurrence of temperature inversions, typified by the entrapment of cooler air near the surface beneath a layer of warmer air aloft, further complicates pollutant dispersion dynamics. In such scenarios, vertical mixing of air masses is restricted, leading to the trapping of pollutants at ground level. These conditions are particularly pronounced during periods of atmospheric calmness or when winds are weak, ranging from 1 to 4 meters per second.

Mitigating these atmospheric challenges necessitates a comprehensive approach to urban planning and air quality management. Strategies may encompass urban design interventions that optimize spatial layouts to enhance air circulation, emission reduction initiatives targeting vehicular and industrial sources, and the implementation of stringent emission standards. Additionally, the integration of real-time air quality monitoring systems and early warning mechanisms can facilitate timely interventions during periods of heightened pollution.

For instance, an urban area might experience a 30% increase in pollutant concentrations in narrow streets due to restricted dispersion. Temperature inversion events could lead to a threefold rise in pollutant concentrations during 75% of calm or weak wind periods (1 to 4 m/s). Implementation of emission reduction measures could potentially result in a 20% reduction in overall pollutant levels in affected areas.

Public awareness campaigns and community engagement initiatives remain pivotal, aiming to foster a collective commitment to sustainable practices and emissions reduction. The establishment of numerical targets for emissions reduction, such as a 25% decrease in vehicular emissions over a defined timeframe, could serve as measurable objectives for urban air quality improvement.

Proposals for Reducing Pollution and Toxicity of Automobile Exhaust Gases. In order to reduce the pollution of atmospheric air with exhaust gases, it is of great importance to carry out daily technical control of the condition of the internal combustion engine of the car. All car companies are obliged to check and ensure the technical adjustment of their vehicles. In cases where the engine is tuned and well regulated, it is observed that the amount of carbon oxides in the exhaust gases does not exceed the permissible standards. In many cases, the low level of maintenance of ground vehicles and the general lack of mandatory technical control over their condition leads to breakdowns of car joints and systems.

Consequently, automobiles exhibiting a marginal deviation from established emission norms for their respective classifications contribute to the compromised efficacy of diligently implemented measures aligned with automotive industry standards. In certain instances, these deviations render such measures ineffectual, undermining the overarching objective of achieving stringent regulatory compliance and environmental responsibility within the automotive sector. Ensure that all vehicles undergo regular and mandatory emissions testing to ensure they meet established environmental standards. This testing should include testing for the presence of carbon oxides, nitrogen oxides, particulate matter and other contaminants. Strengthen regulations related to vehicle emissions and ensure strict enforcement to punish non-compliance. This includes both

manufacturers and vehicle owners. Conduct public awareness campaigns to educate vehicle owners about the importance of regular maintenance and emissions testing. Encourage a sense of responsibility for the environmental impact of their vehicles. Provide incentives, such as tax breaks or discounts on registration fees, for vehicle owners who regularly maintain their vehicles and meet emission standards.

Promote collaboration between government agencies and automobile manufacturers to ensure that vehicles are designed with environmental impact in mind. This includes developing engines that are more fuel efficient and emit fewer pollutants. Investing in research and development of clean, emissions-reducing vehicle technologies such as advanced catalytic converters, hybrid systems and alternative fuels.

Establishing and enforcing strict inspection protocols for vehicle maintenance facilities to ensure they adhere to quality standards and conduct thorough inspections during routine maintenance.

Implement a system for monitoring and reporting vehicle emission levels on the roads. This can be achieved through roadside sensors, periodic inspections and reporting mechanisms that allow authorities to identify and eliminate high-emitting vehicles.

Promote and invest in clean transport alternatives such as electric vehicles and public transport to reduce overall dependence on internal combustion engine vehicles.

In our republic, there exist two categories of standards governing the permissible levels of harmful substances in automobile exhaust emissions, each accompanied by distinct detection methodologies. The first category comprises state standards universally applicable to concurrently active vehicles, thereby encompassing the entire vehicular fleet within the republic. Specifically, GOST 17.2.2.03-87 titled "Nature Protection. Atmosphere. The Content of Carbon Monoxide in the Exhaust Gases of Cars with Gasoline Engines. Standards and Determination Methods" delineates standards and methodologies for assessing carbon monoxide levels in the exhaust emissions of cars equipped with gasoline engines.

Concomitantly, GOST 17.2.2.01-84 titled "Nature Protection. Atmosphere. Car Diesels. The Smokiness of the Exhaust Gases. Standards and Measurement Methods" elucidates standards and methodologies pertinent to the assessment of exhaust gas smokiness emanating from automobiles equipped with diesel engines.

These standards collectively serve as regulatory frameworks, establishing benchmarks for permissible emission levels and stipulating the requisite techniques for their precise determination, thereby contributing to the overarching objective of environmental conservation and air quality maintenance within the automotive sector.

The second category comprises the "Uzavtosanoat" network standards, specifically designed for new products. These standards delineate a framework for verification during acceptance and control tests conducted at manufacturing enterprises producing waste gases from spark-ignition car engines, as well as truck and bus engines within the weight range of 400 kg to 3500 kg.

Under these standards, the manufacturing company assumes the responsibility of determining the quantity of cars (including engines and related components) subjected to control tests. It is noteworthy that this determination is contingent upon the assurance that all manufactured products consistently adhere to the prescribed standards. This approach underscores

a commitment to rigorous quality control measures, ensuring that the entire spectrum of produced vehicles and components complies with the stipulated emission standards.

In essence, the "Uzavtosanoat" network standards for new products embody a comprehensive quality assurance mechanism, integrating control tests as a pivotal component within the manufacturing process to ascertain and affirm adherence to established environmental and emissions standards.

Achieving compliance with ecological requirements involves the implementation of structural modifications and a suite of interconnected measures. Central to this endeavor is the regulation of fuel and motor oil composition, considering both the inherent characteristics and external factors associated with their utilization. In pursuit of enhanced environmental compatibility, a judicious shift towards motor oils characterized by low sulfur and aromatic hydrocarbon content is recommended.

The impact of fuel and oil products on the environment, particularly in the context of fuel and lubrication systems of engines, raises concerns due to their potential to contribute to atmospheric pollution. When these products are produced and utilized in a conscientious manner, there exists the potential to minimize environmental damage significantly. This responsibility extends to all stakeholders in the automotive domain, from informed specialists to drivers and private vehicle owners, regardless of whether their vehicles are powered by gasoline or diesel fuel. It is crucial to emphasize that adherence to permissible norms of pollutants, such as carbon monoxide, and the reduction of smoke emissions not only mitigate atmospheric air pollution but also hold the potential for substantial fuel and oil conservation. Despite the awareness of these benefits, a notable challenge persists in the insufficient dedication of responsibility by individuals, including automotive managers, drivers, and private car owners, toward implementing and upholding these standards.

Failure to earnestly follow and enforce these norms can indeed be considered a matter of concern, akin to an environmental transgression. The consequences extend beyond human health, affecting the well-being of animals and the broader ecosystem. In this context, neglecting environmental standards may be regarded as a form of negligence or even, in some perspectives, as a form of environmental harm against the plant world.

To address this, comprehensive efforts are required, encompassing education, awareness campaigns, and robust enforcement of environmental regulations. Encouraging responsible practices in the production and use of fuel and oil products can not only mitigate environmental damage but also foster a sustainable approach that harmonizes with the needs of both society and the planet.

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CHARACTERISTICS OF AGRONOMIC VALUABLE TRAITS AND CORRELATION BETWEEN THEM IN THE L-53 BREEDING LINE LONG STAPLE COTTON G. BARBADENSE L

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Abstract. *The article provides a description of the main agronomic valuable traits of the promising L-53 line. Correlation analysis revealed the interactions between agronomic valuable traits, making it possible to accelerate the selection efficiency when creating new varieties. A negative correlation was established between the fiber output with a weight of 1000 seeds and the length of the fiber.*

Keywords: *Uzbekistan, cotton, lines, a raw cotton weight of one boll, fiber output, fiber length, correlation.*

Introduction. Under conditions of increased continentality of the climate across most of Uzbekistan, it is particularly relevant and important to breed cotton varieties that are resistant to abiotic and biotic stress factors in the environment, which will make it possible to obtain high yields of cotton with high fiber quality. A large potential for increasing yields lies in the creation and introduction of varieties with high yield potential and high quality products that are resistant to damage by dangerous diseases and pests [1]. Due to altering requirements for varieties and the level of development of agricultural production, the process of creating a variety requires continuous adjustment. Pryadun Yu.P. determined the parameters of variety modeling, based on the study of a range of collection and breeding material of released varieties, the economic, morphological and physiological characteristics of spring barley in various zones of the Chelyabinsk region. Relationships between productivity and elements of its structure were established [2].

For a more complete implementation of the yield potential of varieties in the selection process, it is necessary to highlight the elements of the structure of the variety's yield. Cereals have several elements of crop structure, which are formed sequentially one after another during ontogenesis and show a seasonal trend, which is noticeable when environmental factors favorably influence their formation. These elements include such characteristics as tilling, the number of ears, the number of grains and the mass of the grain in an ear. At the first stage of breeding for the creation of a variety model, that takes into account the implementation of its genetic potential within the environmental conditions of the region for which the variety is intended, a targeted search for the source material is required [3].

V.N. Gudzenko et al. recommend carrying out the evaluation of breeding material at the final stage of breeding, under the interactions of a stable manifestation of yield with other economically valuable traits, in a differentiated manner, according to the changing conditions of the years of testing [4]. According to I.N. Shchennikova, obtaining consistently high yields of spring barley grain can only be ensured by varieties that fulfill, at least, three basic requirements: successfully withstand adverse (extreme) impacts of external factors; utilize favorable environmental conditions with maximum efficiency; have high potential productivity [5].

Variety modeling entails not only theoretically substantiating the achieved breeding results, but also substantiating a completely new model for specific soil and climatic conditions, and proposing practical ways for its implementation [6]. The development of an ideal variety model allows the breeder to more efficiently and economically create varieties that are as close as possible to ideal varieties [7, 8].

Results of a study by Usmanov S.A. et al. showed that the genetic groups studied by them are characterized by rather high rates of raw cotton weight of one boll, fiber output and fiber length. An analysis of the population of the studied genetic groups suggests that the use of these genetic groups will make it possible to obtain breeding material with high rates of raw cotton weight of one boll and fiber output [9].

Long-staple cotton has a high agronomic profitability of cultivation. Growing long-staple cotton is much more profitable than medium-staple cotton [10]. It is known from literature data that hybrid offspring may have the most diverse combination of traits, depending on the selection of the initial material. In this regard, a genetic analysis of the forms involved in the selection process is necessary.

Methods. In 2021-2022 in the Tashkent region, a comparative study of the genetic group of the long staple cotton line L-53 was carried out. Seeds of this line have distinctive white downs on the seed micropyle. Sowing was carried out according to the scheme 60x30-1. The research was carried out on the basis of methodological materials for conducting field experiments: “Styles of conducting field experiments” [11]. Statistical processing of the obtained digital material was carried out according to Dospekhov [12] using the Microsoft Excel software package.

Results and discussions. The soil and climatic conditions of the Tashkent region differ significantly from the conditions of the Surkhandarya and Kashkadarya regions, where long staple cotton was traditionally grown. The creation of new breeding materials characterized by precocity, allows for the expansion of the area of cultivation of this type of cotton in almost the entirety of the Republic of Uzbekistan. The varieties of long staple cotton grown at present have a small raw cotton weight of one boll and a fiber output. To increase the profitability of growing varieties of long staple cotton, it is necessary to increase the values of these traits.

Table 1 presents the characteristics of agronomic valuable traits and the correlation coefficients between them. From the data presented, it can be seen that the average raw cotton weight of one boll in 2022 was 4.3 g. The limit of variability of this trait in 2021 was in the range of 3.8-4.5g, and in 2022; an expansion of the limit of variability of the raw cotton weight of one boll of 3.1-5.5g was noted. It should be particularly noted that in 2022, the number of plants with a raw cotton weight of one boll of more than 4.0 g amounted to 72% of the total number of plants studied.

The average fiber output did not have significant differences depending on the year of cultivation and amounted to 35.1-35.5% with a variability limit of 31.9-40.9% in 2021 and 32.0-40.6% in 2022. The study of the variation series of this indicator showed that in 2022 year, 48.6% of plants had a fiber output of more than 36.0%.

A slight increase in the weight of 1000 seeds in 2022 year was observed. The average weight of 1000 seeds, depending on the year of study, was 128 and 135 g. The limit of variability of this trait in 2022 year was wider and amounted to 104-158g. The raw cotton weight of one boll trait is closely related to the trait of the weight of 1000 pieces of seeds, which is clearly seen both in terms of average values and in terms of the variability limit of these traits.

Table 1

**Characteristics of agronomic valuable traits and correlation coefficients of the L-53 line
(2021-2022 year)**

agronomic valuable traits (average per plant)		2021	2022
	raw cotton weight of one boll, g	Limit of variability	4,1±0,05 3,8-4,5
fiber output, %	Limit of variability	35,1±0,55 31,9-40,9	35,5±0,16 32,0-40,6
weight of 1000 seeds, g	Limit of variability	128±2,27 111-145	135±0,74 104-158
fiber length, mm	Limit of variability	40,2±0,26 38,2-42,4	41,2±0,10 38,0-44,0
correlation coefficients between traits	raw cotton weight of one boll – fiber output	-0,31	0,07
	raw cotton weight of one boll – weight of 1000 seeds	0,24	0,18
	raw cotton weight of one boll – fiber length	0,81	0,11
	fiber output – weight of 1000 seeds	-0,53	-0,44
	fiber output – fiber length	-0,76	-0,20
	weight of 1000 seeds – fiber length	0,41	0,13

The average fiber length in 2022 year was 1 mm higher compared to 2021 year, with a variability limit of 38.0-44.0 mm. In 2022 year, 58.9% of the plants studied had a fiber length of more than 41.0 mm.

When working with breeding material, it is very important to know the correlation dependence of the main agronomic valuable traits. In the data presented in table 1, we see that in 2021 year there was a moderately negative relationship between the characteristics of the raw cotton weight of one boll and the fiber output. In 2022 year, this dependence was insignificant, in the studied plants. This indicates a correctly conducted selection among plants grown in 2021 year. A slight dependence of 0.18-0.24 was noted between the traits of the raw cotton weight of one boll and the weight of 1000 seeds, and the indicators of the correlation coefficient between the traits of the raw cotton weight of one boll and fiber length decreased significantly in 2022 year, from a weak to a high degree in 2021 year. This can also be justified by the result of the selection work in 2021 year. Among the traits, the output of the fiber observed a moderate level of a negative relationship, in the range of -0.44 - -0.53. Between the traits of fiber output and fiber length in 2021 year, a highly negative relationship was noted, and in 2022 year, this value decreased significantly, amounting to -0.20. There was also a decrease in the dependence of the weight of 1000 seeds and fiber length from a moderately positive level in 2021 year to a low positive level in 2022 year.

Conclusions. Based on the analysis of the research results, a slight increase in the average values of the main agronomic valuable traits of the population of the L-53 line, and in particular the raw cotton weight of one boll and the length of the fiber, was observed. According to the results of studies conducted in 2022 year, a significant number of plants with high rates of agronomic valuable traits, with a marked breeding value, were identified. The results of the correlational

studies showed the need for such studies when working on breeding material. The decrease in the values of negative correlations between the agronomic valuable traits makes it possible to select plants with a set of traits to create competitive varieties and donors of long staple cotton.

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RESULTS OF TREATMENT OF PARTIAL OPTIC NERVE ATROPHY OF VARIOUS ORIGINS IN CHILDREN

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Abstract. Despite the modern advances in ophthalmology, low vision, blindness and visual impairment remain at a fairly low level. So, according to WHO, about 150 million people in the world suffer from visual disorders, including 43 million who are completely blind. It should also be noted that over the last more than 20-year period, the number of untainted people has increased by 12 million people.

Keywords: optic nerve, metabolic disorders, retinopathy of prematurity, head injury.

Introduction. Despite the modern advances in ophthalmology, low vision, blindness and visual impairment remain at a fairly low level. So, according to WHO, about 150 million people in the world suffer from visual disorders, including 43 million who are completely blind. It should also be noted that over the last more than 20-year period, the number of untainted people has increased by 12 million people.

Among the main causes of irreversible vision loss and the development of blindness, pathology of the optic nerve occupies one of the leading places. Patients with this pathology account for an average of 19-20% of the blind population. Primary disability as a result of optic nerve atrophy, as a consequence of various diseases of the organ of vision, has almost doubled, which is of very important social significance, since 75% of visually impaired people are people of working age, including more than 50% with high intellectual level. With this pathology, up to 85 - 95% of visually impaired people need medical rehabilitation.

The pathogenesis of optic nerve atrophy is complex and ambiguous. Most authors are inclined to believe that optic nerve atrophy has a multifactorial nature. The most common causes of partial optic nerve atrophy (PONA) in children are infectious inflammatory diseases of the central nervous system (up to 40% of cases), hydrocephalus of various origins, brain tumors, congenital diseases of the central nervous system, metabolic disorders, retinopathy of prematurity, head injury, etc. Partial atrophy optic nerve disorder can be congenital and hereditary, primary and secondary. In this regard, the study of the clinic, pathogenesis, etiology, as well as the development of methods for treating this disease is a relevant and important problem in ophthalmology.

Treatment of partial optic nerve atrophy (PONA) remains one of the important areas in ophthalmology. Treatment methods for PONA are developing in the direction of improving blood circulation, increasing the level of tissue metabolism, creating biochemical, energetic, and functional conditions to improve the conduction of rhythmic excitation along the optic nerve. According to various authors, the positive effect of “traditional” conservative therapy for PONA

is observed in 21.4-63.4% of treated patients. The problem of delivering drugs to the optic nerve and creating their sufficient concentration, taking into account the presence of histohematic barriers, remains a serious problem.

Increasing the effectiveness of treatment can be achieved by introducing drugs to the posterior pole of the eye using various irrigation systems. To facilitate the diffusion of drugs into the tissues of the eye and optic nerves, electrophoresis and laser phoresis are used. Methods for using direct electrophoresis and laser phoresis of drugs in pathology of the posterior segment of the eye are described.

To increase the effectiveness of treatment for diseases of the optic nerve, along with pharmacotherapy, various methods of electrical stimulation and laser stimulation of the optic nerve are quite successfully used. A method of direct electrical stimulation of the optic nerve together with laser stimulation with a helium-neon laser has been proposed: using a model of optic nerve atrophy in rabbits, it has been established that the myelin sheaths are reconstructed around the preserved axial cylinders.

Based on the above, it can be assumed that the problem of partial atrophy of the optic nerve is far from being completely resolved.

The aim of the research. To study the results of an analysis of the treatment of children with partial atrophy of the optic nerve of various origins.

Materials and methods. We examined 36 children (64 eyes), hospitalized in the eye department of the TashPMI clinic and examined in the outpatient clinic of the centre neurosurgery. Of these, boys accounted for 53% (19 children), girls - 47% (17 children). The age of the studied patients varied from 2 to 17 years; the average age was 12 years. Of all requests, 17% (6 children, 9 eyes) are secondary atrophy of the optic disc. 15 children (42%) received transcranial magnetic stimulation as part of the complex treatment of partial atrophy, and 21 children (58%) received conservative treatment.

All children underwent neuro-ophthalmological (visiometry, biomicroscopy, perimetry, ophthalmoscopy, optical coherent tomography, visually evoked potentials), clinical and laboratory research methods, as well as consultations with related specialists (ENT, pediatrician, neurosurgeon).

Transcranial magnetic stimulation (TMS) is a noninvasive form of brain stimulation in which a changing magnetic field is used to induce an electric current at a specific area of the brain through electromagnetic induction. An electric pulse generator, or stimulator, is connected to a magnetic coil connected to the scalp. The stimulator generates a changing electric current within the coil which creates a varying magnetic field, inducing a current within a region in the brain itself.

Transcranial magnetic stimulation is a method based on stimulating brain neurons with an alternating magnetic field and recording responses to stimulation using electromyography. Its essence lies in the depolarization of nerve cell membranes under the influence of a strong magnetic field. Rhythmic TMS (rTMS) is a type of stimulation that generates a series of pulses that range in frequency from 1 to 100 Hz. There are two main rTMS modes: low-frequency (<1 Hz) and high-frequency (>5 Hz). Low-frequency magnetic stimulation causes a decrease in the excitability of neurons in the cerebral cortex, which leads to an inhibitory aftereffect, and high-frequency magnetic stimulation causes its increase, which has a stimulating effect. There are also "pattern" stimulation modes (intermittent theta burst stimulation - iTBS, continuous theta burst stimulation

- cTBS), in which stimuli are presented in the form of specific clusters. The duration of the rTMS aftereffect is proportional to the duration of stimulation, the total number of stimuli and the frequency of sessions [4]. The physiological (therapeutic) effect of rTMS and long-term (up to 3 months) aftereffect are traditionally associated with changes in synaptic plasticity due to the phenomena of long-term potentiation and depression.

Results. The main group consisted of 21 patients (35 eyes) with PONA, the control group - 15 patients (29 eyes). Patients in each of the two groups were divided into three subgroups according to the etiology of PONA: subgroup I consisted of patients with PONA due to pathology of the central nervous system (consequences of intoxication, traumatic brain injury, demyelinating processes, neurosurgical interventions, congenital disorders); Subgroup II consisted of patients with PONA due to retinal pathology (central chorioretinal dystrophy, retinal pigment abiotrophy); In subgroup III we combined patients with pathology of the optic nerve that developed in the long term after acute disorders of the blood supply to the optic nerve and retina (anterior ischemic neuropathies, posterior ischemic neuropathies, thrombosis of the central retinal vein and its branches, occlusion of the central retinal artery and its branches).

Treatment was carried out as pathogenetically as possible, taking into account the underlying disease and was aimed at improving blood circulation and stimulating the vital activity of surviving but depressed nerve fibers.

In the main group, traditional therapy was used to treat patients with PONA, consisting of: 1) nootropics (piracetam, etc.); 2) vasodilators (no-spa, papaverine, nicotinic acid, cavinton, etc.); 3) antioxidants (vitamin A, vitamin E, lipoic acid, blueberry forte, etc.); 4) angioprotectors (emoxipin, etc.); 5) polypeptides (cortexin, retinalamine); 6) neurotrophics (B vitamins, taufon, cerebrolysin).

In the control group, treatment was carried out in combination with transcranial magnetic stimulation. Patients were monitored on an outpatient basis throughout the entire treatment period. The session of transcranial magnetic stimulation lasted 10 days for 30 minutes.

We carried out dynamic monitoring of patients with PONA who were treated. The results obtained were assessed 1 and 3 months after treatment.

Assessing the results of the treatment, one can note better functional results according to the "visual acuity" criterion in subgroups II and III of the control group compared to patients of the main group. In patients with PONA due to pathological changes in the retina and circulatory disorders of the retinal vessels and optic nerve, it was possible to achieve an improvement in visual acuity by 60 and 47%, respectively.

One of the objective methods for assessing functional changes in visual functions was the quantitative assessment of the reduction in the number of absolute and relative scotomas when performing computer perimetry. We were able to achieve the highest results in the third experimental subgroup, where the number of absolute scotomas decreased by an average of 25%, and relative scotomas of the 1st and 2nd orders - by 58.4%.

An increase in visual acuity and electrical lability indicators indicated an improvement in the functioning of the axial fascicle of the optic nerve. An increase in the average amplitude values, a decrease in the average latency values of the P100 VEP wave, along with an increase in the average lability values, indicated an improvement in the parameters of the conduction of rhythmic excitation along the optic nerve. The differences turned out to be statistically significant according to the paired Student's test ($p < 0.05$) when determined before and after treatment in both groups.

Table 1.

