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GOOD SCIENTIFIC MANAGEMENT AS THE BASIS FOR SUCCESSFUL REALIZATION OF SCIENTIFIC PROJECTS IN MEDICINE

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National Scientific Center of Surgery named after A.N. Syzganov, Almaty, Kazakhstan

Abstract

The article presents the results of research activities of the A.N. Syzganov National Scientific Center of Surgery over the past 3 years. In a comparative aspect, the clinic's participation in scientific projects within the framework of targeted funding, the dissemination of scientific publications, the main target indicators and their achievement, participation in multicenter clinical research, the activities of the local bioethics commission, the transfer of innovative technologies and the publication of the journal "Bulletin of Surgery in Kazakhstan" are described.

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Надлежащий научный менеджмент как основа успешной реализации научных проектов в медицине

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Национальный научный центр хирургии им. А.Н. Сызганова, Алматы, Казахстан

Аннотация

В статье представлены результаты научно-исследовательской деятельности Национального научного центра хирургии им. А.Н. Сызганова за последние 3 года. В сравнительном аспекте описаны участие клиники в научных проектах в рамках программно-целевого финансирования, диссеминация научных публикаций, основные целевые индикаторы и их достижение, участие в мультицентровых клинических исследованиях, деятельность локальной комиссии по биоэтике, трансферт инновационных технологий и выпуск журнала «Вестник хирургии Казахстана».

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Keywords

scientific management, research projects

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Ключевые слова

научный менеджмент, научные проекты

Introduction

Scientific research - focused knowledge of reality, the results of which appear in the form of a system of concepts, laws and theories, the process of developing new scientific knowledge is one of the types of cognitive activity, characterized by objectivity, reproducibility, evidence and accuracy [1].

Organizations of Medical Sciences must be wider to implement project-based approach to the management of research projects. Along with the introduction of international standards of scientific research, a modern methodology of scientific research and the principles of evidence-based medicine, effective management should become a key tool to achieve the competitiveness of domestic medical science [3].

The purpose of the study - in a comparative aspect, to present the results of the activities of the department of management of scientific research at A.N. Syzganov NSCS over the past 3 years.

Material of the study

The results of the activities of the department of Scientific management of A.N. Syzganov NSCS over the past 3 years (according to the annual report) was taken as a basis of the data analyses.

Results

Participation of A.N. Syzganov NSCS in Scientific and technical program

In 2017-2019 A.N. Syzganov NSCS participated in two Scientific – technical programs as part of targeting funding:

- 1) The new molecular genetic methods of pre-asymptomatic diagnostics and methods of treating a number of significant diseases (parent organization - NJSC KazNMU named after S.D. Asfendiyarov): 04.N Development of a personalized protocol for the treatment of complex forms of atrial fibrillation. The total amount of expert review by NCSTE made up 21 points.
- 1) The new medical technologies for the development of results of chronic disease treatment and consequences of injuries with heavy loss of functions and severe complications (Head organization – NJSC “Medical University of Astana”): 01.N Development and enchantment of innovative methods of treatment on the basis of using biomaterials under chronic infective diseases and injuries. The total amount of expert review by NCSTE made up 24,66 points.

Table 1.

Dissemination of scientific publications

Name of scientific productions	For 2017-2019
Articles	10 (2 of them are with IF)
Thesis	27
Reports	36
Implementation Acts	7
Patents, copyright certificates	5
Guidelines	2
TOTAL:	87

Table 2.

Dissemination of scientific publications

Name of scientific productions	For 2017-2019
Article	43(17 of them are IF)
Thesis	68
Reports	85
Implementation Acts	33
Patents, copyright certificates	12
Guidelines	8
TOTAL:	164

Table 3.

The key target indicators and their attainment in 2019

The key target indicators	Plan 2019	Fact 2019
The total amount of scientific – research projects	1	3
Number of obtained patents in Kazakhstan	2	4
Quantity ratio of scientific articles for the past 5 years indexing on magazines such as Web of Science, Scopus, to the total amount of production staff	1 to 4	1 to 3,4
The average Hirsh index of production staff on the basis of Web of Science, Scopus	0,18	0,27
The average citation of scientific articles published over the last 5 years on magazines, indexing in Web of Science, Scopus	0,13	0,13

The key target indicators and their attainment

Realization of the key target indicators of scientific activities of the Centre for 2019 represented on the table 3.

Scientific publication, scientific reports, secondary and tertiary developments, security documents

In 2019, employees of the A.N. Syzganov NSCS published about 7 articles in journals with impact factor (Web of Science, Scopus, Springer).

During the reporting period, employees of the A.N. Syzganov NSCS made 61 scientific reports,

the structure of which is presented in Fig. 1.

In 2019, 40 new innovative technologies were introduced (Fig. 2).

Typographically it issued 5 guidelines and 1 manual (Fig. 3).

Received 3 patents for the invention of the Republic of Kazakhstan, 1 utility model and 6 copyright certificates (Fig. 4).

The total number of employees Hirsch index for Web of Science, Scopus in relation to production personnel in 2019 amounted to 0.273 (Fig. 5). In

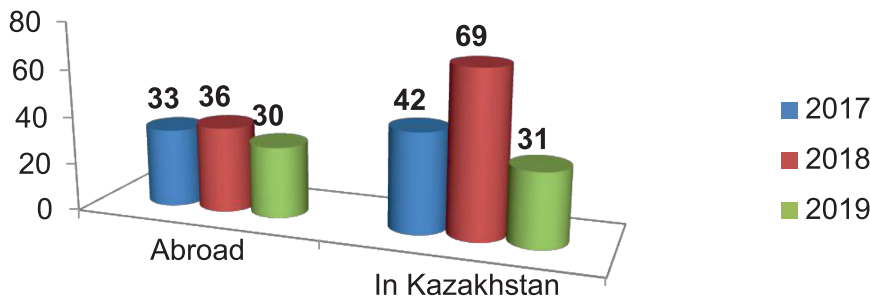


Fig. 1
Scientific reports in Kazakhstan and abroad

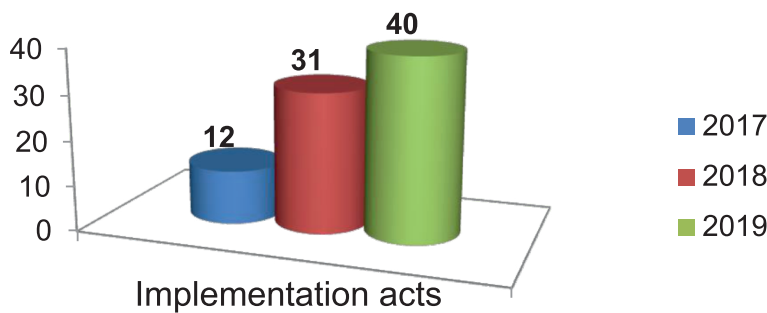


Fig. 2
Introduction of innovative technologies

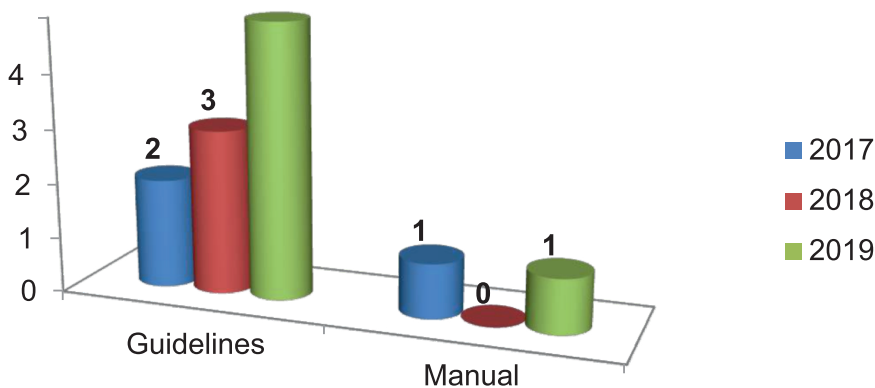


Fig. 3
Secondary and tertiary developments

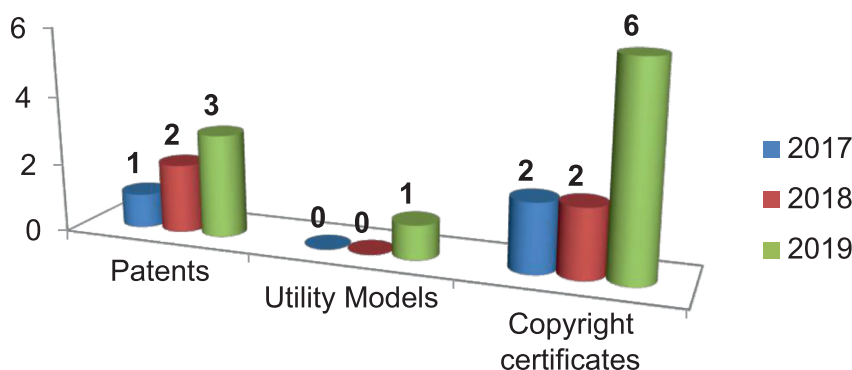


Fig. 4
Security documents

Fig. 5
Average Hirsch index of employees for Web of Science, Scopus

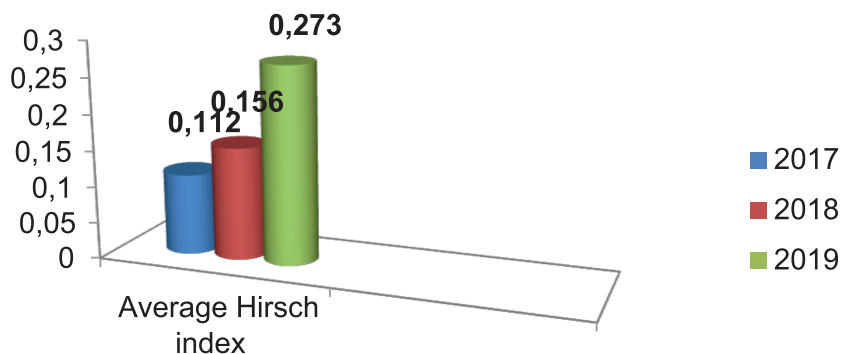


Fig. 6
Impact factor of the journal "Bulletin of Surgery of Kazakhstan" (according to the CSC)

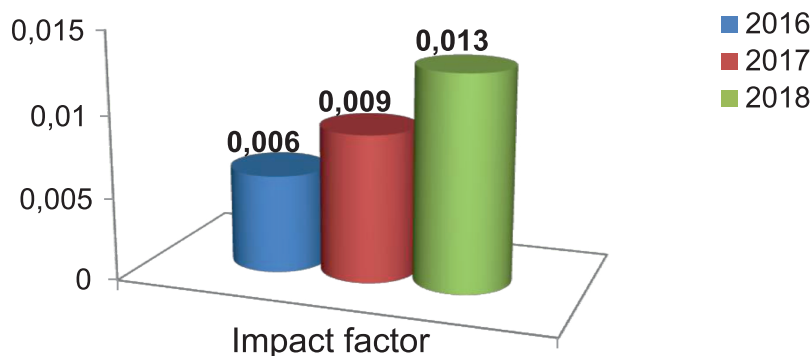


Table 4.
Workshops involving foreign specialists

Name	The date	Proctor (s)	Country
The Rossa operation	17.01.2019	Prof. Karaskov A.M.	Novosibirsk, Russia
Thoracoscopic radiofrequency ablation	17.01.2019	MD. Bogachev-Prokofiev A.V.	Novosibirsk, Russia
Correction of atrioventricular communication	17.01.2019	Ph.D. Omelchenko A.Yu.	Novosibirsk, Russia
Liver transplantation from living related donors using Dual Graft	10.03.2019	Prof. Ahn Chul-Soo, Ha Tae Yon	Seoul, South Korea
Ablation Index, a new marker for the quality and effectiveness of ablation lesions	24-25.05.2019	Ph.D. Shabanov V.V.	Novosibirsk, Russia
Modern possibilities of diagnostic and operative endoscopy	8.06.2019	Smirnov A.A., Malkov V.A.	St. Petersburg, Russia
Endovascular balloon dilatation and stenting of the portal vein	11-13.08.2019	Prof. M.Kasahara, S. Nosaka	Tokyo, Japan
Prevention of liver disease. Management of patients after transplantation	28.10.2019 – 01.11.2019	Prof. Kwang-Woong Lee	Seoul, South Korea
Radiation diagnostics in pulmonology	28.11.2019	Prof. Speranskaya A.A.	St. Petersburg, Russia
Wireless pacemaker «MICRA»	23.12.2019	Hassan Hamadeh, Kemal Cavuz	UAE, Turkey
Thyroid radiofrequency ablation	23-24.12.2019	Dr. Purevbaatar Bat-Ireedui	South Korea, Mongolia

dynamics, there is a constant growth of this target indicator.

Technology transfer

For 2019 at the A.N. Syzganov NSCS held 11 workshops with the participation of foreign experts from the Russian Federation, Japan, South Korea, Turkey, the UAE and Mongolia (Table 4).

Participation in international multicenter clinical trials

A study of the surgical treatment of asymptomatic carotid stenosis-2 (Asymptomatic Carotid Surgery Trial-2). Leading organizations: European Society for Vascular Surgery (ESVS), University of Oxford.

Heart failure register of the European Heart Failure Association of the European Society of Cardiology (ESC). Head organization: ESC.

Local Bioethics Commission (LBC)

In 2019, the number of LBC meetings was 4, while the number of applications reviewed was 4. According to standard operating procedures, the updated composition of LBC was approved (Order No. 01 L / S-N of January 03, 2019).

An article was published in the Journal of Health Development (2019, Vol.1, No. 30, P.59-63) by the authors Mierbekov E.M., Sagatov I.E. on the topic: "Analysis of the activities of the local commission on bioethics at the National Scientific Center of Surgery named after A.N. Syzganov".

Journal "Bulletin of Surgery in Kazakhstan"

In 2019, 4 issues of the journal "Bulletin of Surgery in Kazakhstan" were published. The impact

factor of the journal, according to the Kazakhstan citation database, increased and amounted to 0.013 (Fig. 6).

According to the annual rating among the research institutes/scientific centers of the clinical profile (for all indicators of the effectiveness of research) conducted by the RCHD, A.N. Syzganov NSCS in 2019 took 2nd place, in 2018 - 4th place and in 2017 - 2nd place (Fig. 7).

Conclusion

Thus, a proper scientific management is the foundation of all research activities and scientific research center as a whole, and in particular of the scientific department. It should be of a systemic nature, involving constant monitoring of the progress of the project, identifying deviations of the actual implementation of the project from the planned one.

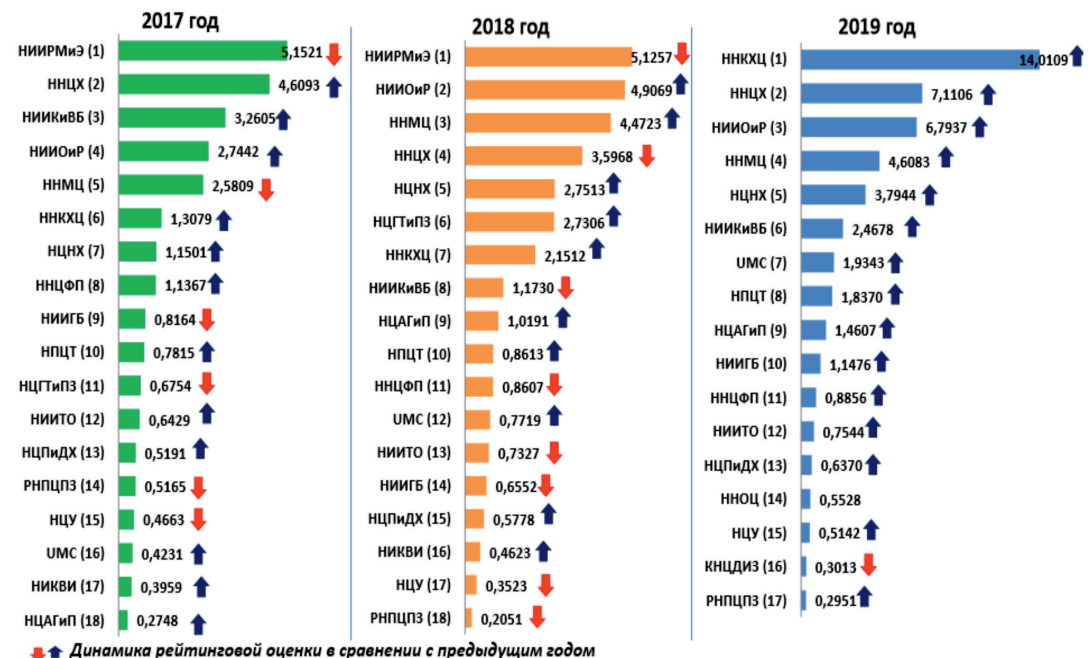


Fig. 7 Rating assessment of research institutes / research centers of clinical profile (RCHR data, www.rcr.kz) [5]

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ANALYSIS OF QUALITY OF LABORATORY STUDIES PERFORMED IN 2018-2019 IN THE CLINICAL AND DIAGNOSTIC LABORATORY OF A.N.SYZGANOV'S NSCS

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Abstract

The purpose of this study was to assess the quality of laboratory research, its problem areas and potential improvement opportunities using the example of the clinical diagnostic laboratory of the A.N. Syzganov's NSCS.

As a result of study, the most frequent errors were in the pre-analytical and analytical process, these studies coincided with the literature data. The implementation of the laboratory information system in the CDL gave a reliable and stable functioning of laboratory research.

Keywords

clinical diagnostic laboratory, pre-analytical and analytical process.

А.Н. Сызғанов ат. ҰҒХО- клиникалық-диагностикалық зертханасында 2018-2019 жж. орындалған зертханалық зерттеулердің сапасын талдау

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клиникалық-диагностикалық зертхана, преаналитикалық және аналитикалық процесс.

Аңдатпа

Бұл зерттеудің мақсаты – А.Н. Сызғанов ат. ҰҒХО клиникалық-диагностикалық зертханасындағы зертханалық зерттеулердің сапасын бағалау, ондағы мәселелерді және сапасын жақсартудың ықтимал мүмкіндіктерін айқындау.

Зерттеудің нәтижесінде жиі кездесетін қателіктер преаналитикалық және аналитикалық процестерде болғаны анықталды, бұл зерттеулер әдебиеттердегі мәліметтермен сәйкес. ҚДЗ-ға зертханалық ақпараттық жүйенің енгізілуі зертханалық зерттеулердің сенімді әрі тұрақты жұмыс істеуіне мүмкіндік берді.

Анализ качества лабораторных исследований выполненных в 2018-2019 гг. в клиничко-диагностической лаборатории ННЦХ им. А.Н.Сызганова.

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Аннотация

Целью данного исследования явилась оценка качества лабораторных исследований, ее проблемные области и потенциальные возможности улучшения на примере клиничко-диагностической лаборатории ННЦХ им. А.Н.Сызганова.

В результате исследования наиболее часто встречающиеся ошибки были в преаналитическом и аналитическом процессе, эти исследования совпали с литературными данными. Внедрение лабораторной информационной системы в КДЛ дало надежное и стабильное функционирование лабораторных исследований.

Ключевые слова

клиничко-диагностическая лаборатория, преаналитический и аналитический процесс

Relevance

According to the WHO, the proportion of laboratory tests is 75-90% of the total number of various types of research carried out to a patient in hospitals. It is believed that 70-80% of clinical decisions are made on the basis of information provided by laboratories [1].

Thus, there is an urgent need to assess laboratory medicine errors within a robust working concept. From the patient's point of view, the reliability of the process as a whole and the ability to prevent any errors at the preanalytical, analytical and postanalytical stages are important. Therefore, any possible defect in the analytical process must be investigated [2, 3]. This will prevent or eliminate any negative impact on the treatment process, regardless of the stage at which the error occurred and the person who made the mistake, whether it is a laboratory specialist or another employee [4].

The purpose of this study was to assess the quality of laboratory research, its problem areas and potential improvement opportunities using the example of the clinical diagnostic laboratory of A.N. Syzganov's NSCS.

Materials and methods

We have assessed the quality of laboratory studies of reported data in the clinical diagnostic laboratory for 2018-2019. Since November 2018, the NSCH has introduced the electronic system MIS "Zhetysu" and LIS.

Statistical processing of the research results was carried out using the Microsoft Excel application package.

Results and discussion

Table 1 shows data on the number of laboratory tests performed for 2018-2019.

As can be seen from Table 1, a total of 579,867 studies were carried out in the CDL for 2018, and in 2019 it is 10.8% more, i.e. deviations in the positive direction are associated with an increase in the provision of paid services.

According to Godolphin et al. [5], the amount of time spent at different stages of laboratory research is not the same. In large foreign clinics, 46% of laboratory errors occur at the preanalytical stage, 7% at the analytical stage, 47% at the post-analytical stage [6].

No.	Analysis type	2018	2019	Отклонения
1	Hematological	134 840	178 297	32,3%
2	Biochemical	329 100	326 360	-0,9%
3	Immunological	11 482	15769	37,4%
4	Others (general clinical)	39 439	54461	38,1%
5	Serology	2 267	2 863	26,3%
6	Microbiological	62 739	64 503	2,9%
	Total	579 867	642 253	10,8%

Table 1.
Number of studies performed for 2018-2019

Criteria	Threshold value	2018	2019
Preanalytical process indicators			
Number of requests from doctors with diagnostics (incorrect study assignment)	5%	0,3	0,5
Number of requests with errors in patient identification	5%	0,08	0,07
Number of requests with errors in patient identification (duplicate request)	5%	2,4	1,2
Number of samples collected in an unsuitable container	5%	0,03	0,03
Number of samples with insufficient biomaterial volume	5%	0,05	0,05
Number of samples damaged during transport	5%	0,01	0
Number of samples delivered outside the specified time range	5%	0,02	0
Number of samples stored in inappropriate conditions	5%	0,01	0
Number of lost-not received samples	5%	0,06	0
Number of hemolyzed samples	5%	0,05	0,04
Number of samples with clots	5%	0,05	0,07

Table 2.
Errors in the preanalytical process of laboratory research

Table 3.
Errors in the analytical
process of laboratory
research

Criteria	Threshold value	2018	2019
Analytical process indicators			
Number of tests covered by external quality assessment systems per year	50%	50	50
Number of unacceptable EQA results per quarter	40%	5	5
Number of unacceptable EQA results that have arisen and have been previously eliminated, per year	40%	5	4
Number of reports delivered later than specified due to equipment errors per year	10%	0,05	0,28
Number of erroneous results due to data rewriting and / or manual data entry into a computer system	10%	1,6	0

As a result of the research, the most common errors were in the preanalytical and analytical process, these studies coincided with the literature data. Errors in the post-analytical process were rare. The use of LIS since 2018 in the CDL gave reliable and stable functioning of laboratory studies, compared to 2017-2015, but despite the electronic base, there were still errors and errors in the CDL.

To reduce the above errors and improve the quality of laboratory tests, we will introduce a monthly systematic analysis of data obtained during

the identification and registration of inconsistencies using the information system, as well as the results of internal audits of all structural units involved in the provision of laboratory services.

Conclusion

the results of conducted estimation of quality of the laboratory studies of reporting data in CDL for 2018-2019 yy. showed that the introduced system of LIS process management allows continuously improve performance of rendering laboratory services and quality of laboratory studies.

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A PRACTICAL CASE IN THE DIAGNOSIS OF SEXUALLY TRANSMITTED INFECTIONS

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Abstract

We are reporting a case of diagnosis of a mixed sexually transmitted infection. In the above case, the question of diagnosing urogenital infections caused by mixed flora is raised. Conclusions were made about the need for an integrated approach to the diagnosis and, in general, the management of patients with chronic inflammatory diseases of the urogenital tract. Compliance with the principles of interdisciplinary integration in the implementation of diagnostic and treatment technologies will allow adequate rehabilitation of urological, gynecological and reproductive health of patients.

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Keywords

trichomonas infection, chlamydial infection, indirect immunofluorescence reaction, direct immunofluorescence reaction.

Жыныстық жолмен берілетін инфекцияларды диагностикалау тәжірибесінен алынған жағдай

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Аңдатпа

Біз аралас жыныстық инфекция диагнозы туралы хабарлап отырамыз. Жоғарыда көрсетілген жағдайда, аралас флорадан туындаған урогенитальды инфекцияларды диагностикалау туралы мәселе көтеріледі. Диагнозды кешенді түрде қабылдау қажеттілігі туралы және несеп-жыныс жолдарының созылмалы қабыну аурулары бар науқастарды басқару туралы қорытынды жасалды. Диагностикалық және емдеу технологияларын енгізуде пән аралық интеграция қағидаларын сақтап, науқастардың урологиялық гинекологиялық және репродуктивті денсаулығын қалпына келтіруге мүмкіндік береді.

АВТОРЛАР ТУРАЛЫ

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Түйін сөздер

трихомонас инфекциясы, хламидиалды инфекция, жанама иммунофлуоресценттік реакция, иммунофлуоресценцияның тікелей реакциясы

Случай из практики при диагностике инфекций, передаваемых половым путем

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Аннотация

Мы сообщаем о случае диагностики смешанной инфекции, передаваемой половым путем. В выше указанном случае затрагивается вопрос диагностики урогенитальных инфекций, вызванных смешанной флорой. Были сделаны выводы о необходимости комплексного подхода к диагностике и, в целом, ведению больных хроническим воспалительными заболеваниями органов урогенитального тракта. Соблюдение принципов междисциплинарной интеграции при осуществлении диагностических и лечебных технологий будет позволять адекватной реабилитации урологического, гинекологического и репродуктивного здоровья пациентов.

ОБ АВТОРАХ

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Ключевые слова

трихомонадная инфекция, хламидийная инфекция, реакция непрямой иммунофлуоресценции, реакция прямой иммунофлуоресценции

Introduction

According to modern data, mixed urogenital infections cause a pathological process characterized by a complex complex of intermicrobial relationships and interactions of various populations of microorganisms with a single pathogenesis, in the development of which each of the microorganisms makes a certain contribution. Microbial associations with varying degrees of etiological significance of each microorganism can form an atypical development and course of inflammatory diseases of the genitourinary tract, which must be taken into account when assessing the clinical picture, laboratory data and prescribing appropriate therapy [1].

To date, the factors of the evolution of the epidemic process of sexually transmitted infections (STIs) are manifested as an increase in the incidence of mixed infections leading to interfering syntropia, the phenomenon of gradual debut and activation of the disease, the predominance of subacute, torpid, asymptomatic (subclinical) and atypical variants of the course of STIs. cases of persistent and *inapparent* STIs, as well as an increase in the incubation period of STIs, the duration of infection of the body of patients with these infections and cases of multifocal lesions with simultaneous registration of pathogens of various STIs in several localizations, a combination of a mild clinical course of the above infections with damage to the ascending genital

tract, an increase in cases of complicated course of STIs with the formation of a complex of pathological symptoms and syndromes. These factors are signs of clinical pathomorphosis of STIs, which must be taken into account when determining the diagnostic route of patients and prescribing treatment for them [2].

Case report

A 42-year-old patient consulted a urologist with the fact that his sexual partner in one of the laboratories found *Tr.vaginalis* in a scraping from the posterior vaginal fornix. The doctor sent a swab from the patient's urethra and a swab from this patient's prostate to the diagnostic laboratory. *Tr.vaginalis* was not detected in the above biological materials. Then the attending physician decided to send the patient's ejaculate for examination. The biological sample of the specified patient was analyzed by the method of indirect immunofluorescence (RIIF) (Fig. 1) [3] using the diagnostic kit "TrichoScan" LLC "Agrobiomed", Russia. The smears were viewed in a luminescent microscope

"Mikromed", Russia, with an immersion objective (100x) using a special non-fluorescent immersion oil, using a system of filters that provide exciting light with a wavelength of not more than 490 nm and emission with an average wavelength of 520 nm. The results were recorded immediately after the preparation was mounted. As a result, *Trichomonas* were found (Fig. 2) in the form of polymorphically limited structures with a bright green glow. Mobile forms were also identified, in which flagella were stained. At the same time, nonspecific bacterial flora was present, which was stained orange. Also identified were epithelial cells, leukocytes, sperm, colored orange. The result was assessed as positive. The result of the analysis was sent to the attending physician. 1.5 months after the appropriate treatment, the above mentioned patient again passed the analysis in order to re-carry out the study of the ejaculate. This time the patient was found to have *Chlamydia trachomatis*. In the smear after performing the direct immunofluorescence reaction (DIF) using the diagnostic kits "ChlamyScan" LLC "Agrobiomed", Russia, a bright green glow was recorded in the form of a dot, which is characteristic of elementary chlamydial bodies, and in the form of an oval, which is characteristic of reticular bodies *Chlamydia trachomatis*, which stood out against the background of epithelial cells stained in red-orange. The result of the analysis was assessed as positive. The results of the study were also addressed to the attending physician.