Dynamics of average visual acuity values before and after treatment, 3 months. (N±n)

	Main group			Control group		
	I	II	III	I	II	III
before treatment	0,17 ± 0,05*	0,25 ± 0,09*	0,17 ± 0,15*	0,16 ± 0,05	0,31 ± 0,15*	0,16 ± 0,03*
before treatment	0,23 ± 0,07*	0,4 ± 0,15*	0,25 ± 0,05*	0,19 ± 0,06	0,39 ± 0,02*	0,21 ± 0,02*
Enhancement Gradient	0,06	0,15	0,08	0,03	0,08	0,05
% improvement	35,3	60	47	18,7	25,8	31,2
* <i>p</i> < 0,05, significant differences before and after treatment						

In general, functional indicators were significantly higher in patients treated with the combined treatment method compared to the group treated with the traditional method. There was an improvement in the functioning of the axial bundle of the optic nerve (increase in the average value of visual acuity, improvement in electrolability indicators), improvement in the functioning of optic nerve fibers coming from the periphery of the retina (decrease in the average value of absolute and relative scotomas, improvement in the amplitude and temporal characteristics of the VEP).

Conclusion. Thus, the data presented in our work convincingly confirm the fairly high effectiveness of the developed method of treating PONA, based on transcranial magnetic stimulation of the optic nerve, which allows for controlled stimulation treatment on an outpatient basis. The original method of treating patients with various forms of PONA that we have developed ensures the achievement of good results in a complex category of patients with pathology of the optic nerve and retina and determines the prospects for the further development of this method of treatment and the widespread introduction of the original method into clinical practice. Combined treatment of partial optic nerve atrophy in children can improve visual functions and stabilize the process.

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IMMUNOLOGICAL INDICATORS IN STENOSING LARINGOTRACHEITIS IN CHILDREN

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Abstract. *The modern concept of the etiopathogenesis of laryngotracheitis takes into account the action of multiple infectious and allergic trigger factors, which are most significant in immunocompromised children. We conducted a comprehensive examination and dynamic observation of 95 children with different variants of ASLT, which were divided into 2 groups. ASLT in children revealed suppression of cellular and activation of humoral immunity. Significant changes in the immune status and cytokine level in patients with frequent relapses of ASLT were manifested by a significant increase in the levels of IL-4 and IL-1 β , as well as an imbalance in interferon genesis and an increase in the level of IgE.*

Keywords: *acute stenosing laryngotracheitis (ASLT), immunology, pathogenesis, children, recurrent course of acute laryngotracheitis (RASLT), primary acute laryngotracheitis (PASLT).*

Relevance. Acute infectious and inflammatory processes in the upper respiratory tract still form the main list of diseases in childhood, which maintains the constant interest of specialists in various fields in this pathology [1,2,8,14]. Particular attention of researchers and clinicians is attracted to the study of etiopathogenetic mechanisms of acute stenotic laryngotracheitis (ASLT), which is caused, first of all, by the development of a life-threatening condition of acute airway stenosis in children [3,4,10,11,12]. According to our observations and literature data, a clear trend towards an increase in the frequency of repeated episodes of ASLT in children has recently been noted, which makes obvious the need for further study of the underlying mechanisms of not only the occurrence, but also the recurrence of ASLT [1,6,7,9].

Recurrence of laryngotracheitis contributes to the formation of chronic inflammatory processes and hyperreactivity of the upper respiratory tract, negatively affects the maturation of the child's immune system, which leads to the development of secondary immunosuppression [4,5,10]. Each new respiratory infection provokes more and more serious disorders of the immune system, contributing to the formation of both chronic inflammatory diseases of the pharynx and respiratory allergies [2,6,11].

The modern concept of the etiopathogenesis of laryngotracheitis takes into account the action of multiple infectious and allergic trigger factors, which are most significant in immunocompromised children [3,4,12]. However, to date, the role of cytokine regulation in the pathogenesis of the disease remains insufficiently studied; the diagnostic and prognostic value of

determining cytokine spectrum indicators for the occurrence and recurrence of ASLT in children has not been clarified [3,13].

Purpose of work. Study of the state of cellular and humoral immunity in acute and recurrent laryngotracheitis in children.

Material and research methods. To achieve this goal, a comprehensive examination and dynamic observation of 95 children with various variants of the course of ASLT was carried out. All patients were divided into 2 groups: children with a single episode of acute laryngotracheitis (63 patients with primary acute laryngotracheitis - PASLT) and with a recurrent course of acute laryngotracheitis (RASLT - 32 patients). All the children we observed were examined using general clinical research methods, followed by an assessment of anamnestic, clinical and laboratory data. In addition, we used an additional examination, including determination of the cellular and humoral immunity (immunoglobulins IgE, IgM, IgG and IgA) in the blood serum, determination of the level of cytokines (IL-2, IL-4) before and after treatment with an immunocorrective drug, IL-6, IFN- α , IFN- γ) in peripheral blood.

Results and discussion. An important link in regulation in the immune system is the interaction of T- and B-class lymphocytes and their subpopulations. The pathological process in PASLT and RASLT is accompanied by compensatory stimulation of the cellular mechanisms of the immune system. Since the absolute number of total T lymphocytes significantly increased by 1.3 times in PASLT and 1.7 times in RASLT, there was also a significant increase in the percentage of T lymphocytes in both groups. There is a significant increase in T-helper cells ($P < 0.001$) in patients with PASLT, and in RASLT it differed little from control values. In addition, the absolute number of T-suppressors, as well as their percentage, was statistically significantly increased in patients of group 1 ($P < 0.001$), and in patients of group 2 it decreased compared to control values. With PASLT and RASLT, this indicator increased by 1.6 and 1.9 times, respectively, which indicates the development of autoimmune processes in the body (Table 1).

Table 1.

Indicators of T-cell immunity in children with ASLT

Indicators	Control group (n=30)	1 group PASLT (n=63)	2 group RASLT (n=32)
Leukocytes, (g/l)	7080 \pm 216,9	9546 \pm 197,2***	8210 \pm 117,4***^^^
Lymphocytes, %	32,9 \pm 0,80	55,2 \pm 1,14***	57,0 \pm 0,86***
Lymphocytes, abs.	2344 \pm 104,6	5233 \pm 144,3***	4697 \pm 102,9***^^
CD3, %	60,9 \pm 1,82	61,7 \pm 1,28	66,3 \pm 0,86
CD3, abs.	1425 \pm 80,1	3241 \pm 114,6***	2920 \pm 75,0***^
CD4, %	38,7 \pm 1,09	35,1 \pm 0,77**	36,6 \pm 0,49
CD4, abs.	897 \pm 42,7	1838 \pm 66,5***	1726 \pm 46,3***
CD8, %	33,3 \pm 0,94	23,2 \pm 0,50***	21,5 \pm 0,31***^^
CD8, abs.	778 \pm 40,5	1214 \pm 43,7***	1006 \pm 25,4***^^^
CD ₄ /CD ₈	1,20 \pm 0,05	1,61 \pm 0,05***	1,75 \pm 0,03***^
CD16, %	14,1 \pm 0,37	11,2 \pm 0,23***	9,9 \pm 0,13***^^^
CD16, abs.	333 \pm 18,3	592 \pm 22,5***	466 \pm 12,3***^^^

Note: * - differences relative to the control group data are significant (** - $P < 0.01$, *** - $P < 0.001$); ^ - differences relative to the data of group 1 are significant (^ - $P < 0,05$, ^^ - $P < 0,01$, ^^^ - $P < 0,001$)

An imbalance of T-helpers and T-suppressors was revealed, which was accompanied by a sharp stimulation of the helper subpopulation in both forms, and against this background there was a significant increase in T-suppressors in OSLT and a decrease in ROLT. When assessing changes in the humoral immunity in patients with OSLT, a significant increase in B-lymphocytes was revealed, compared with control values of 1.3 times in POSTRT and 1.5 times in ROSCLT. A similar picture was observed in percentage terms in both groups. In the blood of sick children, a decrease in the level of IgA and IgG, a slight decrease in the level of IgM, and an increase in the level of total IgE are detected. The highest level of IgE is observed in the group of children with RSLT (362.0 ± 19.5 IU/l), which significantly exceeds the value of this indicator in children with POSTLT (308.0 ± 13.5 IU/l) ($P < 0.05$) and with the indicators of the control group (103.0 ± 6.12 IU/l) ($P < 0.001$).

We noted that the content of immunoglobulins IgA, IgM and IgG in both groups was lower than the age-related parameters. In the group with recurrent croup, the level of total IgE was 2.5 times higher than in POST-RT, which indicates the role of the allergic factor in the pathogenesis of POST. At the same time, in children with a recurrent course of the disease, the level of total IgE in all age groups exceeded the normative values, which not only confirms the presence of an allergic component of inflammation in the pathogenesis of the disease in a recurrent course, but also makes it possible to further clarify the content and focus of anti-relapse measures.

Changes in immunological parameters in patients with OSLT are associated with dysregulation of immunogenesis. To date, the issues of the functional state of the immune system in this category of patients remain insufficiently studied. The study of these issues is of both scientific and practical interest, since the ultimate goal is not only to detect certain patterns of development of the immune system in children with OSLT, but also a differentiated approach to their treatment in terms of increasing efficiency.

According to the theory of polarization of the immune response, helper T lymphocytes are responsible for the development of cellular immunity, and helper B lymphocytes are responsible for humoral immunity. The main role in regulating the type of immune response and in the implementation of reciprocal relationships between them is played by cytokines: tumor necrosis factor- α (TNF- α), γ -interferon (INF- γ), interleukins IL-1 β , IL-4. To establish the role of the cytokine spectrum in the development of the primary and recurrent course of OSLT in children, we determined the level of interferons IFN- α and IFN- γ , the level of IL-4 and the level of pro-inflammatory cytokines: IL-1 β , IL-6.

Our data show a significant dependence of the concentration of proinflammatory cytokines in the blood serum on the form of ASLT. Particularly pronounced disorders were noted in children with RASLT. The identified changes were significantly different from the values obtained in the group of children PASLT. Thus, if during RSLT the level of serum TNF- α in the examined children was significantly higher (243.5 ± 23.9 pg/ml compared with the data of children in the control group - 82.4 ± 7.0 pg/ml, $P < 0.001$), then during PASLT only a moderate increase in this cytokine was noted (118.7 ± 9.3 pg/ml, compared with control $P < 0.05$). When analyzing the results of a study of the level of IL-1 β in the blood serum, it was revealed that in children with RASLT there is an almost tenfold increase in its level compared to the control - 346.7 ± 36.6 pg/ml, versus

35.8 ± 3.9 pg/ml (P<0.001). In children with PASLT, there was an increase in the level of IL-1β by more than 3 times compared to the control group of children - 110.4±8.3 pg/ml (P<0.001). IFN-γ is known to be produced by activated Th1 cells and NK cells. Our studies showed a decreased level of IFN-γ compared to the control group of children. Moreover, this decrease is observed in ASLT: with RASLT – 74.3±4.9 pg/ml (P<0.001), with PASLT – 78.5±7.3 pg/ml (P<0.001). The level of IFN-γ, while in the control group of children, averaged 131.7±11.0 pg/ml. Thus, when analyzing the level of a number of inflammatory cytokines in the blood serum of children with ASLT compared to controls, we noted a significant significant increase in the level of TNFα and IL-1β during ASLT and a moderate increase in their serum content during PASLT. The serum level of IFN-γ in ASLT was significantly lower than in the control group and did not depend on its form.

ASLT is characterized by preferential activation of type II T lymphocytes. The main cytokine responsible for the immune response along the Th2 pathway is interleukin-4, which, together with IL-12 and the CD40-CD40L molecular complex, is involved in triggering the synthesis of antigen-specific immunoglobulins E (IgE) by B lymphocytes. It has been established that the allergic process causes the activation of Th2 helper cells and the synthesis of cytokines that have a suppressive effect on cellular immunity. The cytotoxic mechanism of damage, which is associated with T-killers, is activated. Consequently, our results indicate disruption of metabolic processes and pronounced immunological changes that contribute to the development of complications of this disease.

Immunological studies carried out at the height of ASLT in children indicate the development of immunological failure of both the cellular and humoral components. It should be noted that the inflammatory process in the larynx leads to a decrease in immunological parameters, and the present allergic background activates T-lymphocytes, which explains the imbalance of immunological parameters. And all this indicates the participation of not only the inflammatory process, but also allergization of the body of sick children. The immunological changes we noted can be qualified as a secondary immunodeficiency state.

Thus, we have studied the role of specific and nonspecific immune defense factors in the pathogenesis of acute stenosing laryngotracheitis. The results obtained show that in patients of both groups there was a statistically significant (p <0.001) increase in the absolute number of leukocytes and lymphocytes in the peripheral blood. Thus, in sick children with primary and recurrent laryngotracheitis, the number of leukocytes increased by an average of 62.8%, and lymphocytes by 75.2%. In patients of group 2 with RASLT, more pronounced changes were observed: the number of leukocytes in them increased by 2 times.

The pathological process in PASLT and RASLT was accompanied by compensatory stimulation of the cellular mechanisms of the immune system. Thus, the absolute number of total T-lymphocytes significantly increased by 1.3 times in PASLT and 1.7 times in RASLT; in patients of both groups there was also a significant increase in the percentage of T-lymphocytes. There is a significant increase in the number of T-helper cells (p<0.001) in patients with PASLT, and in RASLT it differed little from the control value. In addition, both the absolute and percentage number of T-suppressors in patients of group 1 increased statistically significantly (p <0.001), while in patients of group 2 it decreased.

With PASLT and RASLT, the immunoregulatory index increased by 1.6 and 1.9 times, respectively, which indicates the development of autoimmune processes in the body. An imbalance

of T-helpers and T-suppressors was revealed, which was accompanied by a sharp stimulation of the helper subpopulation in both forms, and against this background, a significant increase in the number of T-suppressors was noted in ASLT, and their decrease in RASLT. The state of the humoral immunity in patients with ASLT was characterized by a significant increase in the number of B-lymphocytes, compared with control values by 1.3 times in PASLT and 1.5 times in RASLT. In the same way, the percentage of B-lymphocytes changed in patients of both groups. One of the most important characteristics of the B-immune system is the concentration of serum immunoglobulins. In patients with ASLT, the blood level of IgA, which predominates in immune complexes, was 2.0-2.9 times higher than normal. Analysis of immunological parameters showed that in children during the height of the disease, compared with healthy children, the number of leukocytes, the absolute number of lymphocytes, T-lymphocytes, T-helpers significantly decreases ($p < 0.05 < 0.001$) and the indicators of T-suppressors significantly increase (CD8) and T-killers (CD16) ($p < 0.001$).

Conclusion. ASLT in children revealed suppression of cellular immunity and activation of humoral immunity. The identified significant changes in the immune status and cytokine level in patients with frequent relapses of ASLT were manifested by a significant increase in the levels of IL-4 and IL-1 β , as well as an imbalance of interferon genesis and an increase in the level of IgE.

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A HEALTHY LIFESTYLE STARTS FROM THE FAMILY

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Abstract. *In today's world of intensive development of the economy and social complex of activities, great importance and special attention is paid to issues of health and spiritual and moral education of the younger generation. The main link in this work is the family, because it is here that a person is formed as an individual, and the family is the keeper of centuries-old national traditions and the experience of folk pedagogy. Human health is directly formed in the family and affects all aspects of society as a whole. The formation of a healthy family lifestyle will lead to an improvement in the quality of life of the population, strengthening the health of the population through the protection of motherhood and childhood, reducing child and maternal mortality, which is achieved through family planning.*

Keywords: *formation, healthy lifestyle, family, improvement, quality, life, population, strengthening, health.*

For the successful development of a family, it is necessary, first of all, to maintain the health of the mother, ensure a healthy interval between births, and ultimately, the birth of a healthy child. For the full and effective growth of children's development in the first year of life, the most acceptable nutrition is breastfeeding. Feeding children with mother's milk creates psycho-emotional closeness between mother and child and provides a favorable environment for the normal physical and psychological development of the child. The act of breastfeeding helps develop the child's attachment to the mother. This regular physical contact leads to an improvement in the child's general condition, his health, and subsequently his individual adaptability to life. The main task of society and family is the comprehensive education of a healthy generation and preparing it for life in society. One of the most important tasks in the development of the younger generation is the rational organization of physical culture and sports, the activation of the motor regime starting from early childhood throughout life. In order for children to engage in physical education from an early age, we adults must become an example for them in our family [1.5]

The family is the most basic unit when raising a child, because the child spends a significant part of his life here. A child acquires his very first social skills in the family. The upbringing, formation of a healthy lifestyle of a child, organization, and planning of his life begins, first of all, with the education of adults themselves and with the organization of the life of the family as a whole, which is achieved by creating highly moral intra-family relationships that ensure a healthy environment in the family. The effectiveness of pedagogical and social influences depends on a healthy family environment, and it should be noted that young children are more susceptible to educational influences and skills, especially if the child grows up in an atmosphere of friendship, trust and mutual relationships. They observe the relationships of adults, their emotional reactions and feeling, studying for themselves all the diversity of manifestations of feelings of loved ones, the child acquires moral and educational skills and experiences. By nature, a child is more active, mobile and inquisitive, he easily perceives everything he hears and sees around him, all this is passed on to him from adults. It is also important that what kind of psycho-emotional impressions

he receives, positive or negative: love, care, tenderness, goodwill, respect for others or irritability, grumpiness, envy, gloomy faces, pettiness and others. A child needs a serious attitude and genuine attention from adults. Children appreciate this and are drawn to those who understand and support their interests and plans. Love for a child should not be in words, but in the actions and actions of an adult [2]. The spiritual and moral education of children in the family is the main foundation of the future. Therefore, from an early age, children need to form an understanding of national traditions, customs and cultural behavior. The spiritual development of a child mainly depends on a calm and friendly relationship in the family. A child raised in a healthy family becomes a spiritually mature, healthy and independent-minded person. The basis of spiritual and moral education in children is the priority of love and empathy in the family. The spiritual and moral education of a child can be ensured in a friendly atmosphere in the family, its duration, the degree of awareness of the personal "I" of human qualities, the general development of one's horizons and one's independent thinking. Here, an important role in the spiritual and moral education of a child is played by mutual respect for the performance of their duties by family members, the relationship of family members among themselves, relatives, neighbors and empathy for loved ones. If we as adults are committed to maintaining a spiritual connection with our children, we must recognize the need to work on stopping treating our little ones with disrespect. It is respect for the child that will allow us to raise a new generation of leaders who will lead our country forward in the future, bring new victories and achievements, and build a humane, fair, prosperous society.

The content of education, work carried out in the family with children develops a sense of dignity for their family, country, people, language, religion, and the place where they were born, grew up and developed. Raising and teaching children in the family as a human person, developing a sense of dignity, friendship, hospitality, love of work, the pursuit of knowledge and mastering a profession, contributes to the development of family and patriotic feelings, a sense of justice and rules of behavior in everyday life and in society [3].

The formation of a child's personality is influenced not only by the family but also by the adult environment, the public in preschool and school institutions, on the street and in places of public entertainment. The most important thing here is that the child, receiving positive life skills from those around him, learns the ABCs of feelings and measures. It is important that others respect the child as an individual. At the same time, it is necessary to show delicacy and tact when communicating with children. Be able to talk to him and listen to them, always show support, and when a child's disobedience or inattention causes irritation, you need to be able to choose methods and skills to influence the child, be able to understand him and the motives of his actions, stand in his place, decide what to do with him in fairness[4,5]. The most important thing when choosing methods of influence is to rely on all the best that the child has. When raising a child, one cannot fail to take into account that in each age period he acquires important and serious human qualities and life skills. Children look closely at adults, they have such an extraordinary ability to recognize the mood of their elders and become infected by them, they sensitively perceive how adults treat them. Are they ready to give in or demand leniency towards them, are they adamant, irritated or complacent? Young children have a greater tendency to imitate. The desire of children to imitate in most cases can help in education, especially if the child around him sees positive examples of the behavior of adults and his elders. A famous Polish teacher wrote: "The child knows those around him, their moods, their habits, their weaknesses, he knows them and uses them skillfully".

He guesses the location, senses hypocrisy, grasps everything he sees and hears on the fly. The same feature of children often becomes the cause of negative manifestations, since a preschool child does not yet have a strong idea of what is good and what is bad. At the same time, according to his understanding, he is absolutely sure that everything that people older than him do is good. In various life situations, parents and other people around them must take into account the child's self-esteem, see him as a developing personality, and strive for mutual understanding based on respect and trust. Raising a child is a great art, since the process of education itself is a continuous work of the soul, mind, and parents and the public.

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THE STATE OF THE DIGESTIVE ORGANS IN CHRONIC CHOLECYSTITIS IN CHILDREN

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Abstract. *Chronic cholecystitis in children under school age occurs with significant disorders in various organs of the gastrointestinal tract, liver, nervous, cardiovascular system.*

Keywords: *cholecystitis, inflammation of the biliary tract, associated organs.*

Chronic inflammatory diseases of the biliary tract are one of the most common pathologies of the digestive tract in children, and according to various authors, patients with chronic cholecystitis account for 17-20%.

Chronic inflammatory diseases of the gallbladder are combined with functional disorders and changes in the physicochemical properties of bile. The functional properties of bile are diverse: neutralization of hydrochloric acid, pepsin, activation of intestinal and pancreatic enzymes, emulsification of fats, reduction of the proliferation of putrefactive bacteria, stimulation of choleresis in the liver, excretion of medicinal, toxic substances, poisons and others.

Inflammatory processes and disturbances in the passage of bile can contribute to the development of functional and organic pathology of the liver, intestines, and disruption of microbiocenosis in the distal parts of the small intestine.

It is not always possible to establish the root cause of the disease of any of the gastrointestinal organs, since there are very complex functional relationships between them. However, along with the diagnosis of chronic cholecystitis, timely detection of associated functional and morphological disorders of adjacent organs (liver, intestines, etc.) can prevent the development of severe complications.

Chronic inflammatory diseases of the biliary system develop in children over several years, often occurring under the guise of dysfunctional disorders of the biliary tract and intestines. The anatomical and topographical relationships of the gallbladder of the liver, intestines, and their frequent combined involvement in the pathological process have reduced the diagnostic value of such clinical symptoms as pain and cystic symptoms, especially in young children. In this regard, early diagnosis of inflammatory diseases of the biliary system is the key to their successful treatment and reducing the development of associated damage to other organs and systems of the body.

However, it should be taken into account that in children, chronic cholecystitis in some cases occurs without pronounced manifestation of clinical symptoms, especially without an exacerbation or during the initial phase of the disease. But, nevertheless, even minor inflammation of the biliary tract leads to the development of pathology of related organs. (2.3)

In the presence of inflammatory diseases of the biliary system in children, timely detection at the functional level of disorders of related organs (liver, intestines, etc.) will facilitate the appointment of adequate corrective therapy and reduce the development of organic changes in these organs and systems.

The purpose of this study was to study the nature of chronic cholecystitis and its impact on the state of the intestinal biocenosis and the development of pathology of other organs in children 7-14 years old and to develop methodological approaches to their early diagnosis.

Material and methods. To achieve this goal, we examined 72 patients diagnosed with chronic cholecystitis in the acute stage of the disease at the age of 7-14 years. Among the patients with cholecystitis, there were 32 (44.4%) boys and 40 (55.6%) girls. On average, the age of the patients was 11.9 ± 1.9 years (Table No. 1). The collection of material for research and examination of patients was carried out on the basis of 4-GKDB for the period from 2020-2022. Groups of patients were selected by random sampling as they applied to this institution for examination. For each patient, a medical history was created with a registration number for registration and medical examination of patients.

The diagnosis was verified on the basis of anamnestic and clinical data, laboratory parameters and instrumental studies, bile analysis during duodenal intubation.

Results and discussion. All studies were carried out by informing the parents of the children examined.

Table №1.

Distribution of patients by gender and age (n=72)

Age of patients	Boys abs.%	Girls abs.%	P	Total abs.%
7	1(3,1±2,7)	2(5,0±3,3)	P>0,05	3(4,1±2,3)
9	2(6,25±3,1)	2(5,0±3,3)	P>0,05	4(5,5±2,6)
10	3(9,4±3,6)	3(7,5±3,7)	P>0,05	6(8,3±3,2)
11	3(9,4±3,6)	5(12,5±4,0)	P>0,05	8(11,1±3,7)
12	6(18,75±4,2)	10(25,0±3,9)	P>0,05	16(22,2±4,8)
13	10(31,25±3,8)	9(22,5±4,4)	P>0,05	19(26,3±5,1)
14	7(21,9±4,8)	9(22,5±4,4)	P>0,05	16(22,2±4,8)
Totally	32(44,4±7,6)	40(55,6±7,6)	P>0,05	72 (100,0)

Based on the presented data, it can be seen that the largest number of patients were aged 12-14 years. Younger patients were less likely to develop chronic cholecystitis, as evidenced by the data in the table.

The next step was to analyze a number of anamnestic data and complaints from patients. Thus, the common diseases that children suffered were: viral hepatitis A - in 19 (26%), viral hepatitis B - in 2 (2.7%), helminthic infestation in 7 (9.7%), giardiasis - in 9 (12.5%), other types of infection - in 21 (29.1%) and frequent respiratory diseases in 24 (33.3%) children.

When analyzing a number of anamnestic indicators and complaints from patients, we found that in the vast majority of cases, patients associated the onset of the disease with a violation of the diet, consumption of fatty foods, fast food and carbonated drinks. The disease in all cases was recurrent in nature and relapses in 97.7% of cases were caused by gross violations of nutrition and diet, and in 18.0% they were seasonal (spring-autumn) in nature. It should be noted that a family predisposition to the development of chronic cholecystitis in patients was not identified. Thus, chronic pathology of the gastrointestinal tract in the parents of the examined children was noted only in 11.1% of cases. At the same time, almost all patients had a high incidence of various concomitant (100%) and previously suffered (88.9%) diseases, including those from the

gastrointestinal tract. Indicators such as an allergic history in parents (21.8%) could possibly influence the nature and development of chronic cholecystitis in patients. (1,4,5)

Almost all children had numerous complaints from the gastrointestinal tract (abdominal pain of various localization, nature and severity, signs of dyspepsia, phenomena characteristic of intestinal dysbiosis, phenomena of malabsorption and maldigestion, etc.), nervous system, etc.), skin integument (hypo- and hyperpigmentation of the skin, allergies and other rashes) and well-being, moreover, their nature and severity were different and did not depend on the gender of the patients. Parents of sick children paid special attention to their irritability, nervous system lability, and decreased performance at school.

Conclusion. Thus, based on the presented data, it is clear that in school-age children, chronic cholecystitis occurs with significant disturbances in various organs and systems of the body, including pathologies of other organs of the gastrointestinal tract, liver, nervous, and cardiovascular systems.

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ANALGOSEDATION WITH DEXMEDETOMIDINE IN PEDIATRIC CARDIAC SURGERY

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Abstract. *Relevance.* The principles of postoperative multimodal analgesia are reflected in numerous publications; however, this issue remains insufficiently studied in pediatric cardiac surgery.

Keywords: congenital heart defects, pediatric cardiac surgery, postoperative sedation-analgesia.

OBJECTIVE OF THE STUDY: to increase the effectiveness of postoperative analgo-sedation with the combined intravenous use of dexmedetomidine and paracetamol in children after cardiac surgery.

MATERIALS AND METHODS: The study was a prospective, controlled, non-randomized study (n = 65, from 2 to 4 years). Elective heart surgeries were performed on children with congenital heart defects: ventricular and/or atrial septal defect, Tetralogy of Fallot, under conditions of artificial circulation and general anesthesia. Patients were divided into 2 groups according to the type of postoperative pain relief: Group 1, main (n = 35): 30 minutes after surgery, dexmedetomidine infusion with a loading dose of 1.0 mcg/kg/h for 10 minutes, then infusion of 0.8 mcg /kg/hour during the day against the background of planned analgesia with paracetamol (15 mg/kg, intravenously, bolus) 2 hours after surgery and subsequent every 8 hours during the day. Group 2, comparison (n =30), morphine 0.3 mg/kg, intramuscularly, first dose - 2 hours after surgery. The effectiveness of postoperative analgo-sedation in children was analyzed using the Richmond scale and FLACC + systemic hemodynamics, acid-base status and blood gases, cortisol, glucose and blood lactate.

RESULTS. Sufficient stabilization of the main parameters of hemodynamics and breathing confirmed the adequacy of postoperative analgo-sedation in patients of group 1. A decrease in heart rate, specific peripheral resistance and mean arterial pressure of up to 14% was recorded. Respiratory depression was not noted in any case, and the decrease in blood pressure and heart rate was hemodynamically insignificant. Changes in acid-base balance and blood gases in children in the postoperative period were unreliable and within normal limits. Postoperative stability of blood lactate, glucose and cortisol levels recorded the absence of gross metabolic disorders and emotional pain stress in children of the main group.

CONCLUSION. Multimodal analgesia with dexmedetomidine in combination with paracetamol provides an adequate level of sedation, suppresses irritation to extubation, prevents psychomotor agitation and provides effective analgesia. Preservation of the swallowing reflex contributed to the early initiation of enteral feeding. Transfer of 74.3% of patients in group 1 42.3±5.5 hours after surgery to a specialized department reduced costs and burden on ICU medical staff.

RELEVANCE.

Treatment of postoperative pain syndrome (PS) in all areas of surgery remains one of the most pressing problems of clinical anesthesiology. According to a systematic review by Gregory J. et al. (2016), postoperative BP, on average, was observed in 50% of patients with the incidence

of high-intensity pain up to 35% [1]. The severity of postoperative pain in cardiac surgery patients is one of the most intense, which requires adequate treatment [2]. Inadequate pain relief often leads to a complicated course of the postoperative period, contributing to chronic pain. Thus, according to the results of a study by Choinière M. et al. (2014) in 40.1% of patients after cardiac surgery, BS persists for 3 months [3]. The results of other studies revealed the presence of BS in 21% of children in the early postoperative period [4], while the formation of chronic PS was noted in 10% of children after 1 year, in 3% - 5 years after cardiac surgery [5].

No less important is the problem of perioperative cardioprotection, especially in conditions of artificial circulation (CPB) [6]. Today, the understanding of the pathophysiology and prevention of ischemia-reperfusion damage to the myocardium of the operated heart has expanded significantly [7-10]. Issues of additional pharmacological cardioprotection are being discussed [11]. In this regard, the interest of clinicians in the α_2 -adrenergic receptor (α_2 -AR) agonist dexmedetomidine has increased [12,13], which is widely used both for sedation and as an organoprotector and adjuvant during various operations [14,15]. The mechanism of sedation of α_2 -AR agonists is similar to the second stage of natural sleep [16]. Postoperative sedation is necessary for pediatric patients to prevent the development of delirium, anxiety and fear [17,18]. To assess its effectiveness, rating scales generally accepted in resuscitation are used [19]. When using average therapeutic doses of dexmedetomidine, in addition to sedation, effects on the cardiovascular and central nervous systems are manifested. Dexmedetomidine does not affect the respiratory center and does not depress respiration. Its effect on hemodynamics is dose-dependent and is caused by a decrease in noradrenergic activity [20, 21]. The authors of works testing dexmedetomidine during operations with bypass recorded its significant positive effects: a decrease in the level of norepinephrine in the blood, a decrease in hemodynamic reflex reactions to tracheal intubation, prevention of hypertension, etc. [22, 23]. Most researchers indicate a decrease in heart rate with dexmedetomidine compared to other sedatives [24, 25], without excluding the risk of bradycardia [26].

Despite sufficient experience with the use of dexmedetomidine in adult patients, the number of similar publications in children is limited [27-30]. The principles of non-opioid and multimodal analgesia (MMA) are reflected in numerous publications on postoperative pain relief, but this issue remains insufficiently studied in pediatrics, especially in pediatric cardiac surgery. The advantage of paracetamol over NSAIDs and the rationale for its inclusion in MMA regimens is the minimum of side effects [31].

Purpose of the study: to increase the effectiveness of postoperative analgo-sedation with the combined intravenous use of dexmedetomidine and paracetamol in children after cardiac surgery.

Materials and methods:

Study design

A prospective controlled non-randomized study was conducted. study.

Table 1. Study design

Sign	1 group (n =35)	2nd group (n =30)
Boys, n /%	16/45.7	9/30.0
Girls, n /%	19/54.2	21/70.0
Age, years	2.43± 1.42	3.17±0.12
Body weight, kg	12.76 ±4.81	15.01 ±3.49
Diagnosis, n /%		
VSD	11/31.4	12/40.0
ASD	19/54.2	11/36.6

Tetralogy of Fallot	5/14.2	7/23.3
General anesthesia with artificial circulation		
Postoperative pain relief	Dexmedetomidine + Paracetamol IV	Morphine, IM
Evaluation of the effectiveness of postoperative pain relief		
Echocardiography		
Acoustic acid and blood gases		
Blood cortisol		
Blood glucose		
Blood lactate		
Behavioral Pain Scale FLACC		
Scale excitement - sedation Richmond		

Eligibility Criteria

Criteria for inclusion of patients in the study:

1. Surgical approach is median sternotomy.
2. The patient's level of consciousness is clear or mild stunned, 14-15 points on the Glasgow Coma Scale.
3. Signing of voluntary informed consent by the child's relatives/legal representatives to participate in the study.

Patient exclusion criteria:

1. Intolerance to drugs used in the study.
2. Hepatic-renal failure.
3. Perioperative brain lesions.
4. Cardiovascular and/or respiratory failure requiring long-term mechanical ventilation (> 2 days).
5. Postoperative bleeding >1.5 ml/kg/hour.
6. Patients meeting anesthesia risk ASA III-IV.
7. Refusal of the child's relatives/legal representatives to sign informed consent to participate in the study.

Study conditions and duration

Conducted during the period 2020-2022 in the pediatric resuscitation and intensive care unit of the Fergana Regional Children's Multidisciplinary Medical Center. The study included 65 children aged 2 to 4 years with congenital heart defects: Ventricular and/or atrial septal defect, Tetralogy of Fallot (see Table 1).

Description of medical intervention

All patients underwent planned radical surgery under artificial circulation (CPB) after standard preoperative preparation and examination.

All patients underwent surgery under general anesthesia. At the intraoperative stage, the patients were under the same conditions. Induction of anesthesia was carried out by intravenous administration of Propofol 3 mg/kg, Fentanyl 5-8 mcg/kg, Ardoin 0.06 mg/kg, followed by tracheal intubation and transfer to artificial ventilation (ALV). Ventilation with an oxygen-air mixture with EtO₂ - 30% (Primus, Drager, Germany). Maintenance of anesthesia - Sevoflurane 1.0-1.2 MAC, boluses of maintenance doses of Propofol, Arduan, Fentanyl. The assessment of the compliance of delivery and consumption of O₂ by tissues was carried out using the level of blood lactate, pulse oximetry data (SpO₂), the acid-base state and gas composition of arterial blood, the level of hemoglobin and hematocrit were assessed. Infusion therapy: 0.9% saline and HES 6%

(Valustim, Republic of Uzbekistan), on average 4-6 ml/kg/h. All patients received transfusion of donor red blood cells and albumin during cardiopulmonary bypass. Before cannulation of the great vessels, artificial hemophilia was carried out by heparinization at a dose of 300 U/kg with control of the activated blood clotting time. Kustadiol (20 ml/kg) was used as a cardioplegic solution. After IR, a modified ultrafiltration rate of 21.7% was performed depending on the current hematocrit.

All patients were divided into 2 groups according to the type of postoperative pain relief:

Group 1, main (n = 35), where patients 30 minutes after surgery began intravenous infusion of dexmedetomidine with a loading dose of 1.0 mcg/kg/h for 10 minutes, followed by infusion at a rate of 0.8 mcg/kg/h in during the day against the background of planned postoperative analgesia with paracetamol (Infulgan, 15 mg/kg, intravenously, bolus) 2 hours after surgery and subsequent every 8 hours during the day.

Group 2, control (n = 30), morphine 0.3 mg/kg, intramuscularly, was used for analgesia, the first dose was 2 hours after surgery, then every 6-8 hours as necessary. Both groups were homogeneous in terms of surgical pathology, age, body weight, duration of surgery, cardiopulmonary bypass, and postoperative mechanical ventilation (Table 2). The study in children of group 1 was carried out at the following stages: 30 minutes after surgery, 2 hours from the start of dexmedetomidine infusion, after extubation and anesthesia with paracetamol, 8 hours, 24 hours after surgery. Stages of the study in patients of group 2: 2 hours after surgery - resumption of BS and extubation; After 1 hour; after 3 hours; 6 hours after anesthesia.

Table 2. Distribution of patients according to the method of postoperative analgesia, age, body weight, duration of surgery, CB and ALV (M ± SD)

Options	Group 1, n=35	Group 2, n=30	R
Postoperative analgesia	Paracetamol + Dexmedetomidine	Morphine	
Age (years)	2.43± 1.42	3.17±0.12	>0.05
Body weight (kg)	12.76 ±4.81	15.01 ±3.49	>0.05
Operation duration (min)	197.02 ± 37.82	202.3 ± 39.74	>0.05
IR duration (min)	59.44 ± 31.73	64.49 ± 29.18	>0.05
Duration of software ventilation (min)	127.37 ± 35.22	131.77 ± 34.08	>0.05

Main outcome of the study

The results of the study were to evaluate the effectiveness of postoperative analgesation in pediatric cardiac surgery. The effectiveness of the optimized technique for the combined use of dexmedetomidine with paracetamol was assessed by the shift in hemodynamic parameters (HR, SBP, SBP) within + 15% and -15% from the initial one, according to the state of neuroendocrine status, metabolism, acid-base balance and blood gases.

Methods for recording outcomes

During the first day after the operation, the patient's condition was monitored, blood pressure, heart rate, acid-base balance and blood gases were recorded, parameters of mechanical ventilation or spontaneous respiratory rate, and pulse oximetry; assessment of the level of sedation using the RASS-scale (Richmond Agitation-Sedation Scale), assessment of pain intensity using the FLACC behavioral scale, intended for children under 7 years of age (Tables 3, 4). Central hemodynamics were studied by echocardiography (Chison Edit 60, China). Monitoring and invasive measurements of A/D and CVP (Nihon Cohden, Japan). Acoustic acid and blood gases (BGA Wondfo analyzer, China). Artificial circulation (device Liva Nova S5 Sorin, Italy). On the 2nd day, the results of clinical and biochemical data, the duration of postoperative mechanical

ventilation, the presence of adverse reactions and side effects in children in the studied groups were assessed.

Table 3. FLACC Behavioral Pain Scale [32]

Description	point
Face: _ without any special grimaces or expressions	0
sometimes gloomy, tense, distracted	1
The chin often/constantly trembles, the lower jaws are clenched.	2
Legs: _ normally positioned/relaxed	0
restless movements, tense	1
kicked, or raised up.	2
Activity: _ lies calmly, in a normal position, moves easily	0
writhing, moving back and forth, tense	1
arched, rigid, or moves abruptly (jerky).	2
Cry: _ not crying (awake or asleep)	0
whines or whines; rarely bothers	1
cries often, screams or sobs, often worries.	2
Consolability: _ calm, relaxed	0
calms down when touched, from words, hugs, in arms, distracted	1
difficult to calm down.	2

*Note: 0 points - calm, 1-3 - slight discomfort,
4-6 - slight pain, 7-10 - severe pain.*

Statistical analysis of the obtained data was carried out using the application package StatSoft© Statistica ®10 and Microsoft® Office Excel, 2016. To compare groups, non-parametric tests were used: to assess the significance of differences, the Mann-Whitney test (U-test) was used. To compare qualitative characteristics, the Pearson criterion (χ^2) was used. Differences were considered significant at $p < 0.05$.

RESULTS

Study participants

The study involved 65 children with congenital heart defects, of which 38.4% were boys and 61.5% were girls.

Main results of the study

Upon admission, in CICU after 30 minutes operation of group 1, on mechanical ventilation, an intravenous infusion of dexmedetomidine was immediately started with a loading dose of 1.0 mcg/kg/h for 10 minutes, followed by an infusion at a rate of 0.8 mcg/kg/h over the course of 24 hours.

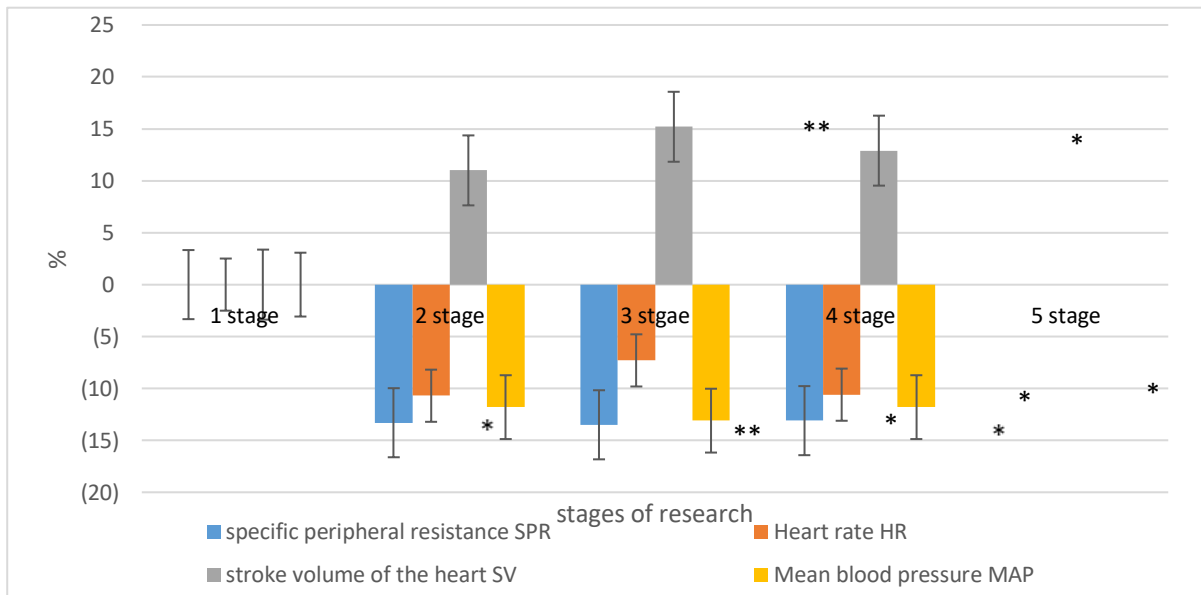
Table 4. Richmond Agitation - Sedation Scale, RASS

Score	Term	Description	Awakening
+4	Agressive	Aggressive state with potential threat to personal	
+3	Extremely agitated	The patient is restless negative towards treatment (removes catheters, probes, drains)	
+2	Agitated	Frequent non-purposeful movements and/or desynchronization with ventilation	
+1	Restless	Excited, but movements are not vigorous or abrasive	
0		Awake, calm, alert	
-1	Drowsy	Loss of attention, but does not close eyes for more than 10 seconds during verbal contact	Verbal stimulation
-2	Light sedation	Quick awaking, opens eyed when called, ability to make eye contact in less then 10 second	Verbal stimulation
-3	Moderate sedation	Any movement (but not eye contact) in response to voice	Verbal stimulation
-4	Deep sedation	Response (motor) to physical stimulus	Physical stimulation

In all patients at the 1st stage of the study (1st postoperative hours), the heart rate remained stable, within the age norm, which could be explained by the preservation of the residual effects of anesthesia, analgesia and myoplegia. Against the background of infusion administration of dexmedetomidine after 28 and 24 hours of the study, heart rate, SBP and SBP decreased within the range of 7.3% -13.5% ($p < 0,05$), with a simultaneous significant increase in SV up to +15.2% ($p < 0,01$), with stage 1gr. As can be seen from Diagram 1, a long-term and sufficient stabilization of the studied parameters of systemic hemodynamics was recorded against the background of dexmedetomidine infusion and planned analgesia with paracetamol, which confirmed the adequacy of sedation-analgesia in patients in group 1f. About reliable suppression of postoperative BS after cardiac surgery in children, evidenced by practically unchanged indicators of SI and FI at the stages of the study.

Blood oxygenation (Sat O₂) at all stages of the study corresponded to standard indicators and fluctuated within the range, both against the background of mechanical ventilation (stages 1-2) and against the background of adequate spontaneous breathing (stages 3-4). Changes in acid-base balance and blood gases in children of group 1 in the postoperative period were unreliable, did not exceed age-related norms, and were characterized by relative stability (Table 5).

Diagram 1. Changes in systemic hemodynamics at the stages of the study in patients of group 1



Note: * $p < 0.05$, ** $p < 0.01$ compared with stage 1 of the study

Table 5. The dynamics of the some studied indicators at the stages of the study in children of the 1 st group ($M \pm m$)

Indicators	1-stage	2-stage	3-stage	4-stage
SatO ₂ , %	96,8±1,75	96,91±1,69	95,27±1,30	94,73±1,43
pH	7,37±0,07	7,39±0,04	7,38±0,05	7,39±0,03
pO ₂ , mmHg	119,05±12,76	105,2±9,13	93,81±7,61	91,67±6,89
pCO ₂ , mmHg	38,78±5,91	36,61±4,34	37,54±4,25	37,90±3,11
BE, mmol/l	-2,87±1,62	-2,79±1,13	-2,54±1,57	-2,37±1,70

Note: * $p < 0.05$, ** $p < 0.01$ compared with stage 1 of the study

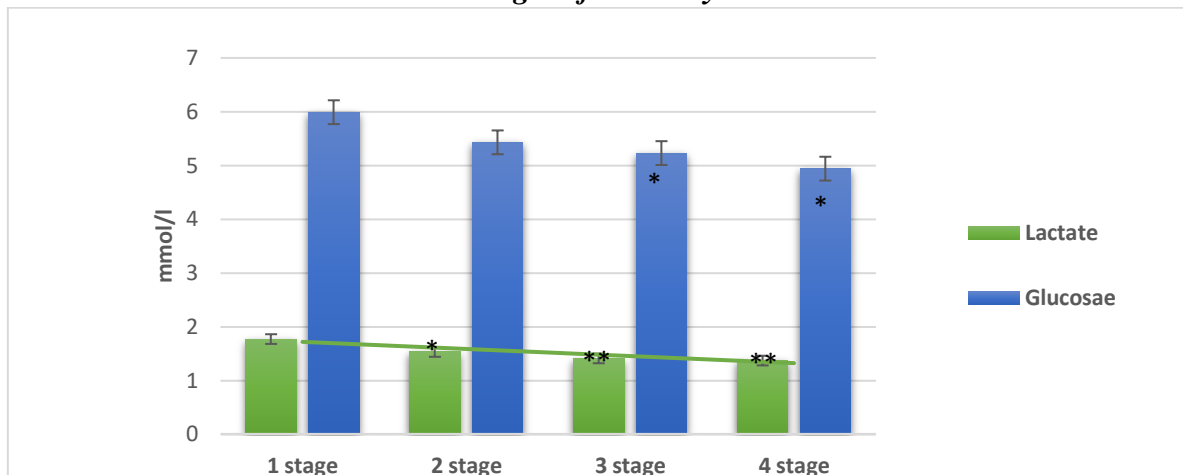
The study of some biochemical parameters, such as blood lactate - a marker of gross metabolic disorders, blood glucose at the stages of the study showed the following results: after surgery at stage 1 recorded, the lactate level was 1.7 ± 0.52 mmol/l, which confirmed the absence of intraoperative hypoperfusion and hypoxia.