Figure 1.
Scheme of the indirect immunofluorescence reaction [3]

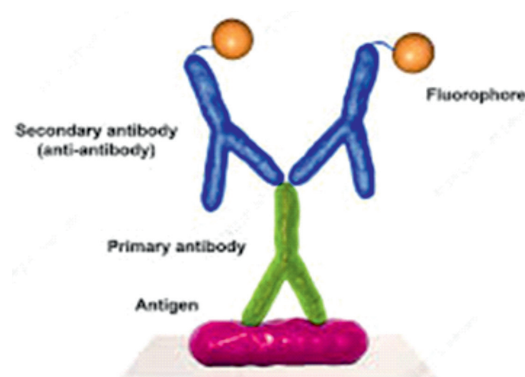
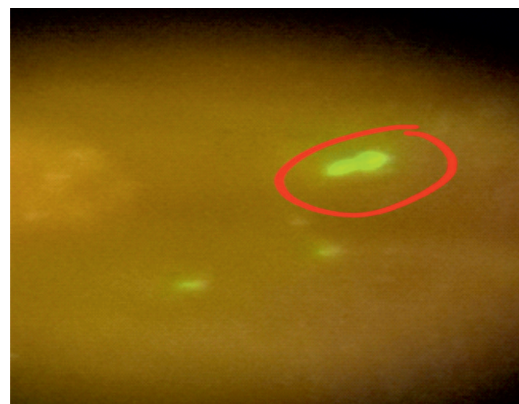


Figure 2.
Trichomonas in the smear from the ejaculate



This diagnostic case from practice confirms the literature data on the high prevalence of mixed urogenital infections causing a variety of obstetric pathologies: missed pregnancy, recurrent miscarriage, premature rupture of the membranes, premature birth, postpartum endometritis, chorioamnionitis, placentitis, intrauterine infection, fetal infection fetal malformations, failures in attempts at extracorporeal fertilization. Only in 10.5% of patients with trichomoniasis proceeds as monoinfection, in 89.5% of cases mixed *Trichomonas* infections are detected in various combinations [4, 5].

Discussion

One of the most common diseases of the genitourinary tract today is urogenital trichomoniasis, which occupies a leading place in the structure of STIs. *Trichomonas* infection affects the genitourinary tract of both women and men, and up to half of the infections are asymptomatic [6, 7]. *Trichomonas* carriage occurs in 40-50% of patients with mixed urogenital infection, and in 30-56% of cases, trichomoniasis is the cause of inflammatory diseases of the urogenital tract in women [8]. The main habitat of *Trichomonas* in men is the urethra, since *Tr.vaginalis* has a tropism to the squamous epithelium, from where it further penetrates into the glands and lacunae of the urethra, and the possibility of *Trichomonas* spreading through the lymphatic tracts and their entry into the lymph nodes has been experimentally proved [9]. Trichomoniasis rarely occurs as a monoinfection. with mixed infection, *Trichomonas* are often a reservoir for the preservation of pathogenic microorganisms. these pathogens persist inside *Trichomonas* and are the cause of the recurrence of the disease concomitant with trichomoniasis. in most (70-90%) patients, *Tr.vaginalis* is a member of microorganism associates, most often (29.1%) including mycoplasmas, gardnerella, ureaplasma, chlamydia, fungi, and gonococci. One of the factors determining the formation of such associates is the ability of *Trichomonas* to carry out incomplete phagocytosis of various microorganisms and viruses, creating a reservoir of pathogenic flora in the body [6].

The outcome of any infectious process is determined, as a rule, by three components: the pathogen (etiological factor), environmental conditions affecting the results of the relationship between the macro- and microorganism, and the state of the macroorganism having a pathological process. All of them have undergone some changes. In the group of increased epidemiological risk, there is an

increase in the number of persons with aggravated premorbid status. Of the endogenous pathological factors that cause a long course of the inflammatory process of the urogenital tract, anemia, systemic blood diseases, diabetes mellitus, glomerulonephritis, and tumors are distinguished.

An important role in the development and regulation of the inflammatory process is played by the immune system, which provides the basic mechanisms of adaptation of the body. Inflammatory processes of the urogenital tract often occur against the background of altered immunity. Patients have a significant decrease in both the relative and absolute number of B-lymphocytes. An imbalance of the immunoregulatory index, a decrease in the number of natural killer cells, a change in the process of induction of cytokines, which manifests itself in the form of persistent states, are often recorded. Transformations in the immune system also lead to a change in the hormonal background and, therefore, to an even more significant disruption in the system of anti-infectious resistance [10].

From the general biological reactions of the body to the invasion of pathogenic microorganisms, and even more so to their communities, the phenomenon of disseminated thrombus formation in microvessels around the foci of inflammation and tissue destruction is currently distinguished. Like edema, leukoedema, phagocytosis and other components of inflammation, the blockade of microcirculation around the lesions is a natural reaction that participates in the isolation of the affected areas and thereby prevents the dissemination of infection, as well as intoxication of the body with tissue destruction products and bacterial toxins. At the same time, it is the intensity and prevalence of blockade of organ microcirculation in inflammatory diseases that lead to the formation of destructive non-draining formations, in which the pathogen is localized and to which the access of drugs slowing down the treatment process is difficult [11].

At the present stage of development of medicine, interdisciplinary approaches to the diagnosis and treatment of STI patients are becoming increasingly important. However, in practice, treatment most often begins without a systematic analysis of the data of a full examination, which does not lead to the expected results and leads to the chronization of the process. It is the increase in the interdisciplinary value of profile standards and protocols for patient management that is the key to their successful rehabilitation.

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APPLICATION OF DIRECT IMMUNOFLUORESCENCE REACTION IN SEROLOGICAL DIAGNOSIS OF UROGENITAL CHLAMYDIAL INFECTION

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Abstract

The paper analyzes the results of direct immunofluorescence studies of biological material for the presence of *Chlamydia trachomatis*, carried out in a private diagnostic laboratory in Almaty during the second half of 2019. We have shown that the direct immunofluorescence method can be used for the diagnosis of urogenital chlamydia. This method allows diagnosing chlamydial antigens, which excludes cross-reactions. However, the implementation of this diagnostic method requires high professionalism from the performer.

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Keywords

serological diagnostics, chlamydial infection, direct immunofluorescence method

Урогенитальды хламидиялық инфекцияның серологиялық диагностикасында тікелей иммунофлюоресценция реакциясын қолдану

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Аңдатпа

Біз аралас жыныстық инфекция диагнозы туралы хабарлап отырамыз. Жоғарыда көрсетілген жағдайда, аралас флорадан туындаған урогенитальды инфекцияларды диагностикалау туралы мәселе көтеріледі. Диагнозды кешенді түрде қабылдау қажеттілігі туралы және несеп-жыныс жолдарының созылмалы қабыну аурулары бар науқастарды басқару туралы қорытынды жасалды. Диагностикалық және емдеу технологияларын енгізуде пән аралық интеграция қағидаларын сақтап, науқастардың урологиялық гинекологиялық және репродуктивті денсаулығын қалпына келтіруге мүмкіндік береді.

АВТОРЛАР ТУРАЛЫ

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Түйін сөздер

трихомонас инфекциясы, хламидиалды инфекция, жанама иммунофлюоресценттік реакция, иммунофлюоресценцияның тікелей реакциясы

Применение реакции прямой иммунофлюоресценции в серологической диагностике урогенитальной хламидийной инфекции

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Аннотация

Мы сообщаем о случае диагностики смешанной инфекции, передаваемой половым путем. В выше указанном случае затрагивается вопрос диагностики урогенитальных инфекций, вызванных смешанной флорой. Были сделаны выводы о необходимости комплексного подхода к диагностике и, в целом, ведению больных хроническим воспалительными заболеваниями органов урогенитального тракта. Соблюдение принципов междисциплинарной интеграции при осуществлении диагностических и лечебных технологий будет позволять адекватной реабилитации урологического, гинекологического и репродуктивного здоровья пациентов.

ОБ АВТОРАХ

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Ключевые слова

трихомонадная инфекция, хламидийная инфекция, реакция непрямой иммунофлюоресценции, реакция прямой иммунофлюоресценции.

Introduction

Chlamydia trachomatis infection is of great social and medical importance to the healthcare system today. This is due to the fact that urogenital chlamydial infection is quite widespread, often causes the development of complications and adversely affects the reproductive health of people. According to the WHO, more than 100 million people are diagnosed annually suffering from the above pathology.

Chlamydia trachomatis affects the cells of the cylindrical and transitional epithelium of the urogenital organs, rectum, posterior pharyngeal wall, conjunctiva, synovial membrane of the joints, as well as epithelial and epithelioid cells of various organs, reticuloendothelial cells, leukocytes, monocytes, macrophages. This pathogen determines the development of infectious and inflammatory diseases of the genitourinary organs of women and men. Most often, urogenital chlamydia occurs without vivid clinical symptoms, which significantly complicates the diagnosis and favors the spread of the disease and the early formation of complications. The predominant clinical forms of chlamydial infection in women are urethritis and cervicitis, in turn, the most common complications are pelvic inflammatory disease. Moreover, after a number of cases of pelvic inflammatory disease, the risk of developing infertility can reach 75% [1]. There is also a certain relationship between the infection caused by *Chlamydia trachomatis* and the formation of malignant neoplasms. There is a possibility that this pathogen is a bacterial cofactor that contributes to the progression of neoplastic processes.

In men, chlamydial infection most often manifests itself in the form of urethritis and prostatitis, as a result of which complications such as epididymitis and orchiepididymitis are usually formed. The latter can lead to the development of infertility. *Chlamydia trachomatis* can cause autoimmune reactions in the body that lead to Reiter's disease and immunological infertility. A characteristic feature of urogenital chlamydia is the defeat of the genitourinary organs and at the same time other organs and systems of the body, due to the generalization of the infection. At the same time, an erased, chronic course of the disease is observed, accompanied by the incommensurability of morphological lesions in the diseased tissues with the clinical picture, inadequacy of the body's immune response. This leads to the formation of secondary foci of infection.

Materials and methods

The article analyzes the results of direct immunofluorescence (DIF) studies of biological material for the presence of *Chlamydia trachomatis*, performed in a private diagnostic laboratory in Al-

maty during the second half of 2019. The sampling of biological material was made from the mucous membranes of the urethra, paraurethral passages (when its expressed), the vagina, and the cervical canal. To obtain material from mucous membranes, a disposable probe was used with a cotton swab with increased adsorption. The material was collected by rotating the swab. Immediately after taking the material, a smear-imprint was prepared by touching the surface of the well of the glass slide. The prepared smear was air dried. The dried smear was fixed in 96% ethanol for 5 minutes. The smear was fixed no more than 5 minutes after taking the material. The material under study should contain as many epithelial cells as possible and the minimum amount of mucus and exudate. Scrapings from the vagina, cervix, cervical canal were taken after removing the mucous plug. In this case, one day before taking the material, it is necessary to perform food or medication provocation. The sample is taken early in the morning before urination or 2-3 hours after the last urination.

A total of 600 studies were performed for the presence of *Chlamydia trachomatis*. Used diagnostic kits "ChlamyScan" LLC "Agrobiomed", Russia. The smears were viewed in a luminescent microscope "Mikromed", Russia, with an immersion objective (100x) using a special non-fluorescent immersion oil, using a system of filters providing excitation light with a wavelength not exceeding 490 nm and emission with an average wavelength of 520 nm.

The results were recorded immediately after the preparation was mounted. The results of the reaction, depending on the degree of color and brightness of specific fluorescence of elementary and reticular bodies of chlamydia, located in the form of cytoplasmic inclusions or extracellularly were assessed visually using a 4-cross system. The result was considered positive if a bright green glow was recorded in the smear in the form of a point (for elementary bodies (EB) of chlamydia) or an oval (for reticular bodies of chlamydia) for at least three crosses, which stands out against the background of epithelial cells stained in maroon or red-orange color. The result was considered negative if there was no specific glow in the smear with the obligatory presence of at least 50 epithelial cells in the smear. A dubious reaction was considered in the presence of single chlamydial bodies with a staining intensity of two crosses or in the absence of epithelial cells in the field of view. In this case, the analysis was repeated.

Research results

During the second half of 2019, the diagnostic laboratory performed 600 DIF analyzes for the pres-

ence of *Chlamydia trachomatis*. Of the total number of studies, 410 were performed by men and 190 by women (Fig. 1). The age of patients ranges from 17 to 67 years. Generally, people aged 32 to 55 are more likely to apply. Of the 600 analyzes for *Chlamydia trachomatis*, 552 (92%) were negative and 48 (8%) were positive.

There are two main strategies for urogenital chlamydial infection: diagnostic screening to identify symptoms of *C. trachomatis* infection and screening at risk. For microbiological diagnosis of urogenital chlamydia, cultural, microscopic, serological and molecular genetic methods are used. The "gold standard" in the laboratory diagnosis of urogenital chlamydia is the culture method. The culture method is the most time consuming and expensive, long-term study (314 days), requiring compliance with strict rules for the transportation of a clinical sample and temperature conditions, and the presence of highly qualified medical personnel. In terms of specificity (100%), this method is a reference, but its sensitivity can vary from 33 to 85% [2]. To detect genital chlamydia, it is recommended to use cultures from both the urethra and the cervical canal, which allows increasing (by 5%) the excretion of the microbe [1]. In case of inactive chlamydia, when metabolic processes are suspended in non-developing chlamydia, false-negative results can be obtained in cell culture. This is associated with the difficulties of diagnosing chronic persistent chlamydial infection. In chronic ascending infection caused by *C. trachomatis*, as well as when taking material from a patient with chlamydia with a low number of viable pathogens, the proportion of detecting chlamydia is low.

The microscopic method for diagnosing urogenital chlamydia is the simplest and most affordable. It gives a general idea of the cytological picture, morphology of cells from the lesion, the presence of microbial contamination, fungi and protozoa. Specific morphological signs allow determining the

presence of chlamydia in the preparation. The most common methods are staining preparations according to Romanovsky-Giemsa, May-Grunwald-Giemsa, Macchiavello, Papanicolaou, Lugol's solution. The sensitivity of the method is 1015%, the specificity is 10-30% [3]. The method is not applicable for screening studies. The diagnostic significance of the microscopic method is rather low: in men it is possible to detect chlamydia with it only in 10-15%, and in women - up to 30-40% of cases (in scrapings from the cervical canal) [4]. With the correct collection of material from patients (from the mucous membranes of the vagina and cheeks) and with the corresponding high qualifications of the doctor, the diagnostic value of light microscopy for the detection of chlamydia is not inferior to the direct reaction of immunofluorescence (DIF) (Fig. 2) [5] and is superior to ELISA.

Serological methods make it possible to detect in biological material (urine, sputum, scraping from the urethra, cervical canal, oropharynx, ejaculate, prostate juice, blood serum, leucoconcentrate, peripheral blood smears, articular fluid) the presence of genus- or species-specific Ag - RIF, or specific antibodies (Ab) of classes IgA, IgM, IgG – ELISA.

The reaction of immunofluorescence (RIF) is based on the detection of chlamydial antigens in the epithelium and other tissues by specific monoclonal or polyclonal antibodies to various chlamydial antigens. There are two types of RIF - direct (DIF) and indirect (RIIF). In the first case, the specific Ab is labeled with flurochrome, and the reaction proceeds in one stage. In the second case, the specific antibodies do not have a label, and labeled antiglobulin antibodies are used to identify the antiglobulin antibodies formed on the complex. The RIF result is assessed visually under a fluorescent microscope. It is positive if the drug contains epithelial cells and it is possible to detect at least 5-10 bright green fluorescent elementary bodies (EB).

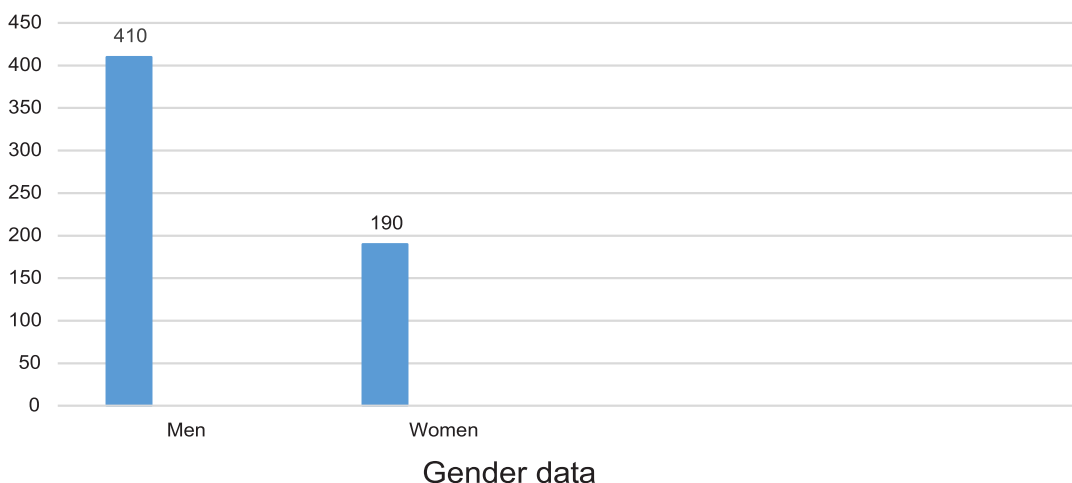


Figure 1.
Distribution of patients by gender

Figure 2.
Scheme of the direct
immunofluorescence
reaction [5]



Discussion

DIF and RIF are widely used to diagnose urogenital chlamydia, but their further use is constrained by the fact that their specificity and sensitivity are in the range of 85-99% and 50-90%, respectively [2]. This is due to the fact that specific Ab are produced by different firms and differ in their quality. In addition to strict conditions for the quality of the test systems themselves, preparation of patients for research, the quality of taking material for research, its further processing and storage are important for obtaining reliable results. Highly qualified specialists in fluorescence microscopy are required. Only if it is performed correctly by an experienced laboratory assistant can a PIF be very sensitive and highly specific [6, 7]. DIF is advisable to use for diagnostics in high-risk groups for urogenital chlamydia, especially in patients with clinical manifestations of STIs, and is not justified for detecting Ag *Cl.trachomatis* in low-risk groups, including those subject to screening [8]. In a comparative study of PCR diagnosticum ("Amplacor", Roche) and DIF for detecting *Cl.trachomatis* in urethral and cervical samples, mainly with a low content of EB, it was found that the sensitivity of PIF is 10 times higher than that of PCR. The diagnostic informative value of a mutual fund is associated with its ability to detect not only corpuscular, but also soluble chlamydial AGs. It is necessary to pay special attention to the qualitative assessment of the research results. The parameters of the method are less dependent on changes in the tinctorial properties of chlamydia during the infection, especially during etiotropic therapy [9].

Serodiagnosis of chlamydial infection has not been sufficiently successful to date, since the disease is caused by a low immunogenic pathogen. Anti-chlamydial antibodies persist for a long time, therefore, even a healthy population may have a background anti-chlamydial antibodies titer. With prolonged and complicated chlamydial infection, serodiagnostic methods can be used.

An important link in the complex of clinical and laboratory measures for urogenital chlamydia is

the assessment of the effectiveness of the therapy - the use of laboratory tests to establish the cure criterion. The main reliable method for establishing the effectiveness of the treatment performed is the culture method (14 days after the end of antibiotic therapy), the use of PCR is not recommended for the purpose of monitoring treatment. Adequate and accessible ways to control the cure of chlamydial infection are PIF and PCR, performed, respectively, not earlier than 2 weeks and 30-40 days after the end of therapy. The combination of various diagnostic techniques significantly increases the efficiency and reliability of monitoring the therapy of urogenital chlamydia.

Currently, there is not only a unified algorithm for examining a patient with suspected urogenital chlamydial infection, especially a widespread form of urogenital chlamydial infection with a protracted, recurrent course of the disease, but also a common opinion on the interpretation of the results obtained. For reliable verification of the pathogen in generalized chlamydial infection, it is necessary to expand the list of investigated clinical samples from patients not only from the urogenital tract, but also from other organs and systems. An important laboratory diagnostic criterion is the detection of chlamydia in the blood, which makes it possible to objectively diagnose the generalized form of urogenital chlamydial infection [10]. The development of modern, inexpensive, highly sensitive and specific methods of laboratory diagnosis of urogenital chlamydia remains relevant and is of great importance for medical science and practical health care [11].

At the moment, I use two main methods to diagnose chlamydia: PCR (smear or scraping for chlamydia) and ELISA (serological diagnosis - antibodies to chlamydia). The main problem is that antibodies to chlamydia are found in a fairly large number of people. And it often happens that people who have found "chlamydia in the blood" do not have any symptoms of urogenital diseases. So where does an IgG (antibody) titer to chlamydia come from in a healthy person? This question interested researchers from the University of Tennessee (USA). They found [12] that antibodies to chlamydia have cross-reactions. That is, antibodies to *Chlamydia trachomatis* are very similar to antibodies to *Chlamydia pneumoniae* (*respiratory chlamydia*). Among women with a titer of antibodies to respiratory chlamydia, 81% were found to have antibodies to *Chlamydia trachomatis*. And vice versa - in the presence of a titer of antibodies to *Chlamydia trachomatis*, 85% showed a titer to respiratory chlamydia. *Chlamydia pneumoniae* usually causes upper respiratory tract disease (bronchitis, pharyngitis). And any person in his life has suffered from various respiratory diseases many times. This ex-

plains why many healthy people (who have never suffered from urogenital chlamydia) suddenly show a titer to chlamydia.

Today, almost all world national guidelines do not recommend using the ELISA method for the diagnosis of chlamydia. Probably the above studies are a sufficient argument for this. However, in our country, the study of the level of antibodies to *Chlamydia trachomatis* is used quite widely. And many people continue to find chlamydia in the blood. Moreover, in some cases, a "blood test for chlamydia" is the only diagnostic method. And some patients have been treating chlamydia for years, the diagnosis of which is made only by the presence of an antibody titer in the blood. And there are quite a lot of such people, given that antibodies to chlamydia are found in almost half of healthy people.

First of all, it is necessary to know about the existence of polyclonal activation syndrome and suspect it in time. To make a diagnosis of various infections, it is not enough just to detect the level of antibodies. In addition, any infection, as a rule, has its own characteristic clinical picture, without which it is not always acceptable to make a diagnosis. It is also desirable to identify the pathogen itself - the PCR method identifies the pathogen only if it is actually present. With a nonspecific increase in the level of antibodies, PCR gives a negative result. It is necessary to actively identify diseases that cause polyclonal activation syndrome (the most common of which is chronic staphylococcal pharyngitis).

This polyclonal activation is caused by superantigens. Superantigens are a special group of antigens (found in both bacteria and viruses) that can cause the activation of several different clones of lymphocytes - polyclonal activation. This activation is not specific - that is, lymphocyte clones that are not related to the superantigen undergo activation. If a B-lymphocyte is activated, it begins to synthesize antibodies. When several different clones of B-lymphocytes are stimulated at once, the synthesis of a variety of antibodies is activated. Thus, antibodies to *Chlamydia trachomatis* can also be found in healthy people. The presence of antibodies can be due to both a previously transferred disease ("serological scar"), and cross-reactions with respiratory chlamydia. Less commonly, the cause of false positive ELISA results is polyclonal activation syndrome. A feature of this syndrome is the detection of acute phase antibodies immediately to a large number of pathogens. Considering all of the above, it should be emphasized that UIF allows diagnosing chlamydial antigens, which excludes cross-reactions, therefore, the method can be recommended for diagnosing urogenital chlamydia.

Conclusions

1. The method of direct immunofluorescence can be used to diagnose urogenital chlamydia.
2. Using the method of direct immunofluorescence requires high professionalism of the performer.

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FIBRINOLYTIC LYMPHOSTIMULATION IN TREATMENT OF DIABETIC ANGIOPATHIES

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Keywords

diabetic angiopathy, lymph, coagulation, lipoperoxidation, lymphatic tissue drainage

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Abstract

Objective: Study of lipid peroxidation disorder, lymph coagulation and lymphatic tissue drainage, their correction in experimental diabetes mellitus. **Methods:** Studies were carried out on 33 rabbits, on a model of diabetes mellitus. In 16 rabbits of the control group, after modeling of alloxane diabetes mellitus, a sucking therapy was performed, and in 17 rabbits of the experimental group, the sucking therapy included intravenous administration of urokinase-medac in a dose of 100,000 U for 7 days. Values of LPO and clotting of lymph as well as lymphatic tissue drainage were investigated by conventional methods. **Results:** Simulation of diabetes mellitus in rabbits contributed to increase of clotting potential of lymph with background of activation of lipid peroxidation and reduction of activity of lymph fibrinolysis, with suppression of drainage function of lymphatic system. After administration of medakurokinase, the coagulation potential of the lymph and the intensity of lipoperoxidation were significantly reduced. At the same time, the content of dieneconjugates (DC) and malonic dialdehyde (MDA) was significantly reduced, and during 30 days of the study, markers of activation of intravascular clotting of lymph were not determined. All this was accompanied by a very pronounced increase in the flow rate of lymph from the drained thoracic duct, exceeding the initial and control levels by 57.1% and 94.1%, respectively ($p < 0.001$). **Conclusion:** the inclusion of medakurokinase in the complex of sugarlowering therapy contributed not only to a marked reduction of clotting potential of lymph and activation of lipoperoxidation, but also very much increased lymphatic tissue drainage.

Диабеттік ангиопатияны емдеудегі фибринолитиялық лимфостимуляция

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диабетикалық ангиопатия, лимфа, ұйығыштық, липопероксидация, тіндердің лимфатикалық дренажи.

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Аңдатпа

Мақсаты: липидтердің асқын тотығуы, тіндердің лимфатикалық дренажының және лимфалардың ұйығыштығы, эксперименталды қант диабеті кезінде оларды коррекциялау. **Материалдар мен әдістер:** қант диабеті моделі арқылы 33 қоянға зерттеу жасалды. Аллоксандық қант диабетін модельдеуден кейін бақылау тобындағы 16 қоянға қантты төмендететін терапия жүргізілді, ал сынақ тобындағы 17 қоянға жасалған қантты төмендететін терапия 7 күн ішіндегі 100 мың ЕД дозасындағы урокиназа медакты вена ішілік енгізуді қамтыды. ЛАТ көрсеткіштері және лимфаның ұйығыштығы, сондай-ақ тіндердің лимфатикалық дренажи жалпыға ортақ әдістер арқылы зерттелді. **Нәтижелері:** қояндарда қант диабетін модельдеу липидтердің асқын тотығуының белсенуі фондында лимфаның ұйығыштық потенциалын көтеруге және лимфатикалық жүйенің дренаждық функциясын тежеп, лимфа фибринолизі белсенділігінің төмендеуіне ықпал етті. Урокиназа медакты енгізгеннен кейін лимфаның коагуляциялық потенциалы және липопероксидацияның қарқындығы айтарлықтай төмендеген. Сонымен қатар диендік конъюгаттар (ДК) және малондық диальдегидтің (МДА) құрамы едәуір төмендеген, зерттеудің 30 тәулігі ішінде лимфаның тамыр ішілік ұйығыштығының белсенділік маркерлері анықталмаған. Мұның барлығы дренажалған кеуде жолынан лимфаның қайтуы жылдамдығының бастапқы және соңғы деңгейлерінің сәйкесінше ($p < 0,001$), 57,1% және 94,1%-дан асуы арқылы жүрді. **Тұжырым:** қантты төмендету терапиясы кешеніне урокиназа медакты қосу лимфаның ұйығыштық потенциалының айтарлықтай төмендеуіне және липопероксидация белсенуіне ықпал етіп қана қоймай, сондай-ақ тіндердің лимфатикалық дренажын күшейтеді.

Фибринолитическая лимфостимуляция в лечении диабетических ангиопатий

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Аннотация

Цель: изучения нарушения перекисного окисления липидов, свертываемости лимфы и лимфатического дренажа тканей, их коррекция при экспериментальном сахарном диабете. **Материал и методы:** исследования выполнялись на 33 кроликах, на модели сахарного диабета. У 16 кроликов контрольной группы после моделирования аллоксанового сахарного диабета проводили сахароснижающую терапию, а у 17 кроликов опытной группы сахароснижающую терапию включали внутривенное введение урокиназымедак в дозе 100 тысяч ЕД в течение 7 дней. Показатели ПОЛ и свертываемости лимфы, а также лимфатического дренажа тканей исследовали общепринятыми способами. **Результаты:** моделирование сахарного диабета у кроликов способствовало повышению свертывающего потенциала лимфы на фоне активации перекисного окисления липидов и уменьшению активности фибринолиза лимфы, с угнетением дренажной функции лимфатической системы. После введения урокиназымедак значительно снижались коагуляционный потенциал лимфы и интенсивность липопероксидации. При этом заметно снижались содержания диеновых конъюгатов (ДК) и мало нового диальдегида (МДА), а также в течение 30 суток исследования не определялись маркеры активации внутрисосудистой свертывания лимфы. Все это сопровождалось весьма выраженным увеличением скорости оттока лимфы из дренированного грудного протока, превышая исходный и контрольный уровни на 57,1% и 94,1%, соответственно ($p < 0,001$). **Заключение:** включение же урокиназымедак в комплекс сахароснижающей терапии способствовало не только заметному снижению свертывающего потенциала лимфы и активации липопероксидации, но и значительно усиливало лимфатический дренаж тканей.

Introduction

Diabetes mellitus (DM) is one of the most important medical and social problems around the world, affecting mainly people of working age and quickly leading to the development of systemic vascular complications. At the same time, great importance is attached to the violation of the hemostasis system, manifested in an increase in the activity of the coagulation and inhibition of the anticoagulation system of the blood [1; 2; 3; 4]. This creates an increased risk of intravascular thrombus formation with the risk of microcirculatory disorders [2], endogenous intoxication syndrome [5; 6; 7; 8]. The prognosis of the disease is worsened by metabolic disorders due to early activation of free radical lipid oxidation processes, intravascular blood coagulation and the development of endotoxemia at the cellular and organ levels [9; 10]. Such disorders in diabetes, ultimately lead to damage and death of the cell structures directly, and vascular mechanisms cause ischemic tissue disorders [11; 12; 13].

All this underlies chronic vascular complications in the form of microangiopathies, which are accompanied by microcirculation disorders, with morphological and functional changes in tissues, including the organ level. Microangiopathies are a feature of diabetes and have a generalized nature [14; 15; 16], affecting the entire microcirculation

system with metabolic disorders. Thus, in diabetes, a favorable condition is created for the accumulation in the intercellular space, in particular, inside cells, of potentially toxic products of free fatty acids oxidation intermediates, which have a detrimental effect on cells [17, 18]. At the same time, it is known that transport from the intercellular spaces of toxic metabolites, large molecular particles and the remains of destroyed cells is carried out mainly through the lymphatic system [19, 20].