The glucose level at this stage was 5.99 ± 0.93 mmol/l. At stages 2-4 of the early postoperative period, there was a significant decrease in lactate levels by 13.6%, 20.4% and 22.6%, but its values did not go beyond the acceptable limits. Glucose levels were stable and decreased by 9.4%, 12.7% and 17.6% at stages 2-4 compared to stage 1. Infusion therapy on the first postoperative day did not include glucose solutions.

Blood cortisol levels in children of group 1 decreased within the range of 26.1-51.3% ($p < 0.05$) during the study stages (Diagram 3). A gradual decrease in the level of cortisol in the blood serum indicated the absence of emotional and pain stress in children.

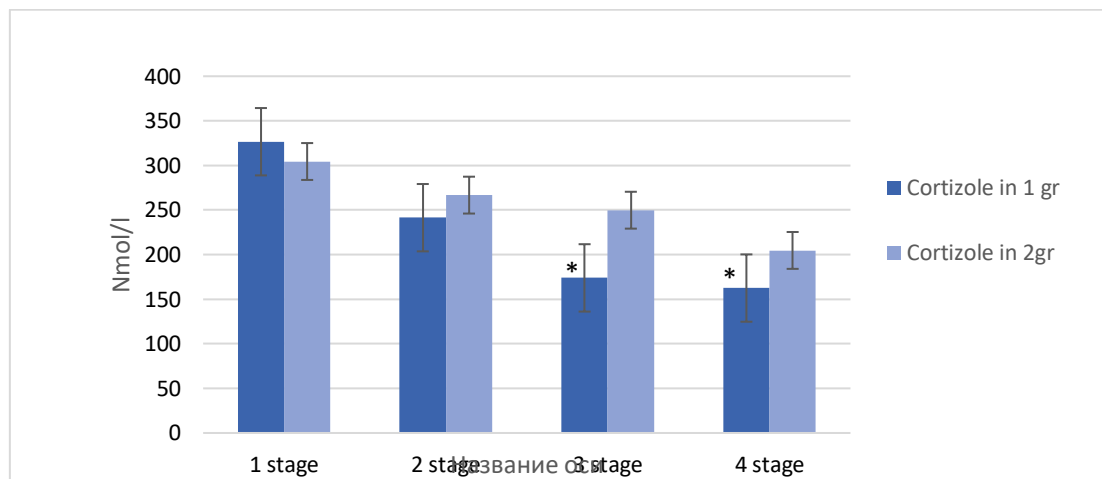
In general, the revealed stability of the indicators confirmed the absence of gross and complex disorders of metabolism and endocrine status in patients of group 1 in the early postoperative period.

Diagram 2. The level of lactate and glucose in the blood in patients of group 1 at the stages of the study



Note: * $p < 0.05$, ** $p < 0.01$ compared with stage 1 of the study

Diagram 3. Cortisol levels in selected groups for study stages



Note: Study stages in group 1: 30 min, 2 h, 8 h, 24 h p/surgery

Stages of the study in group 2: 2 hours of surgery, 1 hour, 3 hours and 6 hours of pain relief

When analyzing the postoperative intensity of pain and assessing the level of sedation using the above scales [33], the results were obtained significantly different in the studied groups of patients.

Table 6. Dynamics of changes in the level of sedation - analgesia according to the FLACC and RASS scales in group 1 at the stages of the study

Scale	1 stage	2 stage	3 stage	4 stage
FLACC, score	0,51±0,08	3,83±1,13	3,05±1,27*	2,63±1,14**
RASS, score	-5,0±0,03	-1,8±0,01	-2,4±0,01	-2,1±0,02

Note: * $p < 0.05$, ** $p < 0.01$ compared with stage 1 of the study

As can be seen from Table. 6, in children of group 1, immediately after surgery at stage 1 in the ICU, that is, 30 minutes after the administration of dexmedetomidine, drug-induced sleep

remained due to the residual effect of drugs and anesthesia. The children were calm, most of them were asleep and did not respond to speech or touch from medical personnel, and the level of sedation was 0.51 ± 0.08 . The pain level at the next stage was 3.83 ± 1.13 , at this stage paracetamol (Infulgan) was administered for the purpose of planned treatment Pof BS in patients after tracheal extubation (100%). The patients experienced slight discomfort, with a tense grimace on their face, but lay calmly in a normal position. At subsequent stages 3-4, the pain intensity decreased by 20.4% and 31.4% ($p < 0.05$) in relation to stage 2 - the beginning of postoperative BS therapy. The patients were calm, relaxed, most of them were in a drowsy state. No one complained of pain. As for the assessment of sedation on the RASS scale, in patients of group 1 at stage 1 it was -5.0 ± 0.03 , the children did not respond to verbal and/or physical stimulation, they experienced drug-induced sleep. Further, in the following stages, a level of sedation between mild and moderate was observed, which was consistently maintained over the next 24 hours. The children were sleepy during this time and could perform movements in response to voice/verbal stimulation. Their early postoperative period proceeded favorably with relatively stable indicators of hemodynamics, respiration, acid-base balance and blood gases, and the studied metabolic indicators. Overall, Dexmedetomidine in the postoperative MMA regimen with paracetamol (Infulgan) in the above indicated dosages contributed to adequate sedation, prolonged the analgesic effect of Infulgan and ensured a favorable course of the postoperative period in cardiac surgery patients.

In patients of the comparison group, as can be seen from Table 7 at stage 1, i.e., 2 hours after surgery, in extubated patients (100%), the intensity level of postoperative pain was, on average, 6.21 ± 1.02 , which corresponded to pain of moderate intensity. The children were restless, wary; their movements in bed were somewhat limited and constrained. The majority of them (75%) reported crying, whining and a reluctance to interact/communicate with medical personnel. Then, 1 and 3 hours after anesthesia with morphine, the children calmed down, most of them (65%) fell asleep/dozed off and the level of pain intensity decreased and amounted to 2.74 ± 0.97 and 3.29 ± 0.98 points, which corresponded to mild discomfort. The intensity of BS at stages 2 and 3 of the study significantly decreased by 55.9% and 47.1% compared to stage 1. At stage 4, 6 hours after anesthesia with morphine, 90% of children noted the resumption of postoperative pain, its intensity was 7.15 ± 1.32 points, which was 138.3% higher than the indicators of the previous 3 stage. This was an indication for re-prescribing morphine in children of this group.

Table 7. Dynamics of changes in the level of sedation - analgesia according to the FLACC and RASS scales in group 2 at the stages of the study

Scale	1 stage	2 stage	3 stage	4 stage
FLACC, score	$6,21 \pm 1,02$	$2,74 \pm 0,97$ **	$3,29 \pm 0,98$ **	$7,15 \pm 1,32$
RASS, score	$+1,0 \pm 0,01$	$-2,01 \pm 0,02$	$-1,06 \pm 0,01$	$+2,04 \pm 0,03$

Note: * $p < 0.05$, ** $p < 0.01$ compared with stage 1 of the study

RASS scale, the level of sedation at stage 1 averaged $+1.0 \pm 0.01$, children woke up from narcotic sleep (residual effect general of anesthesia), at this stage 100% of children were extubated. Behavioral characteristics included restlessness, agitation, low-energy, non-aggressive movements, tearfulness, and groaning, which was an indication for starting postoperative pain relief with morphine. At stages 2 and 3, after anesthesia with morphine, the level of sedation was -2.01 ± 0.02 and -1.06 ± 0.01 , which corresponded to mild sedation or drowsiness; during verbal contact, the patient closed his eyes in less than 10 seconds. The children did not complain of pain and/or other unpleasant sensations. Already 6 hours after anesthesia (4 step), the level of sedation increased and amounted to $+2.04 \pm 0.03$ on the RASS scale, by this time the patients became restless, agitated and made frequent non-purposeful movements. An increase in hemodynamic and

respiratory parameters was noted, which required repeated administration of morphine for treatment purposes after operation pain.

The duration of treatment of children in the ICU depended on the severity of congenital heart disease and the condition of the operated child. On average, the stay in the ICU for children in group 1 was 42.3 ± 5.5 hours, for children in group 2 - 68.1 ± 6.2 hours.

Adverse events

In group 1, bradycardia was observed in 8.5% of cases with rapid administration of a loading dose of dexmedetomidine, without a drop in blood pressure and maintaining normal sinus rhythm. After stopping the drug administration, the heart rate returned to normal within 20-30 minutes. In patients of group 1, against the background of a more favorable course of the early postoperative period, enteral feeding began 24 hours after surgery. In group 2, patients had a high incidence of undesirable effects and complications: nausea-vomiting (16.6%), itching (13.3%), intestinal paresis (6.7%), urinary retention (6.7%). In group 2, 7 (23.3%) children with VSD complicated by pulmonary hypertension and postoperative blockade using cardiac pacing spent 4-7 days in the ICU.

DISCUSSION

Summary of the main finding of the study

The development and implementation of postoperative multimodal analgesia and anesthesia based on the combined use of dexmedetomidine with paracetamol promotes optimal control of pain and sedation, reduces the consumption of drugs for symptomatic therapy and postoperative analgesia, helps reduce complications, early activation of patients and rapid postoperative rehabilitation. In general, the multimodal approach provided an opportunity for the introduction of Fast Track Surgery technology - a strategy of active surgical treatment aimed at accelerating various stages of treatment and early postoperative recovery of children with the above-mentioned cardiac surgical pathology.

Discussion of the main result of the study

Multimodal analgesia has almost become the standard of choice for postoperative analgesia in various areas of surgery in adult patients. MMA is aimed at improving the quality of pain relief through the use of a combination of various non-opioid analgesics, reducing opioid doses and the incidence of complications [34].

Sedation in children undergoing cardiac surgery remains an unsolved problem due to the complexity of operations to correct congenital heart defects and the wide range of patient ages. The current approach to sedation and analgesia in children in the postoperative period has been relatively limited and consists of high doses of opioids in combination with additional sedatives. Long-term use of opioids, especially in young children, depresses breathing, which may require prolonged respiratory support and the development of withdrawal symptoms [35]. The primary goal of sedation in children undergoing cardiac surgery should be to achieve adequate analgesia and sedation without compromising hemodynamic status. A combination of opioids and non-opioids may be helpful in this regard. Several nonopioid agents, including dexmedetomidine, acetaminophen, and benzodiazepines, may be used for sedation and postoperative pain management to reduce opioid adverse reactions. Today, the α_2 -AR agonist dexmedetomidine is widely used for sedation, synchronization with long-term mechanical ventilation, in multimodal pain relief regimens, etc. The use of dexmedetomidine in young children after surgical correction of a congenital heart anomaly was described for the first time in 2006 [36]. The results of its testing demonstrated a minimum of cardiovascular and respiratory effects while achieving adequate sedation - analgesia after operations. The absence of a negative effect on respiratory drive promotes earlier extubation and allows its safe use in non-intubated patients. Thus, in a systematic

review (2018) studying the effectiveness of dexmedetomidine in various schemes of postoperative analgesia after cardiothoracic operations by thoracotomy/sternotomy, it was shown that in patients receiving dexmedetomidine, the intensity of PBS was significantly lower than in the comparison group [37]. This meta-analysis of 12 medical centers (n = 804) documented a significant reduction in the need for additional postoperative pain management and a reduction in opioid use in patients treated with dexmedetomidine.

In pediatric cardiac surgery, where pain is significant, multimodal analgesia regimens have not been sufficiently studied. Optimal postoperative pain relief after cardiac surgery should provide more stable hemodynamics, psycho-emotional peace and reduce the risk of developing ischemic complications in children. This is especially true for young children, when they need adequate protection from stress, pain, negative emotions, fear, depression, etc. Therefore, the state of stress caused by the stay of a small patient in the intensive care unit, first of all, dictates the need for adequate analgosedation. Proper sedative therapy reduces metabolic and neuroendocrine changes, eliminates discomfort, and allows medical procedures to be performed without negatively affecting the cardiovascular system [38]. The results of our study did not record significant hemodynamic disturbances in the early postoperative period; the limit of reduction in heart rate, SBP and SBP was noted to be -14%, which once again emphasizes the dose-dependent hemodynamic effect of dexmedetomidine. In addition, according to the results of studies and our own data, respiratory depression was not detected in patients treated with dexmedetomidine, which is due to the lack of its effect on the respiratory center [37]. And this was a positive side in the favorable course of the early postoperative period in young children against the background of dexmedetomidine.

In many studies testing dexmedetomidine, the most common adverse events were bradycardia and hypotension [7,37,38]. Thus, according to some authors, in children with congenital heart defects admitted to the ICU immediately after surgery, the administration of dexmedetomidine at an initial loading dose of 1 mcg/kg intravenously over 10 minutes, followed by an infusion of 1 mcg/kg/h, led to a decrease in heart rate by 18%. However, despite the low heart rate, normal sinus rhythm and blood pressure were maintained [38]. One study reported bradycardia and 10 seconds of asystole during sedation with an opioid and dexmedetomidine in an 18-year-old double-lung transplant patient. After discontinuation of dexmedetomidine, normal sinus rhythm was restored [39].

In addition, the authors [40] revealed the fact that in preschool children (1-6 years old), intravenous administration of dexmedetomidine at a loading dose of 0.5 mcg/kg followed by an infusion of 0.5 mcg/kg/h in cardiac surgery, weakened intraoperative hemodynamic and neuroendocrine reactions (decrease in plasma adrenaline, norepinephrine, glucose and cortisol). These results are consistent with our data on neuroendocrine status in the postoperative period.

The findings were consistent with international meta-analyses where mechanically ventilated intensive care patients receiving dexmedetomidine demonstrated mild, manageable levels of sedation. In our studies, when using dexmedetomidine in moderate therapeutic doses, all patients had a mild to moderate level of sedation (Table 5). The deep level of sedation in the first postoperative hours may be due to the residual effect of general anesthesia. Dexmedetomidine provides a dose-dependent level of sedation while maintaining verbal contact with the patient, facilitating care and medical procedures.

Paracetamol (intravenous acetaminophen) has been used for more than 10 years in the pediatric population, benefiting from its rapid onset of action and relative safety profile. [41]. Some studies have shown that the use of paracetamol reduced the need for opioids and the duration of mechanical ventilation after non-cardiac surgery [42]. In contrast to non-steroidal anti-

inflammatory drugs with a high risk of bleeding and renal dysfunction, paracetamol provides relative safety in the perioperative period, and its combined use may improve pain control and sedation in pediatric cardiac intensive care units. [35,43].

Limitations of the study. There were no significant limitations that influenced the results of the study.

CONCLUSION

Postoperative multimodal analgesia with dexmedetomidine in combination with paracetamol provides an adequate level of sedation, suppresses irritation to extubation, prevents psychomotor agitation and provides effective analgesia. Respiratory depression was not noted in any case, and the decrease in blood pressure and heart rate was hemodynamically insignificant. Preservation of the swallowing reflex contributed to the early initiation of natural feeding. Transfer of 74.3% of patients in group 1 42.3±5.5 hours after surgery to a specialized cardiac surgery department reduced costs and burden on ICU medical staff. An optimized technique of MMA with dexmedetomidine in combination with paracetamol may provide an alternative to traditional opioid-based postoperative analgesia methods in pediatric cardiac intensive care units.

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A MODEL FOR DEVELOPING STUDENTS TO A HEALTHY LIFESTYLE THROUGH FITNESS-YOGA

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Abstract. *This scientific article focuses on the results of the analysis of modern research in the field of healthy lifestyle development, the analysis of several models of health care today, their effective influence and understanding of the role and place of health care in human life and activities.*

Keywords: *model, healthy lifestyle, fitness, yoga, health, development.*

Development and implementation of a healthy lifestyle development model that allows for the implementation of measures aimed at the health care and strengthening of the higher education system in order to effectively solve the problems of developing a healthy lifestyle among students in the educational space of the university need to increase.

Modeling (latin “modulus”) is a measurement, standard, image or sample of a system of objects. Knowledge allows researching objects, making models of existing objects and events, and systematic learning. The modeling method is widely used in modern science, it facilitates the process of scientific research, and in some cases, it becomes the only means of studying complex objects. This is especially important in the study of abstract objects and the educational process. Models are used to explain the properties of an object and the processes that occur in it.

Modeling of pedagogical conditions for the development of a healthy lifestyle is included in the researches of R.A.Qasimov [14], T.V.Klimova [15], M.O.Shuaybovoy [24], J.F.Jimenez-Parra [2], N.V.Tretyakova [5], N.E.Kasatkina [13] and others. Currently, several models of healthy lifestyle development are presented in foreign studies.

The medical-prophylactic model (A. Charlton, W. Blair [1]) is based on informing people about the behaviors and factors that affect health. This model is often called cognitive. The authors of the model argue that the most important condition for a healthy lifestyle is to inform a person about the health risks of a certain behavior or the benefits of certain behaviors aimed at maintaining health. According to critics of this model, this view is simplistic of the problem of health care and health behavior development. The reason is that not only informational factors are involved in the mechanism of human behavior.

The radical-political model was developed by E.Rogers and F.Shoumaker [3] and helps a person to make a decision to lead a healthy lifestyle by changing external conditions (legislation, social conditions, etc.) based on the idea that it is possible to create a living environment that provides.

The most universal and practice-oriented model, which takes into account a number of factors affecting human behavior aimed at maintaining health, is the health action model developed by the English scientist K.Tones [4]. Such a model is capable of combining the entire spectrum of social and psychological influences that a person faces. The content of this model combines, first of all, activities for health, as well as factors affecting such activities, including human behavior, his value system and motivation. Actions for the benefit of health are carried out on the basis of

information that must be perceived by a person at an interdisciplinary level. A necessary aspect of the model is general social norms.

In our opinion, in order to effectively solve the issues of developing a healthy lifestyle among students in the educational field of the university, it is necessary to introduce a model aimed at the implementation of a set of pedagogical conditions aimed at maintaining and strengthening health into the educational system.

This model consists of three interconnected blocks: *theoretical, content-activity and evaluative-resultative*. They help to understand the essence of the studied object in more depth and detail.

The *theoretical* block of the model contains a description of methodological approaches and principles of developing a healthy lifestyle for students. This block summarizes the principles of *systematic, person-centered, activity-based, and competency-based* approaches. All approaches complement each other, the integration of approaches determines the choice of actions to implement the model.

The *systematic approach* in pedagogy implies an approach to the pedagogical process as a system - a set of clearly structured and closely interconnected elements. This approach, unlike the traditional subject approach, is more qualitative and modern. One of the founders of the systematic approach is K.L.Bertalanfi [6].

It is impossible to create and design a healthcare environment in an educational institution without implementing a systematic approach. A systematic approach to the organization of health care activities in an educational institution is related to the need for a deep, multi-level and multifaceted analysis of the educational process and its impact on human health. A systematic approach to the development of a healthy lifestyle allows you to select and carefully study each element of the system, analyze and compare them by combining them into a coherent structure. At the same time, all their similarities and differences, contradictions and connecting features, the priority of some elements over others, the dynamics of development of each element and the whole system are determined.

Person-oriented approach appeared within humanistic psychology A.Maslow, K.Rogers, [7], I.S.Yakimanskaya [25] and others played an important role in the development of general scientific principles as methodological bases of this approach. Developing a healthy lifestyle of students in person-centered education, creating an appropriate health-saving educational environment and allowing students to directly study independently and without intermediaries, make independent decisions characterized by the implementation of a comprehensive system of enabling conditions. A person-oriented approach in the field of health care has an educational, developmental and formative character that affects the student's personality. This approach to the fitness tool allows to combine personal and practical components and develop the main concept – “personally oriented fitness tool” is the process of developing healthy lifestyle social skills, civic attitudes, behavioral culture among students. In order to implement a person-oriented fitness tool, it is necessary to understand the health-related components of health-related fitness, healthy lifestyle values, development of social activity, as well as self-improvement of motor skills and physical abilities. The main characteristic of students who choose types of physical activity is their personal motivation. The choice of the type of activity with the help of fitness is the student's awareness of his decision, and in making such a choice, the principle of democratization and humanization implemented during the joint activity of the student and the teacher can be

maximally used. For the effective cooperation of the student and the teacher in this type of activity, programs and instructions are drawn up, and practical complexes of fitness exercises are developed for students. The concretization of fitness technologies aimed at meeting the needs and motivations of the student in the selected type of physical activity is of particular importance in the process of implementing a person-oriented approach. Implementation of such technologies in practical activities helps to develop new original forms of physical culture.

The main positions of the *active approach* were formed by L.S.Vygotsky [8], A.A.Leontiev [18], S.L.Rubinshtein [12] and others. In the most general form, an active approach means organizing and managing the student's health care activities in the general context of his life. At the same time, the activity approach implemented in the life context of a specific person, taking into account his life plans, value orientations and other parameters of the subjective world, is essentially a personal-activity approach. It is carried out by creating conditions for strengthening theoretical knowledge in the field of health care based on practical activities. From the point of view of an active approach, the essence of the development of a healthy lifestyle is to focus on the joint activities of the teacher and the student aimed at achieving the goals and tasks of health care. The student not only perceives ready-made knowledge, but also participates in the process of self-improvement. In this case, personally important motives that stimulate activity are activated.

In real conditions, a healthy lifestyle can be effectively implemented using the comprehensive potential of its educational and educational nature, that is, based on the active approach of fitness. The student acquires a system of certain scientific knowledge and practical skills important for a healthy lifestyle, forms a worldview focused on the value of health care, and develops the necessary physical abilities.

The concept of a *competence-based approach* has become widespread relatively recently in connection with the signing of the Bologna Declaration at the Berlin Conference in 2003. Competency-based approach was the result of new requirements for the quality of education [10]. Currently, major scientific-theoretical and scientific-methodological works have already appeared, in which the essence of the competency-based approach and the problems of developing basic competencies are highlighted in the works of most researchers. (R.K.Gilmeeva [9], I.A.Zimina [11], E.V.Kondratenko [17], V.A.Slastenina [21], A.V.Khutorsky, A.A.Sharapov [23]).

The implementation of methodological approaches in the process of developing a healthy lifestyle of students includes the organization of an educational environment that preserves health, taking into account the following general didactic principles (*systematic, scientific, individualization and differential principles*). The principles that reflect the specific features of the development of a healthy lifestyle of students with the help of fitness technologies include *flexibility (adaptive), loadability, psychological regulation, openness and adequacy of choice, aesthetic suitability, adaptation to the student contingent, control and monitoring of students' physical condition, principles such as hedonism and the stimulation of interest* were developed and based on the research of E.G.Saykina [20].

Among the many principles proposed by E.G.Saykina, we single out five specific principles based on the biological, pedagogical and psychological laws of health training development and reflecting the laws of functioning of such a complex, multifunctional socio-cultural phenomenon as fitness. we considered it appropriate to show.

The principle of *loadability* is one of the most important principles of fitness. The principle of loadability reflects the general ideology of fitness, the goal of which is to maintain the body in the

most optimal physiological state. This principle implies the absence of competitive motives and aspirations to achieve a high sports result, which defines the specific characteristics of all fitness programs. The principle of loadability should not be understood as reducing the load to a minimum level, because it is impossible to increase and even maintain the level of psychophysical potential without physical strength. It should also be noted that physical activity during fitness training should not be high, such training should have a healthy character and correct the physical development of the participants, as well as increase their physical fitness.

The principle of *adequacy* of fitness includes the selection of optimal means and methods for achieving a specific goal, based on the individual characteristics of people engaged in physical activity. Each student has the right to choose one or another type of fitness, it depends only on the student's interest and motivation to engage in this type of physical activity.

The principle of *aesthetic expediency* is one of the first principles developed in fitness. In addition to the task of improving health, the appearance of a serious stimulus and motivation in fitness participants satisfies the aesthetic needs of a person (beautiful body shape, correct height, etc.). Fitness training awakens the desire to achieve beauty in a person's appearance, shapes the beauty of actions, teaches to see the beauty around, relationships between people.

The principle of *psychological regulation* determines the need to reduce the level of anxiety and stress of those involved through fitness exercises that allow to relieve muscle tension and regulate the state of the nervous system. A special selection of musical accompaniment will help this: from high-impact music therapy to low-impact, for example, autogenic training.