However, to date, the state of lymph coagulation and lymphatic drainage of tissues in diabetes mellitus has not been studied enough. At the same time, it is known that one of the most important directions in the treatment of ischemic complications of diabetic angiopathy is macro- and microcirculation improvement [21]. Taking into account all this, the elucidation of the role of lipid peroxidation activation, lymph coagulation and lymphatic drainage of tissues in the pathogenesis of diabetic microangiopathies, as well as the use of urokinase-medac (Germany), which have thrombolytic properties, is of great interest because this treatment is pathogenetically justified.

Purposes

Study of disorders of lipid peroxidation, lymph coagulability and lymphatic drainage of tissues, their correction in experimental diabetes mellitus.

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Ключевые слова

диабетическая ангиопатия, лимфа, свертываемость, липопероксидация, лимфатический дренаж тканей.

Materials and methods

The experiments were carried out on 33 Chinchilla rabbits, of both sexes, weighing 2.5-3.0 kg, which were kept on a standard vivarium diet. All experiments on animals were carried out in accordance with ethical principles and documents recommended by the European Convention for the Protection of Vertebrate Animals (Strasbourg 15.06.2006). The animals were kept under standard vivarium conditions on a standard laboratory diet with free access to food and water. To simulate diabetes, animals were injected intravenously with a 5% aqueous solution of alloxan monohydrate, at a dose of 100 mg per 1 kg of body weight. All experimental rabbits with simulated DM were divided into 2 groups. In 11 rabbits of the control group, after the modeling of diabetes, glucose-lowering therapy was carried out, and in 19 rabbits of the second (experimental) group, intravenous administration of urokinase-medac was included in the complex of glucose-lowering therapy. The development of diabetes mellitus was regularly monitored, the fasting blood glucose level was determined using a glucometer (SensoliteNova, Budapest-Hungary) on days 5, 10, 20, and 30 after administration of a 5% aqueous solution of alloxan monohydrate. Persistent hyperglycemia was observed 3 days after injection, which was considered as simulated diabetes. To reduce the risk of death due to hypoglycemic shock, rabbits after induction of diabetes received 5% glucose solution instead of water. After the administration of alloxan, in 15% of the animals developed an extremely serious condition with hyperglycemia above 30 mmol / L, so they were withdrawn from the experiment on the 5th day. Only animals with moderate diabetes mellitus were observed. The criteria for inclusion in the experiment

were: the level of glycemia more than 13 mmol / L and the survival of animals during the entire period of the study. This experimental model is very convenient for studying the pathogenetic mechanisms associated with impaired lipid peroxidation and clotting of blood and lymph allowing to quickly evaluate various methods of correction. At the same time, the animals did not receive food during the night before. Determination of blood glucose (food was removed in 14 hours) was carried out on an empty stomach for 5, 10, 20 and 30 days after the introduction of 5% -goaloxane monohydrate. For analysis, lymph was obtained from a drained lymphatic thoracic duct. All surgical interventions were performed under anesthesia using solutions of calyptol (8 mg / kg) and diphenhydramine (0.15 mg / kg-1% solution), which were injected into the ear vein of the rabbit's ear. The lymph outflow rate (LOR) was determined by the volume of lymph flowing from the drained thoracic duct per unit of time, divided by 1 kg of animal weight (ml.min / kg). To assess the state of lipid peroxidation (LPO) in the lymph, the level of diene conjugates (DC) was determined according to the V.B. Gavrilova et al. [22], the level of malondialdehyde (MDA) - according to L.I. Andreeva et al. [23] and the quantity of reduced glutathione (QRG) by G.H. Ellman [24]. The state of the coagulation system, anticoagulation and fibrinolysis of the lymph was judged by a set of generally accepted tests, such as activated partial thromboplastin time (APTT), prothrombin time (PT), thrombin time (TT), concentration of fibrinogen (FC), soluble fibrin monomeric complexes (SFMC), products of fibrinogen degradation (PFD), antithrombin-III (AT-III) and fibrinolytic activity (FA). The studied parameters of lymph coagulation were determined on a semi-automatic coagulometer

Table 1.
Dynamics of coagulation indicators, LPO in lymph and lymphatic drainage of tissues in experimental diabetes mellitus. (M±m; n=16)

Indicators	Initial condition	After alloxan monohydrate injection (days)			
		5	10	20	30
N	3	3	3	4	3
APTT (sec)	55,1±3,1	50,4±2,5	39,8±2,1**	33,1±2,2***	35,1±2,3***
PT (sec)	31,2±1,6	26,5±0,7*	21,9±0,7***	20,2±0,4***	25,4±1,7**
TT (sec)	27,2±0,9	24,2±0,5*	20,5±0,6***	21,4±0,4***	22,4±0,7***
FC (g/L)	2,9±0,02	2,3±0,03	3,1±0,05	3,9±0,06**	3,6±0,05*
AT-III (sec)	130,4±5,6	155,3±7,3	151,2±6,7**	145,4±5,3*	120,9±4,9*
FA (min)	17,3±0,6	19,1±0,3*	22,2±0,2**	14,7±0,3*	13,2±0,1**
SFMC +/-	-	-	+	+	+
PFD +/-	-	-	+	+	+
DC umol/l	1,3±0,02	2,5±0,03***	4,3±0,02***	4,9±0,04***	3,1±0,03***
MDA umol/l	3,1±0,2	3,8±0,2**	4,9±0,3***	6,3±0,2***	5,3±0,3***
QRG umol/l	3,5±0,2	4,1±0,4*	3,1±0,3*	3,0±0,05**	3,3±0,04**
LOR ml*min/kg)	0,19±0,02	0,23±0,03*	0,17±0,02	0,15±0,02**	0,14±0,02***

Note: Statistically significant difference from baseline: *- $p < 0,05$; **- $p < 0,01$; ***- $p < 0,001$.

"Humaclot-Duo" (Germany) using reagent kits from "Human" (Germany) and "Coagulotest" (Russia).

In the statistical processing of the experimental results, nonparametric and parametric methods of analysis were used; quantitative indicators were expressed as "M ± m", where "M" is the sample mean, "m" is the standard error of the mean. The data were processed using the EXCEL and Statistika software packages according to Student-Fischer and the Wilcoxon method.

Results: Studies carried out in animals of the control group (table 1) showed that modeling of diabetes mellitus significantly enhances intravascular lymph coagulation against the background of a noticeable activation of lipid peroxidation processes. Hypercoagulational changes in some indicators of lymph coagulation (compared with the corresponding initial data, TT was shortened to 88.9%, PT - to 84.9%) were recorded starting from day 5 of the study (p < 0.05). hypercoagulation shifts in the lymph were aggravated, the most pronounced shifts were recorded 20 and 30 days after the administration of alloxan monohydrate.

At the same time, during the indicated periods of the study, compared with the corresponding initial indicators, APTT (by 27.8% and by 60.1%), PT (by 29.8% and by 35.3%) and TT (by 24.7% and 78.7%), and FC during these periods of the study increased, the most pronounced after 30 days of the study, exceeding the initial level by 34.5% (p < 0.05-0.01). AT-III and FA of the lymph at first (after 5 and 10 days of the study) slightly activated, however, starting from the 20 day of the study, a noticeable decrease in the antithrombotic potential of the lymph was recorded. The onset of hypercoagulable changes in the lymph was also evidenced by the appearance in the lymph of intravascular lymph

coagulation activation markers, such as SFMC and PFD. All these changes took place against the background of LPO activation. This is evidenced by the increase in the content of both primary and secondary lipid peroxidation products in the lymph obtained from the drained lymphatic thoracic duct after the modeling of diabetes. The most pronounced LPO activation was recorded 30 days after injection of alloxan monohydrate. During this period of the study, the content of DC exceeded the initial value by more than 3.7 times, and MDA - 2.1 times (p < 0.001). LPO activation persisted throughout the study period against the background of a decrease in the antioxidant potential, which was reflected in a decrease in the QRG content in the lymph. Summarizing the above, we can conclude that the identified danger of thrombus formation in the lymph against the background of lipid peroxidation activation persisted throughout the observation period. All this had a negative effect on the drainage function of the lymphatic system. Despite the fact that at the beginning of the study (5 days after injection of alloxan monohydrate), a slight increase in the LOR from the drained thoracic duct was observed, however, as the study period increased, the LOR gradually decreased. Explicit suppression of lymphatic drainage of tissues was recorded by the end of the study. During this study period, the LOR from the thoracic duct decreased to 73.7% of the initial level (p < 0.001).

Thus, studies have shown that modeling diabetes in rabbits promoted a significant activation of intravascular lymph coagulation against the background of a pronounced activation of LPO, which ultimately led to inhibition of tissue lymphatic drainage. All this creates a favorable condition for the accumulation of toxic products of disturbed me-

Indicators	Initial condition	After alloxan monohydrate injection (days)			
		5	10	20	30
n	4	3	3	3	4
APTT (sec)	51,3±3,1	55,9±3,1	61,4±3,5***	66,7±3,2***	55,4±3,1***
PT (sec)	36,2±1,5	51,3±3,2***	63,6±3,1***	56,3±3,5***	45,2±2,9***
TT (sec)	27,3±1,2	35,3±1,4***	43,1±1,2***	34,1±2,1***	30,5±2,1**
FC (g/L)	2,3±0,02	2,5±0,04**	2,1±0,03**	2,3±0,02***	2,4±0,03***
AT-III (sec)	131,7±6,1	167,4±6,5***	187,2±5,7***	165,4±5,7**	162,8±5,8***
FA (min)	19,1±1,3	21,4±0,8*	27,2±1,2***	28,3±1,5***	23,2±1,4***
SFMC +/-	-	-	-	-	+
PFD +/-	-	-	-	-	+
DC umol/L	1,6±0,2	2,2±0,4*	2,7±0,3***	2,2±0,3***	2,0±0,5***
MDA umol/L	4,1±0,4	4,8±0,6**	5,1±0,7*	5,0±0,5**	4,7±0,5*
QRG umol/L	4,6±0,3	4,8±0,4	5,4±0,6***	4,4±0,8***	5,0±0,8***
LOR (ml*min/kg)	0,21±0,03	0,31±0,04***	0,33±0,02***	0,28±0,01***	0,27±0,03***

Note: Statistically significant difference with intact (*) and control (★) indicators: * ★ - p < 0.05; ** ★★ - p < 0.01; *** ★★★ - p < 0.001.

Table 2.

The influence of urokinase medac on clotting, LPO in lymph and lymphatic drainage of tissues in experimental diabetes. (M±m; n=17)

tabolism, including glycosylated products in the intercellular space and the development of interstitial edema, which, by compressing microvessels, play an important role in the pathogenesis of diabetic microangiopathies.

In 17 rabbits of the experimental group, after modeling diabetes mellitus, urokinase medac was injected intravenously. The results of the study (table 2) showed that intravenous administration of urokinase medac has a very significant effect not only on lymph coagulation, but also on LPO and drainage function of the lymphatic system. So, the most pronounced hypocoagulation changes were revealed after 10 days of the study. During this period, the study of APTT, PT and TT compared with the corresponding baseline values lengthened by 30.0%, 75.7% and 57.9% ($p < 0.001$). In the future, these indicators strove for the corresponding indicators.

However, when compared with the control indicators, it was found that hypocoagulative changes in these indicators persist until the end of the study. This is also evidenced by a noticeable decrease in FC, especially compared to the control parameters, and the absence of intravascular lymph coagulation activation markers such as SFMC and PFD during the month. In this case, the most significant changes were observed in the lymphatic FA. A very noticeable increase in the lymph FA (exceeded the initial indicator by 69.1%) was noted on the 5th day of the study ($p < 0.001$), and then a tendency towards a decrease in this indicator was recorded. After a month of research, it came close to the initial value. However, when comparing these data with the corresponding control parameters, the fibrinolytic effect of urokinase persisted until the end of the

study. This is evidenced by the fact that by the end of the study the lymphatic FA in the control group was 24.3% higher than the corresponding indicator in the experimental group of animals ($p < 0.01$). The introduction of urokinase had a beneficial effect on LPO parameters in the lymph. The antioxidant effect of urokinase appeared 5 days after the administration of urokinase, which was expressed in a decrease not only in lipid peroxidation products, but also in an increase in the content of reduced glutathione. The most pronounced antioxidant effect can be observed when comparing these indicators with the corresponding indicators in animals of the control group.

Thus, our research has shown that modeling diabetes in rabbits leads to an increase in blood clotting not only, as shown in the literature [3; 6; 7; 18], but also to lymph coagulation against the background of a noticeable activation of LPO and suppression of fibrinolytic activity, as well as violation of the drainage function of the lymphatic system. The latter, contributing to the accumulation of toxic products of disturbed metabolism in the intercellular space, including the end products of glycosylation in the intercellular space, negatively affects the morphofunctional state of microvessels and creates prerequisites for the development of diabetic microangiopathies. Intravenous administration of urokinase medac contributed to a noticeable decrease in the clotting potential of the lymph against the background of a significant increase in the FA of the lymph and LOR from the thoracic duct. All this had a positive effect on a decrease in the intensity of LPO, as evidenced by a noticeable decrease in LPO products and an increase in the level of QRG in the lymph.

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DIAGNOSTICS AND TREATMENT OF LUNG ECHINOCOCCOSIS

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Keywords

Echinococcosis of the lungs, videothoracoscopic echinococcectomy, transmediastinal access, albendazole

Abstract

The paper presents the results of treatment of 676 patients with pulmonary echinococcosis. The methods of stage-by-stage and one-stage bilateral echinococcectomy from the lungs, from the lungs and organs of the abdominal cavity and chemotherapy with Albendazole were used. Ways to reduce the trauma of operations are proposed.

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Өкпе эхинококкозын анықтау және емдеу

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Түйін сөздер

Өкпе эхинококкозы, видеоторакоскопиялық эхинококэктомия, трансмедиастинальдық қолжетімділік, альбендозол

Аңдатпа

Осы жұмыста өкпе эхинококкозы бар 676 науқастың емдеу нәтижелері ұсынылған. Өкпеден, өкпеден және құрсақ қуысы мүшелерінен бір мезеттік және кезеңдік екі жақты эхинококэктомия әдістері және Албендозол химиотерапиясы пайдаланылды. Оталардың жарақаттылығын төмендету әдістері ұсынылды.

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Диагностика и лечение эхинококкоза легких

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Ключевые слова

Эхинококкоз легких, видеоторакоскопическая эхинококэктомия, трансмедиастинальный доступ, альбендозол

Аннотация

В работе представлены результаты лечения 676 пациентов с эхинококкозом легких. Использованы способы поэтапной и одномоментной двусторонней эхинококэктомии из легких, из легких и органов брюшной полости и химиотерапия Албендозолом. Предложены способы снижения травматичности операций.

Introduction

Echinococcosis of the lungs, according to researchers, ranks second, yielding to the hepatic localization of the parasite [1, 2, 3]. The spread of echinococcosis in the Republic of Kazakhstan is associated with the fact that it is the leader in the development of sheep breeding [4, 5, 6].

Echinococcosis treatment still remains a problem that has not been finally solved [3, 4, 7, 8, 9]. Most researchers believe that the only radical treatment for echinococcosis of all localizations is surgical. Delay with the operation in the hope of the success of conservative therapy or self-healing due to the death of the parasite with calcification of the dead cysts can only increase the risk of complications and reduce the effectiveness of surgery. At the same time, the use of antiparasitic drugs is one of the important components of the treatment of echinococcosis. In recent years, many publications have appeared on the successful conservative therapy of echinococcosis, therefore the question of the choice of tactics between conservative treatment and surgical intervention remains relevant [10, 11, 12]. Unfortunately, neither the accurate performance of the surgical intervention, nor the use of effective germicides, nor the observance of the asepticality rules during the operation and the use of perfect instrumentation completely exclude the possibility of a relapse of the disease. Therefore, the subsequent chemotherapy or anthelmintic therapy is of great importance for influencing the screenings of echinococcus of small sizes, which are not available for visual detection [11, 12].

Albendazole is a broad-spectrum anthelmintic drug; a benzimidazole carbamate derivative. Albendazole is active against tissue parasites, including cystic echinococcosis and alveolar echinococcosis, caused by the invasion of *E. granulosus* and *E. multilocularis*, respectively. According to various authors, Albendazole destroys cysts or significantly reduces their quantity and size. After treatment with albendazole, the number of non-viable cysts increases to 90% compared to 10% in untreated patients [3, 8, 9]. A number of authors indicate that the use of Albendazole, a complete cure is noted in only a small proportion of patients, and in the majority there is an improvement or stabilization of the process. Multicenter studies evaluating the effectiveness of chemotherapy for echinococcosis, conducted under the auspices of the WHO, showed that the success of therapy (full or partial) was noted with treatment with Albendazole in 30–39% of patients, with mebendazole in 14–17% [4, 7, 10].

Currently, Albendazole is widely used for the prevention of relapses and the treatment of early stages of the development of echinococcosis, but chemotherapy with Albendazole is not equally suc-

cessful in all patients and the reasons for this are not yet clear enough.

Material and research methods

This work is based on the analysis of treatment of 676 patients with pulmonary echinococcosis, 327 (48.4%) of whom had a complicated course of the disease. The right lung was affected in 295 (43.6%) patients, the left lung - in 286 (42.3%), and in 95 (14.5%) - bilateral damage. Combined echinococcosis of the lungs and abdominal organs was observed in 176 (26.0%) cases, while in 136 the parasite was localized in the lungs and liver, and 88 of them had damage to the right lung and liver, in 36 - to the left lung and liver, in 12 - cysts were located in both lungs and liver. In 40 patients, lung damage was combined with cysts of the omentum, spleen, abdominal cavity and omental bursa.

Echinococcosis of the lungs at the early asymptomatic stage of the disease, as a rule, they were detected during prophylactic X-ray studies. Diagnosis of echinococcosis of the lungs based on the data:

- epidemiological history (place of residence and work);
- clinical picture;
- instrumental diagnostic methods (X-ray, computed tomography and ultrasound);
- serological diagnostics (ELISA).

Antiparasitic treatment was carried out according to the standard scheme: albendazole (15 mg / kg / day with a body weight of less than 60 kg or 400 mg 2 times / day with a body weight of more than 60 kg) for 28 days, up to 3 courses with a two-week break.

Results

Operations for pulmonary echinococcosis are performed under general anesthesia with artificial lung ventilation (IVL) single-lumen or double-lumen endotracheal tubes with separate intubation of the main bronchi. A single lumen tube is ventilated through the main bronchus of a healthy lung, and after the main stage of the operation, the transfer to endotracheal mechanical ventilation is carried out [21]. Lung resection was performed in 62 (9.2%) cases: with large festering cysts occupying the volume of almost the entire lobe (two lobes) with the presence of irreversible gross perifocal changes and fibrosis in the surrounding lung tissue, as well as with giant centrally located cysts, excessive multiplicity lesions of one or two lobes.

Organ-preserving operations were performed in 614 (90.8%) patients.

When treating patients with bilateral echinococcal cysts of the lungs (95 patients), depending on the general condition of the patient, the tactics of a staged or one-stage surgical intervention were

followed. Bilateral thoracotomy in two stages with an interval of 3-6-8 weeks was performed in 33 patients. In 4 patients, bilateral lung damage was combined with damage to the liver and spleen; after bilateral staged thoracotomy with pulmonary echinococectomy, they underwent laparotomies with an interval of 1-2 months.

In 23 (3.4%) cases, a simultaneous bilateral thoracotomy with echinococectomy was performed, and the surgical intervention was started from the side where there were cysts that were large in size or threatened with complications. However, this method is quite traumatic, it can lead in the early postoperative period to respiratory failure, and the risk of developing suppuration of surgical wounds increases. Therefore, in case of bilateral pulmonary echinococcosis, in which it is possible to remove echinococcus from the opposite lung from the transmediastinal approach, simultaneous bilateral echinococectomy was performed.

In case of combined echinococcosis of the lungs and abdominal organs, surgical intervention should be started with echinococectomy of the lung, given the possibility of a high risk of complications in the lungs. In our patients, combined echinococcosis was found in 176 (26.0%), of whom 136 had a combination of lung and liver cysts, 40 had cysts of the lung and other organs (omental bursa - 22, spleen - 8, abdominal cavity - 6, large oil seal - 4). 52

patients with echinococcosis of the right lung and upper segments of the right lobe of the liver simultaneously underwent one stage thoracotomy with diaphragmotomy and echinococectomy of the lung and liver, 84 patients - echinococectomy of the lung, then laparotomies and echinococectomies from the liver, and 27 of them were operated on in one stage two stages with an interval of 4-8 weeks.

In order to reduce the trauma of the operation, to reduce the duration of the operation and the postoperative period, bilateral simultaneous sequential videothoracoscopy with echinococectomy from both lungs was performed. Videothoracoscopy is performed under general anesthesia with separate intubation of the bronchi, which allows you to turn off the ventilation from the lung on the side of the operation. The cyst is covered with napkins moistened with povidone-iodine. Through the thoracoport, a puncture instrument with a tubular body is brought to the cyst and the hydatid fluid is aspirated, without removing the needle, the bed of the echinococcal cyst is treated with 70% alcohol or 10% povidone-iodine solution for 3 minutes. The fibrous capsule is opened and the chitinous membrane is removed. The cavity of the fibrous capsule is eliminated, depending on the size, by applying clips or suturing.

Conducting videothoracoscopic echinococectomy of the lung made it possible to reduce the time of anesthetic and surgical aggression, and made it possible to reduce the patient's stay in the hospital to 5-7 bed-days, which is 3-5 times less than the duration of bed-days with other methods of operations used for pulmonary echinococcosis.

In the postoperative period, 30 patients had Albendazole courses to prevent recurrence of echinococcosis. The average age of the studied patients was 35 years (from 18 to 67 years). The number of men and women was approximately same - 52% and 48%.

Relapse of pulmonary echinococcosis was not observed in these patients during three years of follow-up.

In the presence of a single echinococcal cyst less than 5 cm in diameter or with multiple bilateral echinococcal cysts of the lungs, conservative treatment with Albendazole is performed. Currently, according to the planned scheme, 5 patients with echinococcal cysts less than 5 cm in size have been assigned. Follow-up is carried out for more than a year in 2 patients, in others it is carried out for less than one year. There was no drug allergy to Albendazole in our patients. There was a decrease in the titer of antibodies in the blood in non-operated patients while taking Albendazole. According to the data of radiation diagnostics, there are no noticeable changes.

Figure 1.

7 - Patient P., 25 years old. Plain chest x-ray before treatment with Albendazole.

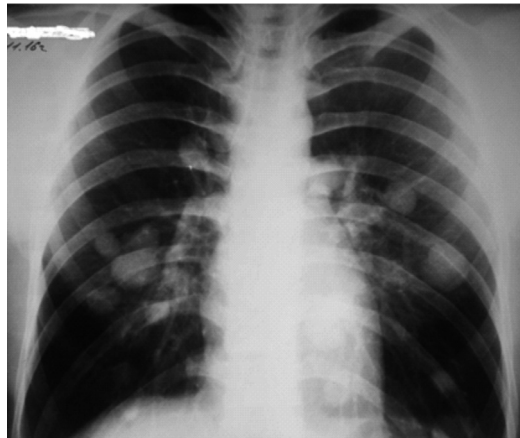


Figure 2.

7 - Patient P., 27 years old. Two years after courses of treatment with Albendazole. Screen from computed tomography of the chest.



Among the operated patients who did not take Albendazole, two of them were diagnosed with liver echinococcosis 2 years after lung surgery. This is apparently due to the reinvasion of echinococcosis in these patients.

In one patient P., 27 years old, with bilateral multiple pulmonary echinococcosis, conservative treatment with Albendazole gave a positive effect. Two years after starting treatment with Albendazole without surgery, all echinococcal cysts died and were coughed up. On the control computed tomogram there is only a single air residual cavity in the left lung (Figures 1, 2, 3).

Conclusions

The methods of simultaneous surgical treatment of bilateral pulmonary echinococcosis using transmediastinal access and videothoracoscopic technique can reduce the trauma of operations, shorten the duration of treatment, and also relieve patients from the painful waiting for the next stage of operations and repeated anesthesia.

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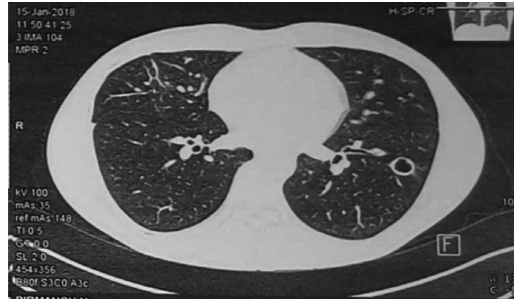


Figure 3.

7 - Patient P., 27 years old. Two years after courses of treatment with Albendazole. In the left lung there is a residual air cavity from the dead echinococcal cyst. Screen from computed tomography of the chest.

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IMPROVING THE ORGANIZATION OF DIAGNOSTIC METHODS AND SURGICAL TREATMENT OF PATIENTS WITH LIVER ECHINOCOCCOSIS

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Abstract

Background. Untreated hydatid disease could pose a threat to human life. Despite the success in the diagnosis and treatment of liver echinococcosis, an issue of diagnosis and optimal treatment remains open.

Methods. From January 2017 to July 2019, 111 patients with primary liver echinococcosis were treated at the Syzganov National Scientific Center as part of a scientific and technical project on the topic "Development of scientifically based optimal surgical and medicinal methods for the treatment of liver echinococcosis". **Results.** Treatment of patients with liver cystic echinococcosis involves an individual approach (table 2) with consideration in each case of a possible combination of different treatment options.

Keywords

liver echinococcosis, pericystectomy, parasitic liver disease, liver hydatid disease

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Түйін сөздер

бауыр эхинококкозы, перикистэктомия, паразиттік бауыр ауруы, гидатидті бауыр ауруы

Бауыр эхинококкозымен ауыратын науқастарды диагностикалау және хирургиялық емдеу әдістерін ұйымдастыруды жетілдіру

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Аңдатпа

Кіріспе. Емдеусіз қалған бауыр эхинококкозы, адам өміріне қауіп төндіруі мүмкін. Бауыр эхинококкозын диагностикалау мен емдеудегі жетістіктерге қарамастан, диагноз қою және емдеудің оңтайлы әдістері жайлы сұрақ ашық күйінде қалып отыр. **Әдістері.** А. Н. Сызғанов атындағы ҰҒХО-да 2017 жылғы қаңтардан бастап 2019 жылғы шілдеге дейін «бауыр эхинококкозын емдеудің ғылыми негізделген оңтайлы хирургиялық және дәрі-дәрмектік әдістерін әзірлеу» тақырыбында ғылыми-техникалық жобаны іске асыру шеңберінде бауырдың эхинококкозы диагнозымен 111 пациент емделді. **Нәтижелері.** Бауырдың эхинококкозы бар пациенттерді емдеу әр нақты жағдайда терапияның әртүрлі нұсқаларының ықтимал комбинациясын қарастыра отырып, жеке тәсілді (2-кесте) қамтиды

Совершенствование организации методов диагностики и хирургического лечения больных с эхинококкозом печени

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Аннотация

Введение. Эхинококкоз при отсутствии лечения может представлять угрозу для жизни человека. Несмотря на успехи в диагностике и в лечении эхинококкоза печени, вопрос диагностики и оптимальном объеме лечения остаются открытыми. **Методы.** В ННЦХ им. А.Н. Сызганова с 2017 января по июль 2019 г в рамках реализации научно-технического проекта на тему «Разработка научно-обоснованных оптимальных хирургических и медикаментозных методов лечения эхинококкоза печени» прошли лечения 111 пациент с диагнозом первичный эхинококкоз печени. **Результаты.** Лечение пациентов с цистным эхинококкозом печени предполагает индивидуальный подход (таблица 2) с рассмотрением в каждом конкретном случае возможную комбинацию различных вариантов терапии

Introduction

One of the important problems in abdominal surgery in Kazakhstan is cystic echinococcosis of the liver, caused in humans by the tapeworm Echinococcus granulosus. Untreated hydatid disease could pose a threat to human life. Taking into account the relatively young age of patients and the high frequency of disability during repeated operations, the problem of treatment of liver echinococcosis in endemic regions of Kazakhstan is becoming more urgent every year. Despite advances in the diagnosis and treatment of liver echinococcosis, the question of diagnosis and optimal treatment remains open [1,2].

Material and methods

From January 2017 to July 2019, 111 patients with primary liver echinococcosis were treated at the Syzganov National Scientific Center as part of a scientific

and technical project on the topic "Development of scientifically based optimal surgical and medicinal methods for the treatment of liver echinococcosis".

Patients after screening were divided into 4 groups:

Group 1: pericystectomy (with capsule removal) with antiparasitic drug administration-30 patients;

Group 2: pericystectomy without antiparasitic therapy - 27 patients;

Group 3: echinococsectomy without capsule removal and antiparasitic drug administration - 27 patients;

4th group (incomparable group): conservative therapy without surgical intervention of echinococcal cysts up to 5 cm – 20 patients.

Indications for planned hospitalization were:

- 1) established diagnosis (the presence of clinical, laboratory or instrumental signs of the disease);
- 2) pronounced clinical signs of the disease, including

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Ключевые слова

эхинококкоз печени, перцистэктомия, паразитарная болезнь печени, гидатидная болезнь печени

WHO classification	Tactics
CE1	Cyst ≤5,0 cm only with Albendazole Cyst ≥ 5,0 cm PAIR+ Albendazole
CE2	Surgical treatment + Albendazole
CE3a	Cyst ≤5,0 cm only with Albendazole Cyst ≥ 5,0 cm PAIR+ Albendazole
CE3b	Surgical treatment + Albendazole
CE4 and CE5	Watch and Wait

Table 1. WHO-IWGE Classification of Ultrasound images of cystic Echinococcosis Cysts. (WHO-IWGE 2003) [3].

against the background of chemotherapy (albendazole) in the presence of echinococcal (hydatid) cysts larger than 5.0 cm in diameter; 3) the presence of focal and/or cystic parasitic liver damage larger than 5 cm based on the stage shown in Table 1 which reflects the treatment tactics depending on the stage according to the WHO classification.