The principle of *control and monitoring* of the physical condition of those engaged in fitness is planning and optimal regulation of physical activity based on the individual capabilities of the student's physical and functional fitness. Such monitoring is carried out in the form of a test in order to determine the desired health effect from the chosen fitness direction and to achieve the maximum positive result and to make additional adjustments to the fitness program.

We used the above principles as a basis for developing a model for developing a healthy lifestyle of students with the help of fitness technologies. The goal of the considered model is to develop a healthy lifestyle of students with the help of fitness technologies. Achieving this goal can be done by solving problems that correspond to the specific stages of development of this type of activity of students, taking into account the opportunities provided by fitness technologies:

- to develop students' awareness of the value of a healthy lifestyle and interest in fitness technologies;
- acquiring knowledge about the essence of healthy lifestyle and fitness technologies;
- use of fitness technologies in the design and organization of health care activities;
- develop the ability to assess the impact of fitness technologies on human health, analyze the results of health care activities, identify errors and shortcomings for further correction of actions.

The analysis of the educational programs carried out within the framework of our research shows that the subjects "Valeology", "Physical culture" and "Safety of life activities" play an important role in the development of general cultural and universal competences related to health care. These disciplines build competencies in physical and mental health. Currently, in the educational environment of many universities, these subjects have been removed from the catalog of subjects in the curriculum. This, in turn, requires a different approach to the development of a healthy lifestyle for students.

Therefore, we divided the *content-activity* block of the process of developing a healthy lifestyle of students into the main (invariant) part and variable (variant) components through the didactic possibilities of general professional subjects in the curriculum. The main (invariant) component is implemented through auditorium activities, and the variable component is implemented through non-auditorium activities.

The variable component of the development of a healthy lifestyle of students includes the introduction of fitness technologies in the course of extracurricular activities of students based on mobile applications, media, social networks and student associations (fitness clubs, departments, network communities). , which allows you to combine practical training in selected types of fitness with basic rational nutrition advice. The purpose of studying fitness technologies for students is to master the methodology of training in various fields of fitness, to develop the correct posture during training, to strengthen skeletal muscles and improve the mobility of internal organs, to strengthen health and a healthy body. is to acquire lifestyle skills. Fitness technologies are focused on all types of physical activity and include sets of physical exercises: strength training, aerobic, anaerobic, fitness-yoga, etc.

In the studies devoted to the problems of developing a healthy lifestyle among university students, it was noted that the organization of *physical culture* or other wellness activities in universities using outdated organizational forms and methods is not effective and does not give the desired results. According to the experts' conclusion, with this approach to the organization of *physical culture* training aimed at solving the problems reflected by the indicators of physical fitness and the standards of the credit module of the curriculum, the attitude of students to health and lifestyle always improves. Also, the analysis of educational and regulatory documents shows that the science of *physical culture* has been removed from the curriculum of most pedagogical higher education institutions (bachelor's field is not physical culture).

Taking into account the appearance of the term “fitness technologies” and its specific features, it should be said that these technologies are developed in accordance with the goals and objectives of fitness, based on its principles, which take into account the motivation of the participants, their age and physiological characteristics and others are considered.

The structure of fitness technologies can be distinguished according to the following directions: aerobic programs (Step-aerobics); strength directions of fitness (CrossFit, Tabata); mixed format programs; low-intensity "Mind Body" programs (fitness-yoga, stretching); dance programs (Zumba, hip-hop) and digital technologies used in fitness (mobile applications, social networks, online platforms) [16]. All of them are aimed at improving the health of the body: a person is aware of his functional state, follows the rules of rational nutrition, leads a healthy lifestyle by increasing muscle mass, reducing fat balance, improving the functional and physical fitness of the body. In the framework of educational organizations of foreign countries, as a rule, fitness is carried out in the form of group training to maintain physical fitness and improve sports. Regardless of the type of fitness, the algorithm for implementing fitness technologies has the following stages: first, the development and approval of a short-term and long-term program; secondly, making an agreement with the executor of the developed program, which will allow you to achieve the desired result on time and make physical activity a necessary component of life; thirdly, current, operational and step-by-step control of the condition of those involved in the implementation of the program to analyze the reactions of the body to physical activity; fourthly,

based on the analysis of the results obtained from the conducted training, the effectiveness of the used fitness program is evaluated and its further correction is carried out.

The development of a model for the development of a healthy lifestyle of students is a systematic process, in which the main idea is to prepare students for independent management of a healthy lifestyle and to use general didactic technologies and activity-type technologies (fitness technologies) in future health activities. is to implement a healthy lifestyle. As a result of mastering fitness technologies, the student knows the complex control methods and organization of fitness classes, can use practical forms, methods and tools of fitness technologies in interaction with the subjects of the educational process; be able to shape your own physical activity and healthy lifestyle based on the needs for physical training; learns how to make a habit of the components of a healthy lifestyle using fitness technologies, to identify mistakes in performing exercises and to find ways to eliminate them in the process of mastering new types of exercises.

Pedagogical monitoring is an effective tool that allows evaluating the effectiveness of developing a healthy lifestyle of students. Pedagogical monitoring includes a system of collecting, storing, processing, evaluating, analyzing, predicting and distributing information about the pedagogical process. Pedagogical monitoring is an element of the evaluation and effective block of the considered model, which allows to assess the impact of fitness technologies on human health.

Monitoring of the development of a healthy lifestyle of students performs several functions at the same time: diagnostics that evaluates and analyzes the results of health care activities; control reveals the management function that allows to correct and predict the errors and shortcomings in the development of this type of training and the state of the healthcare process.

The implementation of the model includes the monitoring of the development of a healthy lifestyle of students using fitness technologies. Pedagogical monitoring at the initial work stage includes diagnosing the level of development of healthy lifestyle of students.

Diagnostics can be carried out using A.G.Nosov's "development of healthy lifestyle components in students" [19], S.Deryabo and V.Yasvin's "health care attitude index" and other methods. This allows us to evaluate the motivational-valuable, cognitive, active-creative and evaluative-reflexive criteria of developing a healthy lifestyle as a diagnostic tool [26].

The identifying and summarizing stage of experimental work includes diagnostic methods aimed at studying the motivation of students to maintain and strengthen their health, determining the level of basic knowledge about communicative and organizational trends, and the ability to reflect. A pedagogical test (interview, questionnaire) will be conducted to determine the level of knowledge of the basics of a healthy lifestyle.

The analysis of the results of the student's health care activities determines the level of readiness of students to practice a healthy lifestyle.

The evaluative-effective block of the model is presented in the form of motivational-valuable, cognitive, active-creative and evaluative-reflexive criteria for indicators describing students' readiness to manage and implement a healthy lifestyle, the level of formation of this preparation.

Thus, all considered components of the model of development of a healthy lifestyle of students act as a single system. Each component of the model is responsible for solving a specific problem, so the unity of all components ensures the achievement of a common goal.

Pedagogical conditions for the effective implementation of this model include the introduction of fitness technologies into the health-preserving educational environment of the university; use of didactic possibilities (potential) of basic academic subjects in the process of preparing students for a healthy lifestyle; involving students in practical activities independently (outside the auditorium) on the implementation of a healthy lifestyle; consists of monitoring students' readiness for a healthy lifestyle.

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CAUSING FACTORS, SYMPTOMS, STAGES, DIAGNOSIS AND TREATMENT OF TUMOR DISEASES OF THE BREAST

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Abstract. *This article discusses the causes of breast cancer, the leading cause of death among women in the world rankings, changes observed in women, symptoms, pathophysiology, stages, diagnosis and treatment, and treatment. The new approach included information on the use of apitherapy.*

Keywords: *lobular cancer, mutation, young age, menopause, ductal carcinoma in situ, tumor marker.*

INTRODUCTION

Breast cancer is a tumor that develops in the tissues of the mammary glands. Most tumors that arise in the mammary glands are benign and are not considered dangerous: they grow slowly, tumor cells do not differ significantly from healthy cells, and do not spread to other organs or parts of the body. Cancer is caused by mutations—abnormal changes in genes that regulate cell growth and keep cells healthy. Poor quality cells multiply uncontrollably, so over time they can spread beyond the primary tumor to surrounding healthy tissue, lymph nodes and distant organs.

According to statistics from the World Health Organization, breast cancer is the second most common cancer after lung cancer and the first cancer causing death among women.

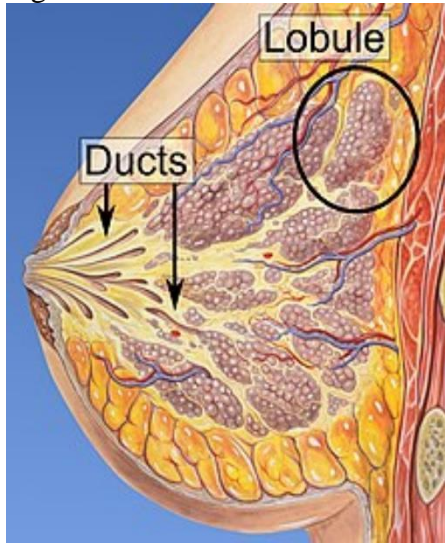
MATERIALS AND RESEARCH METHODS:

The situation in developed countries regarding breast cancer is as follows: For example, in Japan, as in all countries, we can observe many progressive and regressive disease processes. In Japan, every 39th woman suffers from this disease. Specifically, for every 10 thousand population, the average number of 50–54-year-olds was 19 in 1985-1989, 21 in 1990-1994, 29 in 2000-2004 and 27 in 2010-2014. The risk of developing the disease increases with age. It is known that currently the disease occurs even among adolescents 11-13 years old due to their “young age” [4]. Breast cancer is the most common malignant tumor in women, and the number of new cases worldwide exceeds 2.3 million per year [3]. During their lifetime, 1 in 7 women in the United States and 1 in 10 women in Russia develop breast cancer [2]. Enough [1]. In 2018, 3,578 women with breast cancer were registered in Uzbekistan. Today, about 18,000 women suffer from breast cancer. Every year, 800,000–1,000,000 new cases of the disease are registered worldwide. The indicator increased by 0.3% compared to previous years [4]. According to scientists, the risk of breast cancer is especially high in the age range of 50-60 years and is 70%; 1 out of every 12 women in the world suffers from this disease. This disease has not spared men either. The probability of occurrence in men is 0.5-1%, and 15% of the causes of the disease in them are genetic predisposition.

FACTORS FOR THE DEVELOPMENT OF BREAST CANCER:

Risk factors for developing breast cancer include obesity, lack of physical activity, alcoholism, hormone replacement therapy during menopause, ionizing radiation, early, late or absent first menstruation, and a family history of the disease of approximately 5-10. Genetic predisposition. inherited from a person's parents in % of cases as a result, the presence of mutations

in the BRCA1 and BRCA2 genes is a risk factor for developing this disease. Major risk factor for breast cancer One of the factors is the occurrence of this disease in women, and the second is the high incidence of older women. In addition, uncontrollable risk factors include heredity, infertility



ty to get pregnant), high levels of certain hormones, diet and [5]. Breast cancer often begins in the cells lining the milk ducts and the lobules that supply those ducts with milk begins. Cancer that develops in the ducts is called ductal carcinoma, cancer that develops in the lobules is called lobular carcinoma. There are also more than 18 other subtypes of breast cancer. For example, ductal carcinoma in situ occurs in preinvasive lesions. The diagnosis of breast cancer is confirmed by taking a biopsy of the relevant tissue. After diagnosis, additional tests are done to determine whether the cancer has spread beyond breast and to determine which treatments are most effective. factors are divided into two groups - factors that cannot be influenced and factors that can be reduced.

Uncontrollable risk factors include:

- Female. The disease rarely develops in men (possibly due to mutations in genes);
- Age. In 90 percent of cases, the disease is diagnosed in patients over 40 years of age;
- Genetic predisposition, presence of mutations in the BRCA1 and BRCA2 genes;
- Dangerous precancerous (precancerous) diseases of the mammary glands;
- History of breast cancer;
- History of chest radiation exposure;
- Early onset of menstruation or menarche (before 12 years), late menopause (after 55 years).

Modifiable risk factors:

- Inability of a woman to become pregnant (the risk increases if she is not pregnant), refusal to breastfeed, artificial termination of pregnancy;
- Obesity;
- Diabetes mellitus, hypertension;
- Long-term use of steroid hormones, hormonal contraceptives;
- Alcohol abuse, smoking;
- Insufficient physical activity;
- Night work schedule.

SYMPTOMS OF THE DISEASE:

Breast cancer often starts in the lobular cells (the glands that produce milk) or the ducts (the path that carries milk from the lobules to the nipple). More than 80% of people with this disease can identify such a formation on their fingertips. However, the earliest detection of breast cancer occurs through mammography. Lumps in the lymph nodes in the armpits can also be a sign of breast cancer. Symptoms of breast cancer include thickening unlike other breast tissue, changes in the size, shape or appearance of the breasts, changes in the skin, a lump different from the tissue around the breast, redness of the breast or part of the breast. or changes in breast discharge, and if it gets worse, you may experience bone pain, swollen lymph nodes, shortness of breath, or jaundice (yellowing of the chest or entire body). In addition, one breast may become larger or smaller,

change the shape of the breast, indent the nipple, fold the skin, develop a rash on or around the breast, or have persistent pain and swelling in one part of the breast or in the armpit [6]. This type of pain (“mastodynia”) is an unreliable predictor of breast cancer, but may indicate other breast health problems. Inflammatory breast cancer is a rare (less than 5% of breast cancer cases) but dangerous type of breast cancer characterized by swollen, red areas in the upper part of the breast. Inflammatory breast cancer is caused by cancer cells blocking the lymphatic vessels. This type of breast cancer is more common in young or obese women. Because inflammatory breast cancer is not a tumor, there can sometimes be a delay in diagnosis. Malignant tumors can give rise to metastatic tumors - secondary tumors (arising from the primary tumor) that have spread beyond the site of origin [7]. Metastatic symptoms of breast cancer depend on the location of the metastases. Common sites of metastasis include bone, liver, lung, and brain. When cancer reaches this stage, it is classified as stage 4 cancer, which is most often the fatal stage of cancer. Common symptoms of stage 4 cancer include unexplained weight loss, bone and joint pain, jaundice and neurological symptoms [8]. These symptoms are called nonspecific symptoms because they can be seen in many diseases other than cancer.

STEPS:

The stage of breast cancer is determined depending on the characteristics of the disease. Determining the stage helps to choose the optimal treatment methods. Stages of breast cancer typically range from 0 to IV, with stage 0 being non-invasive cancer (carcinoma in situ) and stage IV being invasive disease that has spread to other parts of the body.

Breast cancer is usually classified into stages:

- Stage 0 – non-invasive breast cancer (carcinoma in situ) – has not spread to the tissue surrounding the breast ducts. Non-invasive breast cancer is usually detected during a mammogram and rarely appears as a lump in the breast.

- Stage I - non-invasive breast cancer. Cancer affects tissue near the tumor. The size of the tumor does not exceed 2 cm. The lymph nodes are normal.

- Stage II - invasive cancer. Cancer cells spread through the lining of the ducts into the surrounding breast tissue. The diameter of the tumor is from 2 to 5 cm, the tumor damages the lymph nodes under the armpit. This is the most common type of breast cancer.

Stage III is divided into two stages:

- Stage IIIA. The diameter of the tumor is more than 5 cm, the lymph nodes are greatly enlarged. They stick to each other and to surrounding tissues.

- Stage IIIB. This type includes inflammatory cancer and infiltrative ductal cancer. Characteristic signs of stage 3 are redness of the skin and the appearance of an orange color to the skin [9]. The tumor can be of different sizes. At this stage, the skin of the breast, the internal lymph nodes of the breast or the chest wall are damaged.

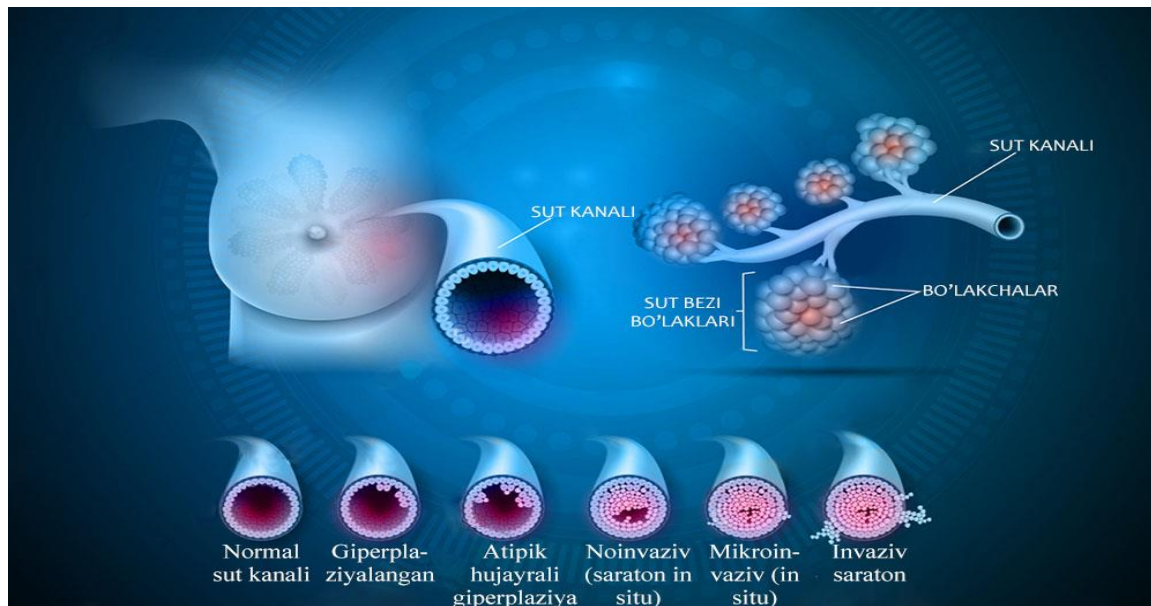
- Stage IV. The tumor invades the internal lymph nodes, reaches the armpit, and also affects the spine, lymph nodes, liver, lungs and brain. Stage 4 cancer is most often diagnosed in women with mutations in the BRCA-1 and BRCA-2 genes.

The figure below shows the anatomy of the mammary glands and their condition during cancer.

What to consider when determining stage:

- Tumor size (indicated by the letter T);
- Condition of regional lymph nodes (letter N);
- Presence of distant metastases (letter M);

- Degree of differentiation of tumor cells (letter G);
- State of tumor receptors (presence of estrogen and progesterone receptors);
- Cancer proliferation index Ki67;
- Presence or absence of overexpression of ERBB2 (HER2/neu).



DIAGNOSTICS:

If you suspect or have symptoms of breast cancer, you should see your doctor for a professional evaluation. The mammologist conducts an initial examination and makes an accurate diagnosis after the following diagnostic studies:

- mammography;
- analysis of tumor markers CA 15-3 in the blood;
- ultrasound examination of the mammary glands, abdominal organs, lymph nodes;
- biopsy (This method helps determine the type of tumor. The danger is determined by examining pieces of tumor tissue under a microscope);
- ductography (contrast mammography);
- immunohistochemical study (to determine the sensitivity of the tumor to certain hormones - estrogen, progesterone).

TREATMENT:

The choice of treatment method depends on many factors: the stage of the disease, the woman's age, the structure and size of the tumor, and growth rate. Modern treatment methods use the optimal combination of surgical, radiation and chemotherapy methods, that is, an integrated approach. In therapy, specialists must approach each patient individually. The team of specialists must offer the woman specific treatment methods in order for the treatment to be successful from an oncological and aesthetic point of view. Today, the most effective methods of treating breast cancer are:

- lumpectomy (includes removal of the tumor itself);
- mastectomy (includes complete removal of the mammary gland and other tissues);
- radiation therapy (if the patient has passed menopause) – cancer is irradiated with radioactive radiation;
- chemotherapy (if the patient has not gone through menopause) – cytostatics are used to ensure the death of cancer cells;

- hormonal therapy – drugs are used that block the sensitivity of the tumor to hormones;
- immunotherapy.

After surgery, depending on the characteristics of the body, the quality of treatment, and the stage of the disease, some patients live for several years, and some until old age. According to statistics, new metastases after surgery appear in the first 3-5 years, then the risk of tumor formation sharply decreases.

Currently, apitherapy is treatment with bee venom. This is one of the new trends in medicine, and its use in oncology will help achieve the expected results [4]. First, it is determined where exactly the breast cancer is located. Then bees sting this place. The patient is then prescribed chemotherapy. In this case, the drugs act on the affected area without affecting other organs. If we apply this treatment method in medicine, it will be very effective. Scientists have found that bee venom contains substances that enhance immunity. This prevents other azos from being ineffective in treating additional infectious diseases and when patients are taking multiple medications. Currently, this method is widely used in medicine in foreign countries. This method is widely used, especially in France and Germany.

Components of bee venom and their effect on the human body:

- microelements – magnesium, phosphorus, calcium, copper;
- acetylcholine and histamine – expand the diameter of blood vessels and increase their permeability;
- inorganic acids – phosphoric acid, chloride acid, formic acid;
- amino acids – 18 out of 20 available;
- acid phosphatase – a protein of complex structure;
- hyaluronidase – a special enzyme that destroys tissue and blood structures and causes a severe allergic reaction;
- phospholipase A is a strong allergen and antigen for the human body, disrupts tissue respiration and converts phospholipids into toxic substances;
- phospholipase B – converts toxic compounds into non-toxic ones, reduces the activity of phospholipase A.

Factors that reduce the risk of developing breast cancer:

1. It is recommended not only to follow the principles of a healthy diet, but also to eat healthy foods regularly. These include: cruciferous vegetables, especially cabbage and broccoli, dark, blue and red fruits, tomatoes, walnuts, garlic, beans, carrots, apricots, pumpkin.

2. Eat spinach! Women who regularly consume this product reduce the risk of developing breast and cervical cancer.

3. Don't forget the nuts! Eating just 15 grams of peanuts per day is enough to reduce the risk of death from many diseases, including breast cancer and diabetes.

4. The common belief that high meat consumption can increase the risk of developing tumors has been proven wrong: more than 20 studies have not confirmed this. Therefore, meat can be eaten without fat and in reasonable quantities.

5. Be careful with alcohol! If a woman drinks alcohol regularly, the risk of breast cancer increases by about 7 percent.

6. It is very important for women to monitor their weight, especially during menopause. A combination of strength training and cardio has been found to be the most effective way to lose

weight and gain muscle mass. Women are recommended to spend at least 4-7 hours a week in the gym.

7. Late-night snacking is dangerous not only for your waistline, but also for women's health in general. Eating earlier and avoiding eating at night can help stabilize your blood sugar and reduce your risk of breast cancer and diabetes.

8. It is very important to sleep at night - it is necessary for the production of melatonin. Women who work night shifts, especially 12-hour shifts, have been shown to have an increased risk of developing breast cancer.

9. Take action! A sedentary lifestyle increases the risk of breast cancer, ovarian cancer and tumors in women by at least 10%.

10. Get regular breast exams! Women aged 50–69 who had regular mammograms had a 40 percent reduction in risk of death from breast cancer due to early detection of the tumor.

CONCLUSION

The survival rate for breast cancer is 55%. If adequate treatment measures are not taken, this figure is 10%. The level of livability is influenced by many factors. If survival is determined by tumor stages, then in the initial stages of the tumor it is 95%. At the second stage, when the tumor reaches 5 cm, the viability of tumor cells with metastases to two lymph nodes is 55-80%. Survival rate for stage III and IV cancer is 10-50%. However, timely detection of the disease, its treatment, simultaneous surgery and chemotherapy, strict adherence to the doctor's recommendations and a healthy lifestyle make it possible to overcome this disease to a certain extent. Research shows that early detection of the disease is the most important factor!