Preoperative data

All patients underwent serology and imaging assessment of liver hydatid cyst by abdominal ultrasound, computed tomography (CT) scan or magnetic resonance imaging (MRI). Liver hydatid cysts were classified according to the WHO international classification of ultrasound images in cystic echinococcosis [3]. Chest CT and X-rays were systematically performed to identify associated pulmonary hydatid cyst.

Results

Treatment of patients with cystic echinococcosis of the liver involves an individual approach (Table 2) with consideration in each case of a possible combination of different treatment options [4-5].

Patients whose cyst size is less than 5 cm, stages CE1-CE3 received conservative therapy on an outpatient level, starting therapy with Albendazole was 10-15 mg/kg / day in 2 doses with no side effects [6-7]. The effectiveness of antiparasitic treatment was evaluated according to the following criteria: positive dynamics on ultrasound (reduction in the size of cysts, transition to CE4-CE5), CT and MRI control - a decrease in the volume of the lesion, signs of calcification.

There are three main methods of surgical treatment of liver echinococcosis (depending on the completeness of removal of the fibrous capsule):

1. Removal of elements of an echinococcal cyst with the remaining fibrous casula of the parasite (echinococectomy);

2. Removal of an echinococcal cyst together with a fibrous parasite capsule (pericystectomy);
3. Removal of an echinococcal cyst by resection of the liver.

The main objectives of surgical intervention were radicalism, reducing the frequency of postoperative complications, relapses, and the duration of hospital stay. The choice of surgical interventions depends on the determination of clear indications for the use of a particular method, depending on the location, size and number, relapse of the disease and complications [8-10].

Discussion

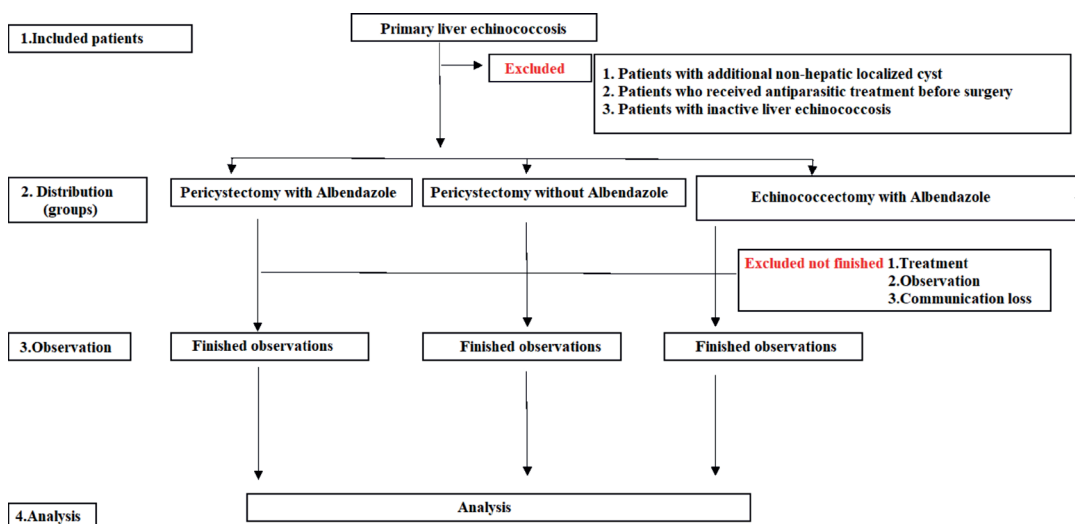
After antiparasitic treatment, all patients are recommended to perform a liver ultrasound to determine the effect of drug therapy. A decrease in the size of echinococcal cysts, the appearance of a detached chitinous layer, an increase in the echogenicity of the cyst contents and calcinates in the capsule is considered a positive response to treatment. This research method can be performed for the purpose of dynamic control in 3-6-12 months.

Computed tomography, mainly with contrast enhancement, is one of the leading methods for diagnosing the hydatid form of echinococcosis in almost all organs and systems of the human body. Computed tomography was the most specific (88.2%) and sensitive (82.5%) method for determining liver echinococcosis [11, 12].

The results show that despite the fact that surgery time and blood loss were significantly higher in patients after radical surgery compared to non-radical surgery, we noted a significant reduction in the frequency of complications and hospital stay after surgery in patients after radical surgery, which contributes to early recovery of the patient and early discharge from the hospital.

Radical operations are aimed at complete removal of the cyst, therefore, carry significant intra-

Table № 2. Study design.



operative risks, but a lower frequency of postoperative complications and relapses. When leaving part of the fibrous capsule (echinococectomy group), the appearance of reactive pleurisy, hyperthermia in the patient was noted, which increased the patient's stay in the hospital in the postoperative period.

Radical surgical treatment of primary echinococcosis of the liver appeared good results in most cases. The growing frequency of liver echinococcosis in surgical practice makes radical operations more rational than non-radical ones, due to the associated low frequency of relapses and a relatively safe postoperative period (fewer hospital stay days).

Conservative therapy without surgery (the patient receives only the antiparasitic drug "Albenda-

zole") is effective in active echinococcosis of the liver up to 5 cm in size, regardless of the number of cysts in the liver.

Conclusion

Based on the data obtained, conservative therapy without surgery is effective for liver echinococcosis up to 5 cm in size. This therapy can be performed at the outpatient stage of treatment.

In the treatment of echinococcosis of the liver larger than 5 cm, radical surgery-pericystectomy, is an economically and socially effective method of surgical treatment (less hospital stay, early recovery).

It is recommended to receive antiparasitic therapy after surgery, regardless of the type of operation.

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CLINICAL AND ACADEMIC ASPECTS OF PERIPHERAL ARTERY ANEURISM (literature review) part one

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Abstract

The review provides data on modern criteria for evaluating peripheral artery aneurysm of various etiology and localization. One of the most common causes of aneurysms the peripheral artery is an injury. Particular attention should be paid to a significant increase in the number of iatrogenic injuries. In recent years, the most complex reconstructive interventions for peripheral artery aneurysms of various etiologies have been introduced. The difficulties that the surgeon faces when performing these operations are due to the variety of anatomical variants of aneurysms. The severity of hemodynamic disorders that occur in this pathology, as well as the complexity of topographic and anatomical relationships. All of the above determines the need for further study of the etiology, pathogenesis, and clinical picture of this disease in order to improve the diagnosis and results of surgical treatment of these diseases.

Keywords

Morph functional structure of the vascular wall and its role in the pathogenesis of aneurysms, complex surgical treatment of peripheral artery aneurysms

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Перифериялық артериялар аневризмасының клиникалық-академиялық аспектілері (Әдебиеттерге шолу) 1-бөлім

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Аңдатпа

Шолуда түрлі этиологиядағы және локализациядағы перифериялық артериялар аневризмасын бағалаудың заманауи критерийлері туралы мәліметтер берілген. Перифериялық аневризмалардың дамуының кең таралған себептерінің бірі – жарақат. Ятрогенді жарақаттар санының артуына ерекше назар аудару қажет. Соңғы жылдары түрлі этиологиядағы перифериялық артериялар аневризмасы кезінде күрделі реконструктивтік араласулар енгізілді. Бұл операцияларды орындау кезінде хирург кезітетін қиындықтар аневризманың анатомиялық нұсқаларының алуан түрлілігіне, осы патология кезінде туындайтын гемодинамикалық бұзылыстардың ауырлығына, сондай-ақ топографиялық-анатомиялық әрекеттестіктің күрделілігіне байланысты. Жоғарыда мазмұндалғандардың барлығы осы ауруларды хирургиялық емдеудің нәтижелерін және диагностикасын жақсарту мақсатында осы аурудың клиникалық көрінісін, патогенезін, этиологиясын ары қарай зерттеудің қажеттілігін айқындайды.

Түйін сөздер

Тамыр қабырғасының морфо-функциональды құрылымы және оның аневризма патогенезіндегі рөлі, перифериялық артериялар аневризмасын кешенді хирургиялық емдеу

**Клинико-академические аспекты аневризм периферических артерий
(обзор литературы) часть 1**

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Аннотация

В обзоре приведены данные о современных критериях оценки аневризма периферических артерий различных этиология и локализация. Одной из наиболее распространенных причин развития аневризм периферических артерий является травма. Особое внимание необходимо уделить значительному увеличению количества ятрогенных травм. В последние годы внедрены наиболее сложные реконструктивные вмешательства при аневризмах периферических артерий различных этиология. Сложности, с которыми сталкивается хирург при выполнении этих операциях, обусловлены многообразием анатомических вариантов аневризм. Тяжестью гемодинамических нарушений, возникающих при этой патологии, а также сложностью топографо-анатомических взаимоотношений. Все выше сказанное предопределяет необходимость дальнейшего изучения этиологические, патогенеза, клинической картины этого заболевания для улучшения диагностики и результатов хирургического лечение этих заболеваний.

Aneurysms of the aorta and peripheral arteries are a common variant of the pathology of the cardiovascular system. The choice of the vascular surgery method for the relief of peripheral vascular dysfunction aneurysms is largely determined by the competence of the diagnostic tool. Most scientific studies were carried out on biological models, however, they do not provide the necessary detail and analysis of the pathology of the aortic wall [de Jong M, Essers J, van Weerden WM., 2014]. However, the distinction between healthy and diseased tissue is the basis for understanding the initiation and progression of cardiovascular disease - both clinically and pre-clinical. This is why, ever since the landscape of medical imaging and diagnostics changed dramatically with the discovery of X-rays by the German physicist Wilhelm Konrad Roentgen in 1895, there has been an ongoing search to improve image resolution and contrast [Logghe G, Trachet B, Aslanidou L, et al. , 2018].

Until now, there is no clear algorithm for diagnosing patients with PAA, on the one hand, this leads to late diagnosis of the disease, after the development of its complications. On the other hand, the development of modern diagnostic methods has not yet led to a generally recognized revision of recommendations for diagnostic tactics. The most controversial issue is the mandatory use of angiography in the diagnosis of this condition.

The need for timely diagnosis of PAA is beyond doubt. However, focusing on literary sources, it can be noted that the stage of the problem is still far from being resolved. Also, many studies note that the surgical treatment of this pathology cannot be considered definitively developed. primarily associated with the variety and complexity of anatomical options, a feature of hemodynamic disorders. The availability of various and far from differently valuable methods of surgical treatment.

Thus, the clinical diagnosis of aneurysms and peripheral arteries (APA) is based on histogenetic, pathomorphological and pathophysiological features of the structure and functioning of the vascular wall. Consequently, a detailed and updated understanding of the morphological principles of the structure of blood vessels, the role and participation of the tissues forming the vascular wall is needed, which allows using high-tech diagnostic equipment to verify its pathological changes in the early stages. Although improved imaging techniques such as X-ray, ultrasound, and echocardiogram have contributed to the earlier detection of aneurysms, surgery is currently the only treatment available. There is no doubt that the volume of medical intervention, conservative or surgical, is determined taking into account the nuances listed above, which are presented in more detail in this section of the work.

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Ключевые слова

Морфофункциональное строение сосудистой стенке и роль ее в патогенезе аневризм, комплексное хирургическое лечение аневризм периферических артерий.

1.1. Morphofunctional structure of the vascular wall and its role in the pathogenesis of aneurysms

The peripheral vascular system (PVS) includes all the blood vessels that are outside the heart. PSS are classified as follows: (Anatomy, Blood Vessels, William D. Tucker; Kunal Mahajan. Author Information, Last Update: January 4, 2019.

1. The aorta and its branches.
2. Arterioles.
3. Capillaries.
4. Venules and veins.

The functions and structure of each PVS segment differ depending on the organ supplied by blood. However, the general plan of the structure of the vessels is represented by three layers:

1. Adventitia or outer layer that provides structural support and vessel shape.
2. The middle sheath, a media consisting of elastic and muscular tissue, which regulates the inner diameter of the vessel.
3. Intima or inner layer.

Within each layer, the number of muscle fibrils and collagen varies depending on the size and location of the vessel [Tucker WD, Bhimji SS.]

The wall of blood vessels belongs to the organs of the layered type of organization. The primary cell types of the arterial wall were described as early as the 19th century. These are endothelial cells and smooth muscle cells. In recent years, a large number of additional cell types have been identified, revealing the complex morphology of large blood vessels. The lumen of the artery is lined with a layer of endothelial cells, which, in addition to performing the main barrier function, also secrete vasodilators (for example, nitric oxide) and vasoconstrictors (endothelin-1). A thin basement membrane separates the endothelium from the surrounding tissues and the inner lining. Here, pericytes are located in a special layer, which, together with endothelial cells, form an interconnected network [Orekhov A.N., Bobryshev Y.V., Chistiakov D.A., 2014].

The role of pericytes located in the intima of large vessels, however, has yet to be clarified, but today their significance is postulated in the literature as an atherogenic link in the development of local inflammation [Ivanova E.A., Bobryshev Y.V., Orekhov A.N., 2015].

Pericytes can be distinguished by their secreted neuroglial antigen 2 (NG2) and CD146. In extracorporeal experiments, pericytes can also differentiate into smooth muscle cells and various cell differentiations of mesenchymal origin [Billaud M., Donnenberg V.S., Ellis B.W., et al., 2017]. Under natural conditions, the plasticity of pericytes is difficult to establish due to the lack of a specific trace line for transgenic models. As, for example, in the clinical

and experimental work of Manchester researchers. Using the Tbx18 (T-box 18) - CRE-ERT2 marker of pericytes, which determines their further development in the tissues of mice, extracorporeally (in vitro) it was possible to obtain a line of differentiation of pericytes that retain their perivascular characteristics, and in vivo this experiment did not show itself. even in the face of induced trauma. In addition, the available data do not exclude that other populations of perivascular cells do not perceive the influence of Tbx18, and in a living organism can act as progenitor cells. [Guimaraes-Camboa N., Cattaneo P., Sun Y., et al., 2017]. Mesangioblasts represent a subset of perivascular cells of the aorta and can also be induced to differentiate [Roostalu U, Wong JK., 2018].

The intercellular matrix of the inner shell consists of proteoglycans, and the cellular composition, in addition to endothelial and pericytes, is also represented by low-differentiated smooth muscle cells. It is known that in the wall it is the aorta certain differentiations of smooth muscle cells develop in the early stages of the embryo and are preserved in an immature state until adulthood. These cells form cushion-shaped branches. It is believed that they can provide strength to the vascular wall in the areas of aneurysm deformation of the vascular wall, under the influence of blood flow turbulence and may even represent a pool of immature cells that can contribute to the development of smooth muscle cells. However, this structure of the vascular wall contributes to the development of atherosclerotic lesions, which demonstrates the importance of histological architecture in the context of cardiovascular medicine [Roostalu U, Wong JK., 2018].