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MODERN FACTORS IN THE FORMATION OF RESPIRATORY FAILURE IN PNEUMONIA IN YOUNG CHILDREN

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Abstract. *In this work, social and hygienic studies of the incidence of pneumonia and the reasons for the formation of a complicated course of pneumonia in young children were carried out. The most common syndromes aggravating the course of pneumonia were respiratory failure of varying degrees.*

Keywords: *pneumonia, obstructive syndrome, social factors, respiratory failure*

Relevance. Despite the fact that many problems associated with respiratory pathology have been successfully resolved, the incidence of unfavorable outcomes of this pathology is still high. one of the manifestations of the aggravated course of pneumonia in children is the complicated manifestation of the process, in particular respiratory failure. considering the increasing prevalence of obstruction in children, assessment of predisposing risk factors and the development of severe pathologies is an important prognostic and preventive measure. [1,4,6].

The causes of complications of this pathology are diverse, among them the leading role is played by social-hygienic, medical-organizational and medical-biological factors. in the formation of a complicated course of pneumonia in children of the first year of life, the decisive role belongs to antenatal factors [3,5].

To date, clear relationships have been established between the level of socio-economic development of the population and the health status of individuals in order to identify similar patterns in observed sick young children. existing data indicate a high incidence of concomitant pathology in patients with covid-19 and it is possible that this is one of the main factors [2,7].

The purpose of the study was to study the frequency of pneumonia with respiratory failure (rf) in young children depending on the influence of socio-biological factors

Materials and methods of research. The subjects of the study were 66 children with acute complicated pneumonia with RF aged from 3 months to 3 years, including 40 children under 1 year, 26 children from 2 years. up to 3 years. In all cases, the diagnosis of pneumonia was based on radiological, laboratory and clinical research methods. Anamnestic, clinical and laboratory parameters were analyzed. A statistical analysis was carried out based on the annual reports of the clinic of the city children's hospital No. 4. To clarify the frequency of morbidity in all children and mothers, data from outpatient observations (outpatient records) were analyzed. Calculations of relative indicators, standardization were carried out, and the probabilities of differences were determined using the Fisher-Student table.

Our research has shown that each of the following factors is representative as the causes that form the complication of the disease with RF, among which the following were identified: medical and organizational (33%), social and hygienic (25%), constitutional and background (42%). Specific aspects of medical and organizational factors in the formation of RF in pneumonia, based on the results of these studies, were the following: late diagnosis of the disease (15% of cases), insufficiently effective therapy in the first stages of pathology development (27%),

insufficient qualifications of doctors (10%), lack of necessary complex examination of the child and, first of all, x-ray analysis (14%), improper organization or violation of the principles of filling wards and the development on this basis of reinfection and superinfection (15%), outbreak of childhood infections in the departments (measles, chicken pox, measles rubella, etc.) (7%); lack of continuity of therapy between clinics and hospitals (12%), insufficient staffing of children's departments of hospitals with the necessary sets of medications and, first of all, antibacterial agents and drugs for transfusion and detoxification therapy (10%). Medical, social, socio-hygienic factors contributing to the complication of grade III RF were presented as follows: large families and the lack of proper attention to sick children on this basis (35%), low level of material security in a number of families (18%), lack proper amount of medical control over sick children (54%).

Constitutional and background factors included a large complex of signs: consequences of perinatal post hypoxic encephalopathy, prematurity, the presence of concomitant diseases (rickets – 25%, anemia – 38%, protein-energy malnutrition (PEM) – 18%, allergic diathesis – 19%), a history of pneumonia and pneumopathy during the neonatal period (17%). In a number of sick children, borderline conditions in the form of respiratory dysfunction, in particular vagal bronchogenic discriminatory syndrome, have been identified. In a number of children, the protracted course of the process was due to changes in the reactivity of the child's body under the influence of vaccinations. As a rule, RF pneumonia was formed against the background of repeated respiratory viral infections, which more often manifested themselves from 3 months of age.

The analysis of treatment and resuscitation measures played a significant role in terms of assessing medical and organizational factors in the formation of stage III-IV pneumonia. Adequate treatment of the main and also concomitant diseases, taking into account modern requirements of the required volume, was established in 65% of patients in urban conditions and 35% in rural areas. In a number of cases, treatment tactics were carried out without taking into account the severity of the disease and the individual characteristics of the child (25.4%). All patients with prolonged pneumonia observed by us had various initial manifestations of intoxication, as well as other symptoms of the disease, the frequency of which depended on the age of the patients.

The formation of RF I-II degrees of acute pneumonia in children after the first year of life was often associated with visiting a preschool group. This was due to the fact that in the presence of functional immaturity of specific and nonspecific defense mechanisms, aggravated by the unfavorable course of anti-, intra- and postnatal periods, concomitant diseases, children showed failure of adaptive reactions to their new microbial environment. Characteristics of premorbid anamnestic data in children with pneumonia with II-III-degree RF are presented in Table 1.

Table 1.
Characteristics of premorbid anamnestic data in children with pneumonia with II-III-degree RF

Analyzed features	Relative frequency of patterns	
	Up to a year	1-3 years
Complicated childbirth	0,26	0,23
premature	0,11	0,06
with asphyxia	0,05	0,08
Intrauterine hypotrophy	-	0,04
Type of feeding: mixed	0,31	0,24
artificial	0,26	0,26

Previous and concomitant diseases, which create opportunities to reduce the effectiveness of the body's nonspecific resistance, as well as a state of secondary immunodeficiency due to overstrain of specific protective factors or delay in their postnatal maturation, were of significant importance in the formation of RF I-II degrees of acute pneumonia. Characteristics of past and concomitant diseases in children with prolonged pneumonia are presented in diagram 1,2.

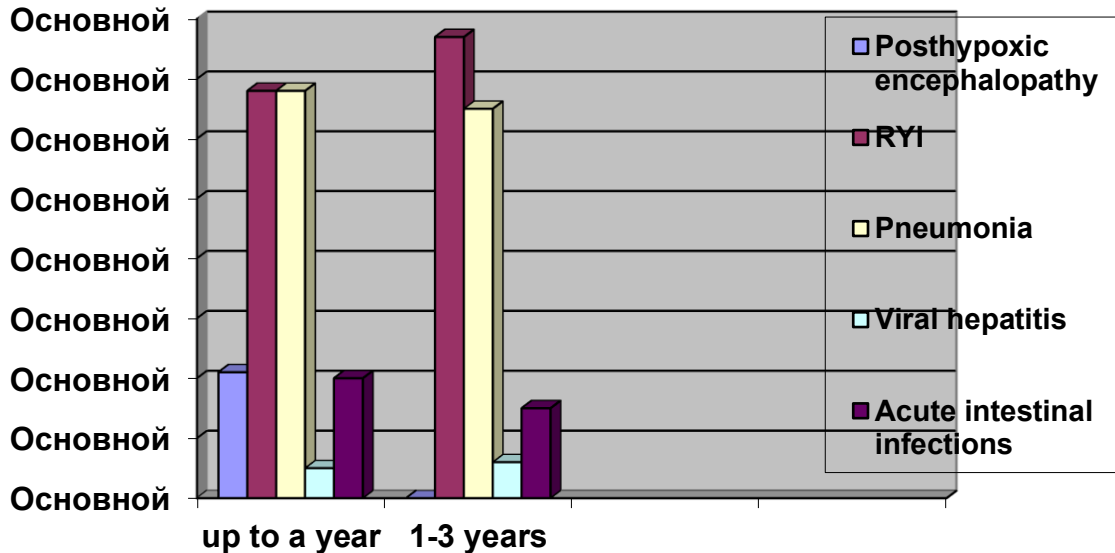


Diagram 1. Characteristics of past diseases in children with pneumonia with RF I-II degrees

As follows from the presented data, the development of RF III-IY degree of pneumonia against the background of rickets, anemia, allergic diathesis and other diseases in a certain way influences the course of the inflammatory process, its severity in the child and its prognosis.

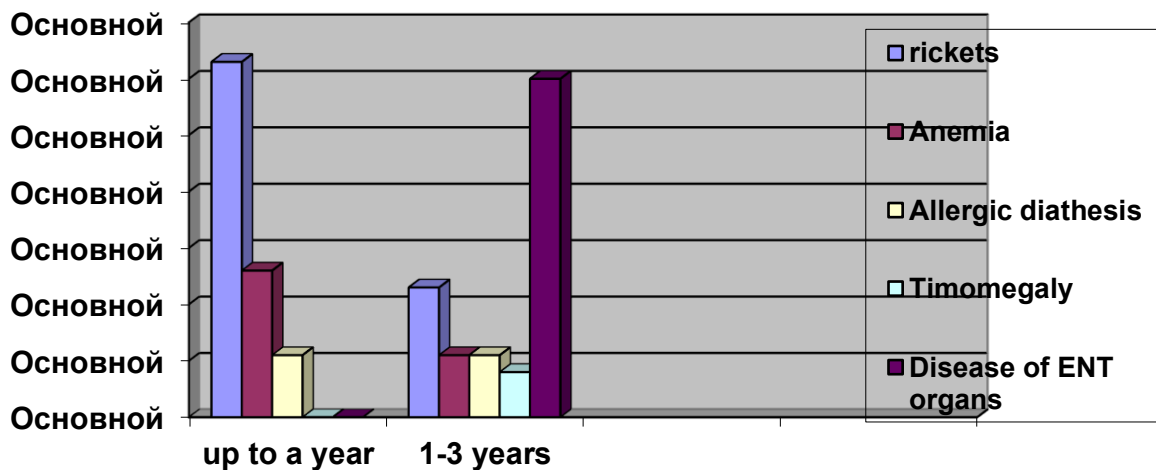


Diagram 2. Characteristics of concomitant diseases in children with pneumonia with RF III-IY degrees

Literature data and the results of the present studies indicate that children with pneumonia and RF are characterized by a high index of infectious morbidity and, especially, a tendency to frequent respiratory viral infections.

Children who developed RF pneumonia were admitted for inpatient treatment and examination at different times from the onset of the disease. Of the total number of children under the age of 1 year, 32% were hospitalized during the first week of the disease, in the second week

- 10% and after 15 days - 58%. Among children over the age of one year, 13% were admitted during the first week, 16% in the second week, and 71% after 15 days. These data indicate that a significant factor in the formation of RF pneumonia, in addition to the components that make up the risk formula, is the late start of complex pathogenetic therapy of the disease in a hospital setting, that is, medical and organizational risk factors. These circumstances also predetermined the severity of the patients' condition upon admission to the clinic. In children under one year of pneumonia with RF, very severe conditions initially prevailed, and in children over 1 year of age, severe conditions prevailed. In general, the analyzed group of children is characterized by a predominance of severe disease upon admission to hospital treatment. The total duration of the disease in children was about 28 days. The bed-days of stay of patients in the hospital did not depend on age and averaged about 16-20 days.

Thus, our clinical observations characterize specific factors responsible for the formation of varying degrees of RF in pneumonia in sick young children.

Conclusions. The formation of RF of acute pneumonia in young children directly depends on general social-hygienic, medical-organizational and constitutional-background factors. Social-hygienic, medical-organizational and constitutional-background factors influence the clinical manifestations of pneumonia in young children and contribute to the development of a complicated course of the disease, and also determine an unfavorable prognosis and the incidence of death.

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REASONS FOR THE DEVELOPMENT OF FORENSIC EXAMINATION

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Abstract. *This article will explore the reasons of suicide and its development of forensic examination in detail.*

Keywords: *WHO, “value vacuum”, “collapse of the nation”, golden injection.*

According to WHO, suicide is among the leading causes of death in many countries. In Russia, the average level of completed suicides is 39.7 cases per 100 thousand people, which is a high figure (2001). The problem of suicide is analyzed in numerous studies by domestic and foreign authors. Suicide is presented as a complex biosocial phenomenon, the result of the influence on the personality of various cultural, social, psychological and clinical factors that have a destructive impact on its adaptation mechanisms (M.A. Lapitsky, S.V. Vaulin, 2000). A number of works by forensic psychiatrists are devoted to a retrospective assessment of the mental state of suicide victims (G.V. Zenevich, 1938; Y.M. Kalashnik, 1963-1971; I.A. Mizrukhin and S.M. Livshits, 1965; A.L. Russinov, 1970; P.P. Lipanov, 1971; V.V. Gorinov, 1994-1996; T.P. Pechernikova, 1996-1998; A.A. Tkachenko, 2001-2002, etc.).

At the same time, the authors' opinion regarding the main subject of expert research when conducting post-mortem SPE “on the fact of suicide” is ambiguous. Ya.M. Kalashnik and A.A. Russinov believed that experts should assess the mental state of suicide victims at the time of suicide; other authors believe that - in the period preceding the suicide. At the same time, judicial investigative bodies often raise before experts the question of the ability of suicidal people, specifically when committing suicide, to “realize the actual nature of their actions and direct them,” and use the formula of sanity (sometimes legal capacity), despite also the fact that Suicide is not a criminal offense.

There are problems that attract the attention of researchers not only because of their objective significance, but also because of their direct relationship to the field of “human studies.” There are many such questions, but in modern conditions, in our opinion, the problems of human adaptation to new economic, social, political and spiritual conditions become particularly relevant. Modern society is increasingly defined as risky, which is associated with the variety of transformation processes occurring simultaneously in it. This situation requires building a system of examination of any reconstructions and innovations in non-economic spheres, since miscalculations in assessing social risk and the lack of mechanisms for insuring society from its consequences lead not to man-made disasters, but to such conditions as “value vacuum”, “collapse of the nation”, “demographic hole”, etc. Understanding that it is impossible to avoid such processes in the conditions of large-scale transformations in an absolute sense, it is still necessary to work to reduce the negative consequences and accumulate a certain resource (ideological, material, etc.) to neutralize them.

But it is when the danger is not recognized that it poses the greatest threat to those affected by it and who lose sight of it.

The current demographic situation in the Russian Federation is largely determined by the socio-economic processes that took place in the 20th century. In the second half of the last century, 2-2.5 million children were born annually in the Russian Federation, and 1-1.5 million people died. The life expectancy of citizens was constantly increasing and approaching the indicators of European countries. Average life expectancy in 1990-1991 was 68 years.

In 1990-1991, the prevalence of suicide was 26.5 cases per 100 thousand population, which was only slightly higher than the WHO critical level. Since 1992, a pronounced increase in the frequency of suicides began, reaching 41 cases per 100 thousand population in 1994-1995 (an increase of 1.6 times compared to 1990).

In 1996-1998, the frequency of suicides gradually decreased. However, by 2000, their level had risen sharply again to 39 cases per 100 thousand. Only in 2002 did a gradual decline in the suicide rate begin. This dynamics reflects the changes in the social situation taking place in the country.

In 2006, Russia came in second place in the world, after Lithuania, in terms of suicide rates, said Boris Polozhy, head of the department of environmental and social problems at the Serbsky State Scientific Center for Social and Forensic Psychiatry. According to the expert, in our country there were 36.1 cases of suicide per 100 thousand inhabitants, in Moscow this figure was 11, in St. Petersburg - 17.8.

Experts have also identified about 800 reasons why people voluntarily decide to die. True, in more than 40% of cases, the cause of suicide remains unknown. Fear of punishment (19%), mental illness (18%) and depression (18%) prevail among those identified. Passions, financial losses, boredom, and physical ailments all together account for no more than 10% of life. Psychologists identify a connection between suicide and loss of social status (King Lear complex). The highest rate of suicide is observed among alcoholics, drug addicts, disabled and mentally ill people. The affected category includes discharged servicemen, demobilized officers and prisoners. Suicide is a very complex and multifaceted phenomenon of a person, which is determined by many reasons and situations that sometimes contradict each other. Suicide is a serious public health and mental health problem in particular.

According to WHO, "among the CIS countries, Kazakhstan, Turkmenistan, and the Russian Federation continue to occupy a strong place among the countries with a high rate of suicide¹". The suicide rate among young people has tripled in the last decade. Every year in Russia, every twelfth youth between the ages of 15 and 19 attempts suicide; the rate of suicide among young people in our country is 20 per 100,000 population, which is 2.7 times higher than the world rate.

There are many structures in the world that deal with suicide problems. The Los Angeles Center for Suicide Research and Prevention is the most famous. According to statistics, suicide among drug addicts is one of the highest: 178 people per 100,000 people.

The high prevalence of heroin addiction in Central Asia determines the need for further study of the characteristics of clinical symptoms and therapy of this pathology. It is recognized by a large number of researchers that the effectiveness of heroin addiction therapy is quite low. The results of heroin addiction therapy determine a relatively low percentage of long-term remissions - no more than 10-15% of patients. In connection with this situation, the search for modern methods and means of heroin addiction therapy is extremely urgent.

The confirmation of the existence of the problem of combined pathology (addictive and mental disorders), the large number of cases of combined pathology, the absence of a unified approach to the qualification and therapy of such patients, without a doubt, determine the essence of studying the problem of the combination of mental disorders with the consumption of psychoactive substances as extremely urgent.

Often, a drug addict consciously uses an excessive amount of drugs, in the jargon, gives himself a "golden injection" and dies.

Even more frightening is that he must always run and find money to buy drugs later, or he feels internally malformed. An addict does not suffer from abstinence syndrome.

The analysis of published scientific literature shows that at the current stage of the development of science in our country, there is a tendency to study the relationship between signs and symbols that describe various constitutional and personality-related aspects of individuality. One of the important tasks of modern scientific theory and practice is the interest in determining the characteristics of various systems of the organism, the study of the nature of inter-systemic connections at the constitutional and psychological level in the structure of the individual.

Scientists have studied the psychological landscape of a number of diseases. However, due to the inherent difficulties in describing the psychological determinants of certain diseases, it is considered that these works have not been completed.

To determine the risk of suicide, a structured questionnaire is often used to determine suicidal thoughts. However, this is not always possible, so a simple study that objectively shows the risk of suicide is needed. It is necessary to find a biomarker for acquisition and analysis. Conducting biochemistry and functional MRI of the brain in each and every person is considered a very expensive procedure, a "simpler" diagnostic method is needed. Blood and urine analysis are suitable for this role. These fluids contain a large number of substances that characterize the metabolism of various organs and tissues.

At first glance, the idea of diagnosing a mental disorder based on a blood test seems strange. If an infection or a myocardial infarction can be diagnosed by a blood test, what can prevent a suicidal tendency using the same method?

In depression, the amount of monoamines (serotonin and noradrenaline) in MAT decreases: neurotransmitters do not enter the synaptic cleft in sufficient quantities. Depression leads to fear and insomnia (in the case of serotonin deficiency) or decreased concentration and lethargy (in the case of noradrenaline deficiency).

Data on the metabolic characteristics of the body of suicide victims began to be collected in the late 70s of the XX century, and some of the observations were related to the metabolism of noradrenaline. It was found that the concentration of 3-methoxy-4-hydroxyphenylglycol (metabolite of noradrenaline) in the blood and urine of suicidal people is lower than in patients without suicidal attempts.

But the concentration of this metabolite, on the contrary, increased in suicide cases in patients with personality disorders. Such a feature makes it difficult to determine the risk of suicide, because it requires taking into account additional information.

The researchers then focused on serotonin (5-hydroxytryptamine, 5-HT). This monoamine not only works in the nervous system (including the response to the feeling of satisfaction), but is also important in the blood clotting system. Serotonin levels in blood plasma and platelets were

significantly lower in depressed patients who committed suicide. Interestingly, platelet count was also found to be associated with suicide.

Israeli scientists found that the number of platelets in depressed suicide patients was 20% higher than in depressed patients who did not commit suicide. Serotonin stored in platelets is necessary for normal blood clotting, and the body compensates for its deficiency by forming blood platelets. This is confirmed by the detection of disorders in the activity of the serotonin transmitter and the enzyme responsible for its inclusion in platelets of suicide victims.

This affinity between brain serotonin systems and platelets is explained by the fact that their protein - 5-NT transporter and capping enzyme - is structurally similar in blood platelets and neurons and is encoded by the same gene - chromosome 17 gene. Because platelet counts can vary for many reasons, this marker may not be specific enough to assess suicidal tendencies.

In parallel with the study of serotonin metabolism, scientists studied the receptors of this neurotransmitter, which are observed not only in the central nervous system, but also in the gastrointestinal tract, blood vessel walls, and other structures. There are 15 types of 5-NT-receptors, which make up 7 families, but only 5-NT2A is recorded in platelets. The amount of receptors can be determined by radioligand analysis method. Cells suspected of having receptors of interest are treated with a radioactive target using a special substance. The target substance "sticks" to them, and the excess of the substance is removed. Radioactivity from molecules attached to receptors is then measured. The higher its speed, the more target substance remains in the cells, which means the more receptors we are looking for.

It was found that the expression of 5-NT2A-receptors in the brain and platelets was similar, and they were also matched in terms of metabolic parameters. Therefore, the study of receptors in the periphery, in blood cells, can provide reliable information about the amount of receptors in MAT. The number of platelet 5-NT2A-receptors was found to be higher in people who committed suicide than in people who did not commit suicide, regardless of the disease that led to this act. Later, it was found that there is a correlation between suicidal behavior and higher levels of expression of 5-NT2A-receptors in the hippocampus in the prefrontal cortex.

The amount of 5-NT2A-receptors in platelets became one of the first real genetic markers of suicide risk. The relationship between neurons, which are complex in structure and function, with cells without nuclei in the blood, reminds us of the high level of integration of all processes in our body.

A more specific substance that can be detected in the "suicide analysis" is a protein called "brain-derived neurotrophic factor" (BDNF). BDNF is a substance that controls structural and synaptic plasticity, nerve regeneration, structural integration of neurons, and synthesis of neurotransmitters. As mentioned above, people who suffer from depression often commit suicide. In depression, the amount of BDNF decreases and neuroplasticity decreases, the complete connections between the frontal cortex and other areas that control human social behavior are disrupted. That is, the brain loses the ability to fully respond to external signals. When antidepressants are used, BDNF levels increase, and brain activity returns to a more or less normal mode. During the study of brain tissue of individuals who committed suicide, it was found that the concentration of BDNF decreased in the prefrontal cortex and hippocampus. An increase in the amount of 5-NT2A-receptors is determined in the same sections of the brain of people who commit suicide. A decrease in the amount of BDNF in the brain also leads to a decrease in its concentration in the blood.

Another potential marker of suicidal risk was reported in a 2013 study published in the *Journal of Affective Disorders*. The authors considered the clinical and demographic characteristics of 100 patients with depression. All participants of the study were tested for suicidal tendencies during 12 weeks. In addition, the level of methylation of the promoter region of the BDNF gene was determined in each patient (methylation usually blocks gene expression). It was found that the level of methylation was higher in individuals who committed suicide and in individuals who expressed suicidal tendencies during treatment.

Until now, there has been talk about specific molecular changes related to brain activity. In cases of suicidal attempts, indicators of serotonin system activity and BDNF synthesis show changes in the activity of the prefrontal sections of the cerebral cortex and the hippocampus. Perhaps, the disturbances in the biochemical status reflect the disruption of the functional connection between these parts of the brain. The hippocampus forms negative experiences, it serves as a background for depression and supports it. An emotional problem requires a solution, and the prefrontal cortex, which performs the functions of forecasting and planning, cannot find this solution. It seems that there is no way for a person to get out of a difficult life situation, which manifests itself in the form of broken connections for the brain. It is this helplessness that leads people to commit suicide, both from a neurobiological point of view and from a psychological point of view. Dysfunction of the prefrontal cortex, which is manifested in impaired planning of actions and a decrease in their control, in patients with high suicidal risk with schizophrenia, confirms this.

In addition to narrow, "brain-related" biomarkers, when assessing suicidal risk, it is also possible to determine the general mobilization response of the body - indicators that indicate stress. In the second half of the 20th century, scientists focused on the activation of the hypothalamus-pituitary-adrenal system (HGBT) in mental disorders. Members of the GGBT are closely related. The hypothalamus secretes the peptide hormone corticoliberin, which increases the secretion of adrenocorticotrophic hormone (ACTG). An increase in the amount of ACTG increases the secretion of cortisone - a stress hormone. In addition to the described direct relationships, this system also has a reverse situation, a unique stress-inhibiting system - an increase in the concentration of one hormone reduces the secretion of its predecessor.

Autopsies of suicide victims revealed enlargement of the adrenal cortex, and high concentrations of corticoliberin were noted in the cerebrospinal fluid. Because this hormone is directly related to anxiety disorders, drugs that modulate corticoliberin receptor activity are currently being tested.

A number of scientists have also studied the correlation of myoglobin levels with suicide.

Myoglobin is an iron-storing protein that is stored in skeletal muscle cells and myocardium, providing them with oxygen, which gives them the power to contract.

During the normal functioning of the body, the content of myoglobin in the blood is so low that it cannot be determined by laboratory methods. An increase in its concentration in the blood occurs when skeletal muscles and myocardium (heart muscle) are damaged. In 85% of patients with acute myocardial infarction, an increase in the level of myoglobin is observed for 2-3 hours after the onset of pain and persists for 2-3 days (it remains longer in the case of an aggravated infarction). It is important to note that repeated increase in the level of myoglobin in the patient's blood after the indicator has normalized, without a doubt indicates the expansion of the infarct area and the recurrence of the disease. In addition to acute myocardial infarction, a significant

increase in the level of myoglobin in the blood is observed in extensive muscle injuries, long-term pressure syndrome, severe electric shock. The myoglobin molecule is formed by a single polypeptide chain and heme containing iron, and is similar in structure and function to blood hemoglobin. Myoglobin is a single polypeptide chain, consisting of 153 amino acids with a molecular mass of 17 kDa, and is structurally identical to the β -chain of hemoglobin. Protein is found in muscle tissue. Myoglobin has a greater affinity for oxygen than hemoglobin. This property of myoglobin ensures the function of storing oxygen in the muscle cell and using it only when the partial pressure of O₂ in the muscle decreases significantly (to the level of 1-2 mm Hg). Myoglobin binds oxygen (oxymyoglobin appears) and is its main supplier for skeletal muscles. In hypoxia (for example, during intense physical exertion), oxygen is released from the complex with myoglobin and enters the mitochondria of myocytes, where ATP synthesis takes place. Myoglobin is excreted unchanged in the urine, so its concentration also depends on the functions of the kidneys. In any injury, necrosis, lysis of skeletal muscles or myocardial tissue, myoglobin enters the blood. The expression level of hypermyoglobinemia in myocardial infarction is directly related to the size of the necrosis center. It is one of the earliest markers of myocardial infarction (it is detected only 2 hours after the attack, the concentration can increase by 10 times), it is assumed that its rapid entry into the blood is related to relatively small molecules, which explains its rapid removal from the blood through the kidneys.

Damage to muscle cells causes it to be released quickly and enter the bloodstream due to its small size.

Myocardial necrosis creates conditions for increasing not only the release of enzymes into the blood, but also the release of other myocyte contents, including myoglobin. The diagnostic test is based on the determination of myoglobin content in the blood, which under normal conditions does not exceed 85 ng/ml, and may increase to 1000-1500 ng/ml and more in case of myocardial infarction. The small molecular mass allows myoglobin to easily pass through the glomerular membrane of the kidneys, which leads to a rapid decrease in its concentration in the blood plasma. Free myoglobin is a biological marker of impaired muscle cell membrane permeability and has toxic properties by itself. The most clearly expressed damaging effect of free myoglobin on vascular endothelium and epithelia of the proximal tubules of the kidneys is described in the vasoconstrictor effect of myoglobin. As mentioned above, myoglobin is stored in red muscles. The myoglobin depot (Mb) in the myocardium is the oxygen reserve for the heart. Mb composition depends on muscle activity. The average content of myoglobin is 0.3% of body weight (5). Mb, like hemoglobin (N), has the property of combining with oxygen (oxymyoglobin), with carbon oxide (carboxymyoglobin), and can be oxidized and regenerated to metmyoglobin.

In forensic practice, when myocardial infarction is suspected, the concentration of myoglobin in blood serum and urine is determined to confirm the diagnosis of electrical injury, in positional pressure syndrome, in toxic injuries (1,3,4,5). The normal content of myoglobin in blood serum and urine is up to 80 ng/ml, with 160 ng/ml being the upper limit of normal (4). A.F. According to Kinle (2002), myoglobin should not normally be present in urine, the norm in the blood of corpses is 0.006-0.01 g/l.

According to the literature, in primary myoglobinuria, myoglobin enters the urine after 2-24 hours and is detected for 2-3 days. In traumatic myoglobinuria, myoglobin enters the blood and urine in large quantities at the same time, acute kidney failure develops. In muscle tissue ischemia, a small amount of myoglobin is detected in the urine, no changes are observed in the kidneys.

Myoglobinemia is of great importance in the diagnosis of acute myocardial infarction, although an increase in myoglobin level in the blood may also indicate skeletal muscle damage. In acute myocardial infarction, the content of myoglobin in the blood increases to a discriminatory level (80-200 ng/ml) 4-6 hours after an anginal attack. Usually, myoglobin level in the blood increases 10-13 hours after an acute myocardial infarction, and returns to normal after 24-38 hours.

Solving issues of thanatogenesis in mild atherosclerotic damage of heart vessels and alcoholic cardiomyopathy (AKMP) in forensic practice creates certain difficulties.

The dexamethasone test has also been used to assess suicidal risk. The patient takes 1 mg of the glucocorticoid dexamethasone before going to bed at night, after which the patient's individual cortisone levels are determined for several hours. When taking dexamethasone, feedback mechanisms are activated: due to the increase in the concentration of glucocorticoids, the amount of secretion of corticoliberin and ACTG decreases. As a result, the concentration of cortisone should decrease. In this situation, the body cannot distinguish much - cortisol and dexamethazol are "the same" for it. If the concentration of cortisol decreases, the test is negative in the experiment, otherwise it is concluded that the activity of GGBT is increased. In patients at high suicidal risk, the dexamethasone test was often positive. This indicates that the GGBT is activated in depression and that the body is in a state of stress. Unfortunately, the diagnostic value of this examination method was not so high. It was necessary to find a more specific way to determine the tendency to suicide, and in this, scientists turned to genes.

Many researchers hypothesize that persistent GGBT activation in suicidal individuals is due to the insensitivity of receptors to glucocorticoids, similar to how insulin resistance of the body's tissues leads to type 2 diabetes. All efforts were directed to the study of the FKBP5 protein, which is included in the structure of the glucocorticoid receptor. It was found that the combination of one of the structures of FKBP5 with psychological trauma in childhood significantly increases the likelihood of suicide in the future. Unfortunately, this information has brought researchers little closer to a suicide biomarker. A biomarker needs to be simple, and in this case it has to take into account the person's past, even though the past may have been misrepresented by the person himself in the conversation with the doctor.

A specific protein SKA2 (spindle and Kinetochore associated complex subunit-2) is also associated with glucocorticoid receptors. This protein is responsible for modulating the activity of these receptors inside the cell, and its deficiency leads to a prolonged and excessive response of the brain to stress. To investigate whether a particular variant of SKA2 is associated with suicide, Johns Hopkins University scientists performed genotyping of brain tissue samples from deceased individuals and examined the DNA of participants in several mental health projects. A high level of methylation of the SKA2 protein gene and a decrease in its expression in the brain were found in suicidal individuals. Frozen, non-autolyzed corpse samples were used in the work. In living study participants, low levels of SKA2 were found to be significantly associated with increased levels of cortisol and a shift from suicidal thoughts to active actions. The results of all groups showed that the SKA2 protein has a functional relationship with the SAT1 (spermidin/spermine N 1 – acetyltransferase 1) protein. The latter protein is involved in controlling the intracellular concentration of polyamines and their transport outside the cell. High levels of SAT1 in patients diagnosed with bipolar affective disorders are associated with past suicide attempts and future suicidal acts.

Summary. The analysis of scientific literature shows that in the modern period of the development of scientific knowledge in our republic, there is a tendency to study the connection of signs and sign systems describing various constitutional and personal aspects of individuality. One of the important tasks of modern scientific theory and practice is the interest in determining the characteristics of different systems of the organism, the study of the meaning of intersystem relationships in the structure of the individual at the constitutional, as well as psychological level. In this regard, the search for markers that allow to identify individuals prone to suicide in order to carry out preventive measures in order to prevent suicide cases is becoming extremely urgent.

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RESULTS OF SURGICAL TREATMENT OF DISSEMINATED ECHINOCOCCOSIS OF THE ABDOMINAL ORGANS

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Abstract. *The authors, as a result of the research work carried out, the frequency of general complications from 4 (9.7%) to 1 (2.2%) - an improvement of 7.5%, complications associated directly with EE - from 14 (34, 1%) to 3 (6.5%) and increase the number with no complications from 27 (65.9%) to 43 (93.5%), i.e. 1.4 times; improve excellent and good results from 9 (22.0%) to 37 (79.4%), i.e. 5.2 times; reduce the frequency of satisfactory results from 12 (29.3%) to 6 (13.0%) and poor results - from 11 (26.8%) to 2 (4.3%), which in general improved the results of surgical treatment of DE abdominal organs, i.e. achieve the research goal.*

Keywords: *echinococcosis, abdominal organs, mortality, hepatoprotectors and laser therapy.*

Relevance of the problem. According to WHO estimates, more than a million people worldwide become ill with echinococcosis every year, leading to 19,300 deaths worldwide in 2015. Every year, the cost of treating patients with echinococcosis, as well as damage to livestock production, amounts to several billion dollars [9]. Today, echinococcosis is called the helminthological cancer of the 21st century, which determined the WHO strategy to include echinococcosis in the list of diseases requiring priority elimination [2;3;8].

The frequency of disseminated echinococcosis (DE) of the abdominal cavity ranges from 5.9 to 30%, with 90% of all multiple lesions occurring in the abdominal cavity and its organs [4]. Performing radical operations in such conditions is possible in only 25-30% of patients, and postoperative mortality reaches 7-18% [5;7].

Many studies have been devoted to various aspects of this problem, however, regarding DE of the abdominal organs, there is no specific definition, which causes confusion in terminology, and there is also no classification of its complicated forms. The high toxicity of chemical agents for treating OP, the insufficient effectiveness of existing physical methods and the lack of a unified algorithm of actions in determining surgical tactics dictate the need for further search. Because this search will improve the results of treatment of the most complex type of echinococcosis of the abdominal organs, in the form of its dissemination, which determines the extreme relevance of this problem.

Material and research methods. The Department of Surgery at the Department of Surgery of the Andrei State Medical Institute has experience in treating 714 patients with echinococcosis of various localizations, including 87 cases with DE of the abdominal organs, which are conditionally divided into 2 groups:

- comparison group – 41 (47.1%) patients, from 2011 to 2017. (retrospective study);
- main group - 46 (52.9%), who were subject to surgical treatment adhering to optimized surgical tactics from 2018 to 2022. (Prospective study).

Disseminated echinococcosis of the abdominal organs is the most severe form of complication of the disease, manifested by primary, secondary or tertiary contamination of the

host organ (mainly the liver) and abdominal organs with germinal elements of the parasite, and also manifested by more than three cysts.

Disseminated echinococcosis of the abdominal organs is the most severe form of complication of the disease, manifested by primary, secondary or tertiary contamination of the host organ (mainly the liver) and abdominal organs with germinal elements of the parasite, and also manifested by more than three cysts.

Among residents of the northwestern region of the Andijan region, the incidence was 49 (56.3%), which turned out to be significantly higher than among residents of the southeastern regions - 29 (33.3%) - ($p < 0.01$). The analysis of climatic conditions showed that the average climatic indicators in the northwestern region were 38.1° , while in the southeastern region - 36.8° , i.e. a temperature difference of 1.3° also had a statistically significant effect on the prevalence of this disease - ($p < 0.001$). The incidence among rural residents was noted in 77 (88.5%), among urban residents - 10 (11.5%). The data obtained confirm the close connection between human living conditions and the characteristics of the parasite's life cycle, where for a number of reasons the risk of contact is significantly high. In general, with DE of the abdominal organs, the local form was noted in 29 (33.3%) cases, widespread - in 34 (39.1%) cases and generalized - in 24 (27.6%) - ($p < 0.01$).

The presence of 2 cysts in the comparison group was established only in 7 (17.1%) patients and in the main group - in 9 (19.6%). Most often in the compared groups, 3 – 4 – 5 or more EC were diagnosed, which in total amounted to 34 (82.9%) and 37 (80.4%) patients, respectively ($p < 0.01$).

In the comparison group, an uncomplicated course of the disease was diagnosed in 31 (75.6%) patients, and in the main group - in 22 (47.8%). At the same time, in the comparison group, a complicated course was established in 10 (24.4%) patients and in the main group - in 24 (52.2%), which indicates an established tendency towards an increase in complicated forms of this disease - ($p < 0.01$).

For diagnosis, general clinical methods (complaints, anamnesis, objective examination) were used in combination with fluoroscopy, ultrasound (US), computed tomography (CT), and magnetic resonance imaging (MRI).

Changes in biochemical parameters, in particular indicators of urea nitrogen, AST and ALT, fibrinogen and bilirubin, were found to be statistically significantly higher in the studied patients compared to healthy individuals, which indicated functional liver disorders and a correlation with the size of the parasitic cyst - ($p < 0.01$). At the same time, a study of biochemical blood parameters in the postoperative period showed a restoration of its parameters close to the healthy group, which was one of the criteria for the effectiveness of the treatment - ($p < 0.01$). Serological diagnosis of patients with DE was based on the detection of antibodies (IgG) in the blood serum of infected people, which are specific markers of parasitic infection. In patients with DE, in the preoperative period IgG immunoglobulins were elevated in almost all observations.

In order to determine the statistical significance of the obtained data, χ^2 and Pearson's p test were calculated, as well as according to T-Student.

The operations were performed with precision, taking into account the likelihood of iatrogenic injury to the cyst membrane and contamination of the abdominal cavity with the parasite's scolex. For the purpose of prevention, the subcutaneous tissue and abdominal cavity were delimited from the EC with gauze swabs moistened with a hypertonic solution (20-30%) of

sodium chloride. We also carried out a multicomponent treatment of the walls of the OP: the inner surface of the fibrous capsule with a 10% sodium chloride solution with an exposure time of 2 minutes, furatsilin heated to a temperature of 700 C for 2 minutes, 700 alcohol for 2 minutes, and 5% iodine tincture with exposure for 2 minutes and at the end, electrocoagulation of the inner surface and edges of the fibrous capsule for 2 minutes, a total of 10 minutes [1].

Another improvement in the tactics of DE of the abdominal organs was the development of an algorithm for surgical tactics for DE of the abdominal organs [10], according to which, in all cases, chemotherapy, immunotherapy, hepatoprotectors and laser therapy were included in the preoperative preparation. We use this algorithm to optimize the surgical tactics of treating DE of the abdominal organs.

Results and its discussion. To assess the immediate results, patients with postoperative complications were divided into two subgroups, which made it possible to conduct an objective analysis of the surgical results.

1. Postoperative complications directly related to surgery for echinococcosis of the liver and abdominal organs (fluid accumulation in the residual cavity, formation of external biliary fistulas, blood; liver abscesses, suppuration of the residual cavity, complications of the surgical wound).

2. Postoperative complications of a general nature that can occur during surgical interventions on other organs and systems of the body: cardiovascular system, bronchopulmonary (bronchitis, pneumonia). Complications that arise during surgery on the liver and abdominal organs may be associated with the surgical technique itself. However, there are also complications that are typical for this type of operations performed in hepatic and abdominal surgery.

General complications in the immediate postoperative period, depending on the elimination of AP in the comparison group showed that bronchopulmonary complications were noted in 1 (2.4%) patient after combined EE, acute cardiovascular failure also in 1 (2.4%) patient after open EE and acute hepatic-renal failure in 2 (4.9%) - after semi-closed EE in 1 (2.4%) and combined - in 1 (2.4%).

General complications in the immediate postoperative period depending on the elimination of AP in the main group showed that acute cardiovascular failure was detected in 1 (2.2%) patient after combined EE.

A comparative assessment showed that in the comparison group, complications of a general nature in the immediate postoperative period, depending on the elimination of AP, were observed in 4 (9.7%) patients, while in the main group - only in 1 (2.2%) patient (improvement by 7.5%) - ($p < 0.005$).

The number of patients with complications prevailed in the comparison group - 14 (34.1%), while in the main group - only 3 (6.5%) patients - ($p < 0.001$). In the comparison group, bleeding was noted in 3 (7.3%) patients, while in the main group - only in 1 (2.2%); biliary fistula in the comparison group was observed in 2 (4.9%) patients, in the main group it was not observed; purulent fistula OP with communication into the abdominal cavity in the comparison group was found in 1 (2.4%), while in the main group it was not noted. A long-functioning biliary fistula during drainage of OP in the comparison group was observed in 3 (7.3%) patients, in the main group - in 1 (2.2%) and suppuration of OP - in 2 (4.9%) and 1 (2.2%). %, respectively. Early relaparotomy for complications, regardless of the source of peritonitis, was performed in 2 (4.9%) patients in the comparison group, while in the main group there was no need for relaparotomy.

Postoperative mortality occurred only in the comparison group in 1 (2.4%) patient, due to the development of acute cardiovascular and hepatic renal failure.

Thus, the best result can be seen in the group with the tactics we propose and a set of measures developed for the treatment and elimination of OP, depending on the factors.

Optimization of surgical tactics in the treatment of DE of the abdominal organs could not but affect the immediate results of management of this category of patients. In general, in the main group, compared with the comparison group, the frequency of immediate postoperative complications decreased by almost 5.2 times.

As a result, the number of patients with no postoperative complications in the comparison group was 27 (65.9%), while in the main group there were 43 (93.5%) - an improvement of 27.6%, i.e. 1.4 times, and general complications were minimized - from 7.8 to 2.7%, respectively - ($p < 0.001$).

Including, in the main group, it was also possible to avoid cases of relaparotomy - from 4.9% and mortality - from 2.4% to 0%, respectively - ($p < 0.05$).

Long-term results of surgical treatment of recurrent EP were observed in the comparison group in 32 of 41 operated patients and in 45 of 46 patients of the main group for up to 3 years and after surgery. 30 people were examined during the first year, but then the number of visits decreased. Excellent results were obtained in 5 (12.2%) patients in the comparison group and in 27 (58.7%) in the main group, characterized by a complete absence of symptoms of disease relapse after surgery. The patient was practically healthy, did not follow a diet and did the same job.

We combined patients who had no complaints and considered themselves absolutely healthy into a group with good results. Good results were observed in 4 (9.8%) patients in the comparison group and in 10 (21.7%) patients in the main group. Satisfactory results were obtained in 12 (29.3%) patients in the comparison group and in 6 (13.0%) patients in the main group. The identified changes were corrected by conservative measures.

A poor result was observed in 11 (26.8%) patients in the comparison group and in 1 (2.2%) in the main group, when a relapse of hydatid disease was diagnosed during the examination. These patients required surgical treatment in specialized departments and were recognized as disabled groups II and III. If long-term results were unsatisfactory, the issue of repeat surgery was decided. Optimized surgical tactics made it possible to increase the frequency of excellent and good results from 9 (22.0%) to 37 (79.4%), and also to reduce the proportion of satisfactory results from 12 (29.3%) to 6 (13.0%) and bad - from 11 (26.8%) to 2 (4.3%).

Conclusion. Thus, as a result of the research work carried out, the frequency of general complications from 4 (9.7%) to 1 (2.2%) is an improvement by 7.5%, complications associated directly with EE - from 14 (34.1%) to 3 (6.5%) and increase the number with no complications from 27 (65.9%) to 43 (93.5%), i.e. 1.4 times; improve excellent and good results from 9 (22.0%) to 37 (79.4%), i.e. 5.2 times; reduce the frequency of satisfactory results from 12 (29.3%) to 6 (13.0%) and poor results - from 11 (26.8%) to 2 (4.3%), which in general improved the results of surgical treatment of DE abdominal organs, i.e. achieve the research goal.

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STUDYING THE MECHANICAL COMPOSITION OF COLLECTION SAMPLES OF GRAPES

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Abstract. *In this article illustrated results of studying mechanical composition of 111 collection grape varieties from the RIPGR gene pool, where were analyzed valuable properties of grape varieties based on various directions. As a result of the researches have been identified suitable table and technical varieties of grape with higher economically valuable properties for growing in Tashkent region.*

Keywords: *grapes, variety, bunch, juice yield, gene pool, collection, sample, productivity, yield, mechanical analysis.*

INTRODUCTION. The natural and climatic conditions of Uzbekistan (soil conditions, varied vertical zoning, long growing season, significant solar insolation, the presence of a dry subtropical zone and high temperatures) allow the cultivation of various grape varieties from ultra-early to late-ripening varieties.

In order to develop viticulture and winemaking, the President and the Government declared a number of Resolutions on measures for the further development of viticulture in the Republic. It is planned to increase the area of vineyards to 200 thousand hectares, special attention should be paid to technical grape varieties and create new plantations of technical (wine) varieties on an area of 30 thousand hectares. At the same time, new plantations must be pure-varietal and consist of varieties widely known in the world for the subsequent production of export-oriented elite wines. Also, in order to develop, modernize and increase the competitiveness of viticulture and winemaking in the Republic, according to the Resolution (No. PR-4161 02/05/2019) and the Decree (No. DP-5656 02/05/2019) of the President of the Republic of Uzbekistan, to intensify the industry in the Republic, great work must be carried out to implement and the cultivation of new, well-known and promising foreign technical grape varieties, the products of which are in great demand on the world market.

The existing wine assortment of grapes in Uzbekistan requires improvement. In order to further stable development of the viticulture and winemaking sector in the country, targeted increasing and cultivation new promising varieties of industrial grapes, strengthen and financial supporting for the provision of raw materials to processing enterprises, training high qualified specialists, as well as increasing the volume of exports of viticulture and wine products. To achieve high goals in these directions has been declared Resolution of the President of the Republic of Uzbekistan “On measures for the further development of viticulture and winemaking in 2023 - 2026.”

LITERATURE AND METHODOLOGY. Uzbekistan is situated in the Central Asian center of origin of cultivated plants. The flora of the republic is very close in genesis and composition to the flora of neighboring republics (1, 2, 3). All new varieties of grapes, created in the process of natural morphogenesis, were selected by human from wild forms. It goes without saying that the selection of new forms among wild grapes continues to occur today. Each viticulture region has developed its own local assortment, which bears the imprint of local natural conditions. In accordance with local natural conditions, these forms are characterized by higher adaptability to drought, salinity and other growth factors (4, 5, 6).

Accordingly, these forms are characterized by various morphological characteristics that differ from other forms. Their available spectrum of polymorphism is wide, which requires a detailed study of their identification and generalization (7, 8).

Uzbekistan is wonderful land of the earth, one of the most ancient and brilliant centers of viticulture and winemaking culture. Despite the successes achieved in the field of ampelographic research and selection, the assortment of grapes in Uzbekistan needs to be enriched and improved. Particular attention should be paid to replenishing and improving the technical and table grape assortment with high-quality varieties with different ripening periods.

The main task in the field of technical assortment of grapes is the identification and introduction of high-quality varieties of universal use, with high sugar accumulation energy and early ripening [6, 8]. Each new variety must have wide plasticity to the soil and climatic conditions of its cultivation [5, 8].

For achieving solutions of these problems, in 2017-2018, studies were carried out on 111 varieties of grape collections that had not been studied previously, or had been studied to a limited extent.

Research methods. The mechanical composition of the bunches of the studied grape varieties was determined according to the method of Professor N.N. Prostoserdova [9]. At the beginning of the researches were determined average weight of a bunch, the weight of berries, ridges, peels, seeds, solid residue, pulp with juice, and the number of berries and seeds in a bunch. Then, based on these data, were compared the structure, composition and structure of the grape bunches.

In grape juice, the mass concentration of sugars and titratable acids was determined by using standard methods [10, 11]. The mass concentration of tartaric, malic, citric and succinic organic acids, the mass concentration of potassium, sodium, magnesium and calcium cations were determined by using a “Kapel-105M” capillary electrophoresis system.

RESULTS AND DISCUSSIONS. An important indicator of quality for table grapes is: the size of the bunch and berries, a high percentage of the edible part, marketability, high mechanical properties, and transportability. For technical varieties - worth yield.

Over the years of research, it has been revealed that the mechanical composition of the studied varieties varies within the following limits: skin 1.3-11.0%, seeds - 0.8-9.0%, juice and solid parts of the pulp 75-95% (Table 1).

The varieties that stood out in terms of the average size of bunches during the study period were Xusayne Garmskiy, Artik oga, Kata kurgan ferganskiy, Sovetskiy stoloviy, Nadjim, Ishaki from 470 to 1023, and this figure is quite stable over the years.

Large berries from table and table-raisin varieties (5.3-7.5 g): Obak rassechenniy, Artik oga, Xusayne Garmskiy, Italiya., Italy. Among the small-berry varieties, varieties of predominantly technical direction are noted - Champion, Kizilovyy, Shasla muskatnaya (1.5-2 g).

Table No. 1

Mechanical analysis of a bunch of grapes (2017-2018)

№	Name of variety	Average weight of a bunch	Size of a bunch, sm	Average number of berries in a bunch, pcs.	Weight 100 pcs. seeds, g.	Weight 100 pcs. berries, g.
Varieties with high juice yield						
1.	Saperavi	246	17,6x11,1	104	3,8	235
2.	10/45 (Tavkveri x Pino chyorniy)	262	15,2x8,9	115	3,6	228
3.	125/22 (Tavkveri x Kaberne Sovinon)	271	16,7x11,7	107	3,7	252
4.	Ak mayzi	402	16,9x11,2	92	3,6	420
5.	Ak pari	252	16,3x8,6	68	5,5	361
6.	Kara keleskiy	417	21,5x10,3	133	5,1	339
7.	Muskat armyanskiy	222	17,7x10,5	105	4,6	222
8.	Yalanja byala	264	16,7x9,3	103	3,4	251
The most meaty varieties						
1.	Ocha xorak	575	20,5x11,9	163	3,8	362
2.	Taush	512	21,0x14,4	167	3,7	195
3.	Lok kok uzyum	618	23,6x14,0	146	3,6	412
4.	Xusayne garmskiy	229	19,5x8,8	35	5,9	543
Large berry varieties						
1.	Obak rassechenniy	871	21,9x17,6	150	4,9	672
2.	Artik ocha	310	19,8x7,0	48	6,2	574
3.	Kopa	410	22,1x10,1	84	5,5	472
4.	Nairi	160	13,1x9,5	51	5,3	313
5.	Siyex mayda	650	21,3x14,5	241	5,2	266

In the total mass of the bunch, ridges account for 1.2 to 3.0% in most varieties (Table 2). For the varieties Xusayne Garmskiy, Shasla muskatnaya and Taush this figure is 3-4%. In the variety – Ak pari of ridges account for 7.8-9% of the total weight of the bunch.

High content of juice (must) (>80%) was concentrated in varieties of technical direction - 10/45 (Tavkveri x Pino chyorniy), 125/22 (Tavkveri x Kaberne Sovinon), Ak mayzi, Ak pari,

Muskat denausskiy, Kara obak kitabskiy and Yaranja byala. Up to 80% of the juice contained berries of the Kara kelesskiy, Kopa Muskat armyanskiy and Bryazi varieties.

Based on the weight of the edible part (93-95%), the following varieties stood out: Oga Khorak, Tukhumi kaftar, Taush, Portala, Ak Maizi, Portala, Maizi cobwebby.

Table 2.

Mechanical composition as a percentage of the total weight of the bunch (2017-2018)

№	Variety name	ridges	juice	hard part pulp	skin	seeds	edible part
1	Saperavi	2,9	85,4	10,5	4,2	2,4	90,5
2	10/45 (Tavkveri x Pino chyorniy)	1,7	88,3	7,9	3,2	2,2	92,9
3	125/22 (Tavkveri x Kaberne Sovinon)	1,9	86,8	8,7	3,4	2,3	92,4
4	Ak mayzi	1,3	83,1	9,1	4,1	2,4	92,2
5	Ak pari	7,0	79,2	9,0	2,8	2,0	88,2
6	Kara keleskiy	2,5	78,1	12,3	4,5	2,6	90,4
7	Muskat armyanskiy	2,3	80,9	7,8	5,7	3,3	88,7
8	Yalanja byala	1,6	84,9	6,9	4,2	2,4	91,8
9	Ocha xorak	2,1	46,8	46,6	2,6	1,9	93,4
10	Taush	3,5	54,5	39,4	1,3	1,8	93,9
11	Lok kok uzyum	2,3	24,4	45,7	3,4	1,2	93,1
12	Xusayne garmskiy	2,5	47,1	44,9	3,2	2,3	92,0
13	Obak rassechenniy	1,7	64,3	26,7	6,7	1,3	90,3
14	Artik ocha	2,2	73,1	19,6	2,4	2,7	92,7
15	Kopa	1,7	78,2	14,0	4,0	2,1	92,2
16	Nairi	2,3	73,9	17,1	3,6	3,1	91,0
17	Siyex mayda	2,2	66,3	21,6	5,4	4,0	88,4

In terms of transportability, the table varieties stood out first: Obak rassechenniy, Pustigov rozoviy and Kopa, and wine varieties Shiroka melnishka and Nairi. To crush the berries of these varieties, a force of 1400-1700 g is required, and to tear off a berry, a force of 400-500 g is required.

CONCLUSION. As a result of the study of the mechanical composition of collection samples of grapes of the Research Institute of Plant Genetic Resources, the mechanical composition of grape bunches was determined and samples were identified according to the size and total weight of the bunch, the size of the berries, the high content of juice (must) (>80%) and the weight of the edible part of the berries. The selected variety samples serve as primary material in the selection of grapes in areas of use.

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THE SIGNIFICANCE OF VITAMIN D IN THE DEVELOPMENT OF REPETITIVE DISEASES OF THE RESPIRATORY SYSTEM IN CHILDREN

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Abstract. *According to the World Health Organization, every year one in three of the world's population suffers from respiratory diseases, which make up 90% of all infectious diseases. The increasing incidence of the disease in the population, insufficient study of pathogenetic mechanisms and predictive factors, necessitates the need to carry out scientific research on this disease.*

Keywords: *vitamin D, recurrent respiratory diseases, akvodetrim.*

Actuality: In almost half of the population of all countries in the world, hypovitaminosis D is hidden and is often detected during the diagnosis of other diseases, which leads to immune deficiency in children and the increase in the number of frequent diseases among them. That is why the death rate of children due to respiratory system diseases has been determined to be more than 60%. "Respiratory diseases are often considered a global public health problem due to their high prevalence and severity." Wide spread of deficiency and deficiency of vitamin D in the whole world "The hidden non-infectious-metabolic epidemic of the 21st century is associated with a high risk of medical and social consequences for children's health" [1,2]. The increasing incidence of the disease in the population, insufficient study of pathogenetic mechanisms and predictive factors, necessitates the need to carry out scientific research on this disease.

The mortality rate (1-5 years) due to lower respiratory tract infections (mainly pneumonia) is considered to be one of the highest causes compared to other diseases. In 2015, about 10 million children died worldwide, so 20% or 1.9 million children died from pneumonia. In the origin of diseases of the lower respiratory tract, especially in children of early age, socio-economic status, ethnicity, lack of immunization, exposure to tobacco smoke, air pollution and other related chronic diseases. [3]

According to the definition of the World Health Organization (WHO), children who are frequently sick have acute respiratory diseases more than 8 times in a year [6]. Frequently sick children or patients with recurrent ORI are not diagnosed, they are considered to have frequent respiratory infections due to transient disorders of the body's defense systems that can be corrected without organic changes under dispensary control. The occurrence of respiratory infections in frequently sick children does not depend on congenital and hereditary pathological conditions. [4] The purpose of the study is to study the importance of vitamin D in recurrent respiratory diseases in children and to develop scientifically based treatment guidelines.

As the material and method of the research, the concentration of vitamin D in blood serum before and after treatment in 168 children from the group of frequently ill children aged 1-18, who were monitored in the clinic of the Tashkent Pediatric Medical Institute and the family polyclinics of the Tashkent City Health Association from 2018 to 2022. was determined. The examined patients were divided into two large groups depending on the localization of the disease. The first group included 112 children with diseases of the upper respiratory tract (rhinitis, acute pharyngitis,

acute sinusitis, acute tonsillopharyngitis and acute laryngitis). The second group included 56 patients with lower respiratory tract and respiratory organs (acute tracheitis, acute bronchitis, acute and protracted pneumonia). 69 children were selected for the control group.

The distribution of sick children by age is as follows: 59 (35.1%) children of early age, 42 (25%) children of preschool age from 4 to 7 years old, 27 (16.1%) children of junior school age, adolescents from 11 to 18 years old 40 people (23.8%) made up. The distribution of patients by gender is dominated by the number of boys (87 people, 51.7%).

Based on the national program "Prevention of vitamin D deficiency and deficiency in the Republic of Uzbekistan" developed in 2019, if vitamin D deficiency is < 20 ng/ml of 25(OH)D in the blood serum, deficiency - from 20 to 30 ng/ml, and adequate level -30 above ng/ml. [5]

Research results: According to the results of the research, vitamin D deficiency in the second group, specifically in lower respiratory tract pathologies, was statistically more convincing compared to the level of vitamin D in the first group when compared to the control group ($r < 0.001$).

Vitamin D in the main and control group patient children comparative description

Serum levels of vitamin D	Control group (n = 64)	CONTB (n = 112)	CONTK (n = 56)	P
Deficiency < 20 ng/ml	14 (21,8 %)	22 (19,6 %)	36 (64,2 %)	< 0,001
Deficiency 20–30 ng/ml	8 (12,5 %)	69 (61,6 %)	11 (19,6 %)	< 0,001
Reference value > 30 ng/ml	42 (65,6 %)	21 (18,7 %)	9 (16,2 %)	< 0,001

Note: *p*-analyzed difference of parameters in control, high and low QRK patients

Statistically significant deficiency of vitamin D in patients with recurrent diseases of the upper respiratory tract compared to the control group ($r < 0.001$) encourages us to consider it as the main etiological factor leading to a violation of vitamin D metabolism.

In patients of this group, vitamin D deficiency is observed more frequently ($r < 0.001$), disease localization, and the chronic nature of the inflammatory process.

According to the results, despite the fact that 60% of the children taken for control had a sufficient amount of vitamin D, 35% of them had a decrease in the amount of vitamin D in one way or another, especially deficiency and deficiency were 22.6 and 12.9%, respectively. The results of this study confirm that hypovitaminosis D is one of the most common medical and social problems among children.

As can be seen from the data in the table, uneven changes in the amount of vitamin D with increasing age are characteristic of recurrent respiratory diseases in the upper respiratory tract, while in pathological cases of the lower respiratory tract, on the contrary, a sharp decrease in the amount of vitamin D was observed.

Based on the data in the table, it should be noted that the lack of vitamin D, especially its deficiency, increases susceptibility to the disease, based on the initial and high concentration of risk factors entering the upper respiratory organs through external atmospheric air and the anatomico-physiological characteristics of the wall of the lung.

Children of the first group had insufficient serum vitamin D compared to the control group at all ages. It should be noted that the tradition of increasing vitamin D levels in adolescents up to

the limit of normal values can be explained by the increasing social opportunities of children of this age.

Comparative description of the amount of vitamin D in the studied groups depending on the age periods

Research groups	Follow-up periods			
	1-3 years old	4-7 years old	8-12 years old	13-18 years old
ЮНЙҚК (n = 112)	16,24 ± 1,14 (n = 36)	21,74 ± 0,32 (n = 33)	21,2 ± 1,82 (n = 19)	28,44 ± 2,14 (n = 24)
ПНЙҚК (n = 56)	18,17 ± 2,34 (n = 23)	22,41 ± 1,46 (n = 9)	13,25 ± 2,24 (n = 8)	11,62 ± 1,30 (n = 16)
Control group (n = 64)	19,32 ± 1,21 (n = 16)	25,24 ± 1,26 (n = 16)	34,12 ± 1,73 (n = 16)	33,51 ± 1,36 (n = 16)
P	> 0,01	> 0,01	< 0,01	< 0,01

Note: *p*-analyzed difference of parameters in control, high and low QRK patients

Statistically reliable differences in the level of vitamin D between patients of the first and second observation groups from the period of junior school age correspond to vitamin D deficiency in patients with diseases of the upper respiratory tract, and deficiency values in children of the second group ($r < 0.01$).

In the comparative analysis of the number of bronchopulmonary exacerbations in children with CRK, it was found that exacerbations of the clinical manifestation with vitamin D deficiency were recorded 3-4 times a year ($r < 0.001$), while the number of exacerbations in the reference indicators did not exceed 2 times a year ($r = 0.016$).

Despite the fact that in the case of vitamin D deficiency, 39.9% of children had more than 4 recurrences per year, the difference was statistically insignificant ($r = 0.071$).

According to the results of statistical analysis, vitamin D deficiency is associated with the risk of severe recurrence ($r = 0.047$). The results of this work confirm the opinion of many researchers about the direct participation of active metabolites of vitamin D in the elimination of inflammatory processes. According to the analysis of the obtained results, the function indicators of the lungs were determined in the deficiency values, and it was found that the vitamin D deficiency in the patients was statistically significantly correlated with the level of the vitamin D content in the blood serum. External respiratory activity values below normal values up to 60% correspond to vitamin D values ($r < 0.001$, $r = 0.007$, respectively).

Analysis of changes in vitamin D levels in blood serum allows us to emphasize that it has a significant impact on the description of the course of CRK in children. At the same time, the degree and severity of the changes prompts the analysis of the etiological factors of the disease.

During the study, it was found that the concentration of calcidiol in blood serum affects the phenotypic characteristics of CRKs due to genetic and non-heritable mechanisms of chronic inflammation control. A correlation between vitamin D supply, the number and severity of disease outbreaks, the microbiological nature of the respiratory tract, and the functional indicators of the lungs was determined. According to the results of instrumental examination methods, deficiency of vitamin D in blood serum is directly related to severe course of clinical manifestations and decrease in functional parameters of lungs.

Despite the fact that doctors have a large number of drugs for the treatment and prevention of OCD, this problem remains relevant today. But their meeting in children corresponds to 3-7 years old. The study shows that vitamin D deficiency and deficiency are common among children, that vitamin D deficiency is associated with the incidence of various infectious diseases, that vitamin D is involved in the regulation of immunity against infection, and that it is appropriate to use it as a nonspecific prevention of respiratory diseases. In the background of stimulation of innate immunity and increase of protection indicators against infection, prolonged use of vitamin D preparations is considered appropriate for children aged 3-7 years under the influence of vitamin D. For this purpose, the drug Akvadetrim mecelial solution was recommended.

Vitamin D has been recommended as an adjunctive treatment for CKD. The drug was recommended based on the program "Prevention of vitamin D deficiency and deficiency in the Republic of Uzbekistan" developed in 2019 in a therapeutic dose based on the amount of vitamin D in the blood serum. 20-30 ng/ml 2000 IU, 10-20 ng/ml-3000 IU, 10 ng/ml 4000 IU daily for 1 month is recommended.

The amount of vitamin D in the blood of children is shown in the following table, based on the results after the course of treatment.

Research groups	Follow-up periods							
	1-3 years old		4-7 years old		7-11 years old		11-18 years old	
	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
CONTB (n = 112)	17,84 ± 1,24 (n = 36)	19,45 ± 1,32* (n = 36)	24,14 ± 0,46 (n = 33)	26,23* ± 0,24 (n = 33)	31,42 ± 1,77 (n = 19)	32,22* ± 1,56 (n = 19)	33,01 ± 1,68 (n = 24)	35,35 ± 1,05 (n = 24)
CONTK (n = 56)	19,07 ± 2,04 (n = 23)	22,55* ± 1,77 (n = 23)	23,38 ± 1,08 (n = 9)	25,54* ± 1,02 (n = 9)	18,05 ± 1,98 (n = 8)	20,01* ± 1,44 (n = 8)	17,62 ± 1,05 (n = 16)	21,52** ± 1,19 (n = 16)

Note: * - ≤ 0.05 ; ** - ≤ 0.01 ; *** - ≤ 0.001 the difference between the comparison groups was considered reliable when

As can be seen from the table, vitamin D serum levels in children of all age groups receiving therapeutic doses of vitamin D were found to be significantly higher compared to pre-treatment values in the observation age groups.

After one month, the therapeutic dose was continued for another 15 days in children whose re-examination was below 30 ng/ml. A prophylactic dose of 1000 IU was recommended in children whose vitamin D level was higher than 30 ng/ml after completing treatment with vitamin D.

Complex treatment and preventive use of vitamin D reduced the complications and negative consequences of respiratory diseases.

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CREATION NEW VARIETIES OF NON-TRADITIONAL FRUIT CROPS IN UZBEKISTAN

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Abstract. *The article presents the results of a scientific study on the non-traditional culture of Japanese medlar in Uzbekistan and the development of a new variety of this crop. Japanese medlar is an evergreen fruit and ornamental crop. In the conditions of the Tashkent region it can withstand frosts down to -18°C . The fruits of the new variety “Yagona” are quite large, the average weight of one fruit is 36 grams. The maximum weight of the fetus is 55 grams. It produces a harvest every year; the yield of a 10-year-old tree averages 35 kg.*

Keywords: *japanese medlar, variety, harvest, evergreen, research, non-traditional.*

INTRODUCTION. In order to further ensure the country’s food security and saturate the market with high-quality, safe and affordable food products, on January 16, 2018, has been signed Decree No. UP-5303 of the President of the Republic of Uzbekistan “on measures to further ensure the country’s food security”. The strategic goal of food security is to provide the country's population with safe agricultural products and food. The guarantee of its achievement is the stability of domestic production, as well as the availability of the necessary reserves and reserves. The decisive role in ensuring food security is played by varieties with high productivity and crop quality, adaptive to local soil and climatic conditions and resistant to abiotic and biotic factors. Crop diversification is also important.

MATERIAL AND METHODS. The research material was collected samples of genetic resources of the Japanese medlar from the Research Institute of Plant Genetic Resources. The passage of phenological phases, biological and physiological characteristics of the samples were studied. Morphological descriptions of the trees were also carried out. “Methods for studying collection samples of fruit crops” were used.

RESULTS AND DISCUSSIONS. In order to introduce new non-traditional fruit crops for Uzbekistan, the department of genetic resources of fruit and berry crops and grapes of the Research Institute of Plant Genetic Resources began in 1990 breeding work to develop a variety of Japanese medlar (*Eriobotrya japonica*), adapted to the agroclimatic conditions of the local environment, with high productivity, resistance to winter and late spring frosts, with good technological properties of the fruit.

Japanese medlar is a very healing plant. The leaves, bark and raw fruits of the plant contain nutrients that are used to nourish the skin. The leaves contain many valuable substances - antioxidants, tannins and absorbents. A decoction of the leaves of the plant is used for diarrhea. To do this, a handful of muskrat leaves are boiled in water and soaked for 4 hours. If the prepared tincture is taken half an hour before meals, the illness immediately subsides. This remedy helps lower cholesterol and remove toxins.

The source material was a sample with catalog number K-35235 from the institute’s loquat gene pool, introduced from Japan. As a result of many years of breeding work, a variety of Japanese medlar was developed, characterized by relatively winter hardiness, fruit size and quality, with regular fruiting (Table No. 1). The bred variety feels good in open ground in the conditions

of the Tashkent region of Uzbekistan. In 2020, this variety, called “Yagona” (“The Only One”), was transferred to the State Variety Testing Commission.

According to the passage of phenological phases, Japanese medlar differs sharply from other fruit crops common in Uzbekistan. She is not deciduous. In the conditions of Uzbekistan, flowering occurs in the fall, October-November. The fruits ripen very early, on average in March - early April. During this period, in our conditions, no fruits ripen.

The fruits of the “Yagona” variety are quite large, the average weight of one fruit is 36 grams. The maximum weight of the fetus is 55 grams. It produces a harvest every year; the yield of a 10-year-old tree averages 35 kg.

Table No. 1

Economic characteristics of medlar in the conditions of the Tashkent region

No.	Properties	Unit	Recommended variety Yagona	Sample No. K-35235
1	Fruit ripening time		very early	very early
2	Calendar dates for fruit harvesting - beginning, end	Data	5.03 – 15.04	3.03 – 12.04
3	One-dimensionality of fruits		one-dimensional	Non-one-dimensional
4	Productivity from 1 tree	kg	35.5	27.5
5	Productivity per 1 hectare	c	142	103
6	Average fetal weight:	g	36	24
7	Maximum fetal weight	g	55	39

The new medlar variety “Yagona” is superior in biochemical parameters to the original material (Table No. 2).

Table No. 2

Biochemical composition of medlar fruit pulp

No.	Main biochemical indicators	Unit of measurement	Variety Yagona	Sample No. K-35235
1	Dry matter	%	11,4-13,5	14
2	Sahara	%	6,0-8,6	5,7-6,8
3	Acids, titratable acid	%	0,14-0,18	0,17-0,21
4	Pectin substances	g/100 g	0,94	0,98
5	Vitamin C	mg/100 g	9,6	8,4
6	Tasting evaluation of fruits	point	9	4

Loquat (*Eriobotrya japonica*) is a subtropical tree of the rose family (*Rosaceae*), grown for its evergreen foliage and edible fruit. Loquats are native to central-eastern China. It was introduced to Japan over 1,000 years ago, where it was grown as a horticultural plant and is still highly prized. It grows wild in subtropical conditions in southeast China at an altitude of 900 to 2000 meters above sea level. This is a species adapted to temperate or cold-temperate climates with average environmental humidity requirements. It adapts to various types of soil, prefers well-lit areas and does not tolerate strong winds.

As a decorative species, Japanese medlar is often planted in parks and gardens. The fruits are rich in fiber, vitamin A and antioxidants.

Japanese medlar, a tree 4-8 meters high, rarely exceeds 10 meters in height. The leaves are thick, hard, located along the branches, sometimes they are located in terminal bundles, grouped towards the ends of the branches. The leaf shape is lanceolate-elliptic, the edges of the leaf blade are coarsely serrated (toothed), length 200–250 mm, width 60-90 mm.

The flowers are small, creamy white, fragrant and pubescent, 1-2 cm in size and collected in inflorescences or multi-flowered panicles. They have five cream-colored petals; the peduncle and calyx are serrated; blooms between autumn and winter. This is a honey plant.

The fruits are fleshy, spherical, pear-shaped or oval, yellow, 3-6 cm in diameter. The skin is smooth, shiny, and easy to remove. The pulp of the fruit is yellow-orange, with a pleasant smell and taste, juicy, sweet with a sour taste, reminiscent of other fruits of the same family, such as plums, apricots and cherries. Contains 2-4 brown seeds. In the conditions of the Tashkent region, the ripening of Japanese medlar fruits takes place on average from April to May.



Photo 1. Fruits with leaves



Photo 2. Fruits of the “Yagona” variety

The Yagona variety reproduces well by seeds and vegetatively. To obtain pure-quality seedlings, they are grafted onto medlar, hawthorn, and pear. They are well established on a variety of soils, from sandy loam to clayey, and begin to bear fruit at three to four years of age. Nature is resistant to most diseases and insects. This variety is recommended for both fruit and ornamental use, and can also be grown as a houseplant.

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