In the inner lining of the arteries, intima, an internal elastic membrane is also isolated, consisting of elastic fibers and a spindle-shaped form of contractile smooth myocytes. In the middle lining of the vessel, the media, smooth myocytes are most prominent and form concentric layers of mature smooth muscle tissue. Elastin, located on the surface and surrounding smooth muscle cells, allows large arteries to expand and narrow during systole and diastole. The relative abundance of collagen (type 4 collagen in the wall of the thoracic aorta) and other extracellular matrix molecules of elastin determines the biomechanical properties of arteries [Cheng J.K., Wagenseil J.E., 2012; Xu K, Xu C, Zhang Y, et al., 2018].

The middle shell, the media, is surrounded by the adventitia layer, which is represented by loose connective tissue and contains many cell diférons. Identification of the cell composition of the vascular wall is of great clinical and laboratory importance for the determination of markers corresponding to discrete cell lines at different stages of differentia-

tion of one cell line. The most common markers for adventitial cells are SCA1 (stem cell antigen-1) and CD34, which identify cells around the artery itself. Similar CD34 + cells are found at the border of the middle and outer membranes [Roostalu U, Wong JK., 2018].

It is believed that some of the SCA1 + cells may also be located in the middle membrane, which suggests their ability to penetrate into the deep layers, or this indicates their smooth muscle origin. Typical adventitia cells manifest themselves as transcriptional activators and repressors of smooth muscle cells in their state. In addition, these cells decide the fate of endothelial cells. [Shen Y., Wu Y, Zheng Y., et al., 2016].

Some authors have shown in experimental studies that there are even more multipotent progenitor cells in the adventitia. They can be detected using markers of mesenchymal stromal cells (CD44 and CD90). However, it is possible that they represent the same cell population in origin, at different stages of activation and differentiation. These stromal (connective tissue) cells are able to differentiate into smooth muscle cells, they have chondrogenic and adipogenic properties [Corselli M., Chen C.W., Sun B., et al., 2012].

The study of adventitial cells using markers is one of the promising areas of vascular medicine. GLI1 + cells express typical markers of adventitial cells - SCA1, CD34 and, to varying degrees, markers of various mesenchymal stromal cells (CD29, CD44, CD90), as well as markers of poorly differentiated smooth myocytes, which indicates possible lineages of these cells. GLI1 + cells can differentiate into smooth myocytes, fibroblasts and osteoblasts [Kramann R., Schneider R.K., DiRocco D.P., et al., 2015; Kramann R., Goettsch C., Wongboonsin J., et al., 2016]. There are also progenitor / stem cells in the walls of the blood vessel, which are characterized by the release of the following markers: SRY-Box 10 (SOX10), SOX17, S100 β , as well as mesenchymal stromal markers CD44 and CD29. The markers CD31, CD34, CD146 and SCA1 are found in smaller quantities. In an extracorporeal experiment, these cell populations differentiate into smooth myocytes, Schwann cells of peripheral neurons, chondrocytes, osteoblasts and adipocytes [Tang Z., Wang A., Yuan F., et al., 2012].

Large human vessels are surrounded by a dense capillary network, which is located in the adventitia membrane of the vessel wall and is called vasa vasorum (vessels of the vessels). They are necessary for the blood supply to the outer layers of the vessel (middle and outer shells). Perivascular adipose tissue creates a kind of cushion around the artery, even extending far beyond the adventitia layer. The composition of adipose tissue in human arteries is

represented by brown and white adipocytes [Brown N.K., Zhou Z., Zhang J., et al., 2014]. Perivascular adipocytes are increasingly recognized as an important vascular mediator system. They release a wide variety of signaling molecules that often promote vasodilation: adiponectin, H₂, angiotensin (1-7), palmitic acid methyl ester and prostacyclins [Cheng J.K., Wagenseil J.E., 2012 and many others]. Adipocytes can also potentiate contractile smooth muscle cells and produce angiotensin II and superoxide [Owen M.K., Witzmann F.A., McKenney M.L., et al., 2013; Ramirez J.G., O'Malley E.J., Ho W.S.V., 2017]. In addition, perivascular adipocytes regulate intravascular temperature [Cheng J.K., Wagenseil J.E., 2012] and secrete a large amount of cytokines and growth factors that affect cell differentiation in the arterial wall [Nosalski R., Guzik T.J., 2017]. Finally, the arteries are richly innervated, which is necessary to modulate vascular tone.

Most tissues respond to damage with an inflammatory response, in which many different cell populations are involved. In addition, the changes also affect intracellular transformations. It was revealed that the cathepsin gene plays an important role in the pathological cascade of the pathology of cardiovascular diseases, in particular, dysfunction of the heart valves, stiffness of the aorta and its dilatation. Excessive accumulation of cathepsin in lysosomes leads to degradation of the extracellular matrix components of the aorta, cardiac muscle and heart valves, primarily due to fibroblast dysfunction. Inhibition of cathepsin improves the parameters of cardiac function, the state of the aortic wall and the valve apparatus by increasing the total activity of elastase in the aorta [Gonzalez EA, Martins GR, Tavares AMV, et al., 2018].

Other authors also wrote about the participation of intercellular components in the pathogenesis of diseases of various parts of the aorta. Thus, K. Subramaniam and M.N. Sheppard in his works established that dilatation and subsequent rupture of the aorta occurs as a result of extensive cystic degeneration of the medial layer of the aorta and degeneration of smooth muscle cell nuclei, with disorganization, fragmentation, disappearance of elastin fibers and an increase in collagen [Subramaniam K, Sheppard MN., 2018].

Abdominal aortic aneurysm (AAA) is an enlargement of the abdominal aorta that causes serious complications and death. The development of AAA is associated with the accumulation of cells that cause inflammation in the aneurysmal vascular wall. These cells include various types of leukocytes, such as monocytes, macrophages, dendritic cells (DC), NK cells, neutrophils, B lymphocytes and T lymphocytes [Patel MJ, Blazing MA. 2013; Chang TW, Gracon AS, Murphy MP, et al. 2015]. The in-

flammatory response is a key process in the pathogenesis of AA [Peshkova IO, Schaefer G, Koltsova EK. 2016], since it increases the production of elastase and other proteinases (matrix metalloproteinases, serine proteinases, cathepsins), which are primarily responsible for the structural loss of the integrity of the vessel walls leading to the formation of AA [Sterpetti AV., 2013]. In addition, many authors noted a local increase in the level of biologically active substances:

1. chemokines
 - 1.1. monocyte chemoattractant protein-1 [Nakao T, Horie T, Baba O, et al., 2017];
 - 1.2. chemokine C-C in ligand 22 (CCL22) [Jones GT, Phillips LV, Williams MJ, et al., 2016],
 - 1.3. chemokine secreted by stromal cells (stromal cell-derived factor 1 (SDF-1) / chemokine (CXC motif) receptor 4 - CXCR4 and its ligand CXCL12 [Michineau S, Franck G, Wagner-Ballon O, et al., 2014; Tanios F, Pelisek J, Lutz B, et al., 2015];
2. growth factors: granulocyte colony stimulating factor (GCSF) and macrophage colony stimulating factor (MCSF) [Lu G, Su G, Davis JP, et al., 2017];
3. cytokines (TNF- α , IL-6, IL-1 β) [Lu G, Su G, Davis JP, et al., 2017; Lindberg S, Zarrouk M, Holst J, et al., 2016].

Such a complex interaction of immunocompetent cells and cytokines in the pathogenesis of ABA determines the regulation of pro-inflammatory th1 cells (producers of IL-1 β , IL-6, TNF- α and IFN- γ) and anti-inflammatory th2 cells (producing IL-4, IL-5 and IL-10) [Johnston WF, Salmon M, Su G, et al., 2013].

Natural killer cells (NK lymphocytes) and a subset of other T cells express the invariant T cell receptor (TCR) and markers characteristic of these cells, which are found in abundance in the aneurysmal vessel wall. When activated and depending on conditions, natural killer cells can quickly and simultaneously produce large amounts of both pro-inflammatory (IFN- γ , IL-2, TNF- α) and / or anti-inflammatory cytokines (IL-4, IL-5, IL-10, IL-13). Numerous studies have already proven the role of killer T cells in atherogenesis, but whether the presence of these cells in the aneurysmal vascular wall is directly related to the development of aneurysms is still unknown. Killer cells promote the development of aneurysms by inducing the expression of matrix enzymes that destroy smooth muscle cells and macrophages, which leads to the release of cytokines and a decrease in the viability of smooth myocytes in an angiotensin II-mediated model. [van Puijvelde GH, Kuiper J., 2017; van Puijvelde GHM, Foks AC, van Bochove RE, et al., 2018].

In addition, the literature pays attention to the development of macroautophagy as an element of

the pathogenesis of aneurysms. Autophagy is the most important cellular response to stress, manifested by the destruction of defective macromolecules and organelles, accompanied by the release of bioenergetic intermediates during hypoxia and lack of nutrients. Taking into account the prevalence of aneurysms in aged patients, some authors believe that the pathogenesis of aneurysms is due to thiol-dependent disorders of autophagy during aging. Losses in the covalently bound LC3 molecule damage the thiol catalytic processes mediated by the Atg3 and Atg7 proteins, which leads to inhibition of oxidation, preventing lipidolization of LC3 [Frudd K, Burgoyne T, Burgoyne JR., 2018].

Thus, the hemodynamic conditions in which the vessels function predetermine the features of their architectonics [Teregulov Yu.E., Mayanskaya SD, Teregulova ET, 2017]. In the pathogenesis of aneurysms, inflammatory reactions, including autoimmune ones, are of great importance. Theoretical experimental-academic knowledge can be applied in clinical practice, for example, in determining the cytokine profile, consisting of pro-inflammatory cytokines, chemokines, and specific growth factors in patients with aneurysms. The prospects for conservative treatment are also associated with the functioning of the vascular wall at the cellular level. By morphology: interventions. When carrying out surgical treatment, the structural features of the vascular wall described above must also be taken into account.

Classification of peripheral artery aneurysm

Classification of aneurysms is an important stage in preparation for surgery, the volume of which will directly depend on the results of auxiliary and high-tech methods of diagnostic examination of patients. For example, using CT, you can diagnose with high accuracy changes in the aorta and its branches, identify such a serious complication as dissection of the aorta [Bazhenova Yu.V., Drantusova N.S., Shanturov V.A., et al., 2014] ...

The main options for the classification of aneurysms involve taking into account such factors as etiology, morphology, localization of aneurysms, and clinical manifestations.

According to the pathogenetic principle, aneurysms are distinguished:

1. aneurysma verum,
2. aneurysma spurium,
3. aneurysma dissecans,
4. aneurysma congenitalis - angiodyplasias.

By morphology:

1. saccular
2. fusiform

By localization in PVS:

1. iliac,

2. Aneurysms of the visceral arteries of the abdominal cavity
3. femoral,
4. popliteal,
5. carotid
6. subclavian,
7. arteria brachialis,
8. radialis
9. ulnar,
10. tibia
11. axillary arteries.

Among the various types of peripheral vascular aneurysms, the most common are traumatic and atherosclerotic, which are of the greatest practical interest. Traumatic aneurysms are formed as a result of damage to blood vessels, mainly after bullet and shrapnel wounds. Their percentage in relation to all aneurysms of peripheral arteries is on average about 50% (A.A. Spiridonov, K.M. Morozov, 2004). It is noted that in the last 10-15 years the number of post-traumatic aneurysms has increased significantly. Most often, according to most authors, traumatic aneurysms are localized on the femoral artery, then on the popliteal, brachial, axillary and common carotid arteries. An independent group consists of pseudo-aneurysms of iatrogenic origin, and their number increases according to the spread of angiographic studies. The predominant localization of iatrogenic aneurysms: the femoral artery after its puncture according to Seldinger, the jugular and subclavian veins. Attention should also be paid to postoperative aneurysms that develop after various reconstructive operations on the vessels. False aneurysms of the anastomoses can be caused by the primary infection of the surgical wound and prosthesis, the failure of the anastomoses, the eruption of sutures due to various reasons. True aneurysms of the anastomoses area develop after endarterectomy and plasty of the autovein artery, as well as due to the ongoing degenerative process in the vascular wall. Explants aneurysms are more typical for biological and semi-biological materials. An essential role in the development of aneurysms is played by the presence of hypertension in patients. In the development of peripheral aneurysms against the background of nonspecific aortoarteritis, the starting point is inflammation, which begins with adventitia and leads to the destruction of the vascular wall with the subsequent formation of aneurysmal expansion.

From a tactical point of view, the Stanford classification is more convenient and justified, since it allows us to clearly distinguish which of the patients requires urgent surgical treatment (type A), who can be treated with medication until the condition stabilizes (type B), and operated on with appropriate indications in the long term.

The generally accepted classification of true (chronic) thoracoabdominal aortic aneurysms is E.S. Crawford (1986), taking into account the prevalence of the process and the involvement of the main branches of the aorta.

Aneurysms of the visceral arteries of the abdominal cavity

Aneurysms of the visceral arteries (AVA) of the abdominal cavity are rare diseases and are often a diagnostic finding during examination or are diagnosed when complications arise (ruptures, thrombosis of the distal parts). According to pathological studies, AVA are detected in 0.01-0.2%. According to the literature, the most common aneurysms of the splenic artery, hepatic artery (respectively 60-80 and 20%), much less often gastroduodenal, pancreatoduodenal and superior mesenteric arteries. The causes of AVA are atherosclerosis, fibromuscular dysplasia, disorders in the synthesis of collagen structure, trauma, etc.

Clinically, AVA can manifest itself when they rupture and are accompanied by symptoms of "acute abdomen", hypotension. Ultrasound duplex scanning plays a certain role in diagnostics. An accurate diagnosis of ABA is established by performing multispiral computed tomography, angiography of the visceral branches of the abdominal aorta.

In the treatment of AVA, endovascular, surgical methods are used. So, in case of aneurysm of the splenic artery, resection of the aneurysm is recommended, with its large size and location in the gate of the spleen - splenectomy, if possible, resection is completed by restoration of the splenic artery. In case of aneurysm of the hepatic artery, it is recommended to ligate the hepatic artery without reconstruction with the proximal extrahepatic location of the aneurysm; sometimes it becomes necessary to perform shunting operations on the distal segment of the hepatic artery [6]. Endovascular interventions - stenting, aneurysm embolization are low-traumatic, but they should be performed according to strict indications. [3, 6, 7].

Aneurysm of the renal arteries is a local expansion of the diameter of the vessel in two or more times, compared with its unchanged or normal diameter. This disease is very rare. Aneurysms of the renal arteries account for only 0.8 - 1% of aneurysms of all other localizations (A. Abeshouse, 1951). However, at present, in connection with the improvement of diagnostic methods, especially screening, as well as the introduction of renal angiography into clinical practice has led to a more frequent diagnosis of this disease (Pliskin M.J. et al., 1990).

The first preoperative diagnosis was made in 1924 by G. Soderlung, who radiographically re-

vealed a calcified aneurysm, confirmed the diagnosis pyelographically and successfully performed nephrectomy.

The main etiological causes of renal artery aneurysm are: congenital degeneration of the media, atherosclerosis, nonspecific aortoarteritis, fibromuscular dysplasia, periarteritis nodosa and trauma (E.K. Berezovskaya et al., 1950; N.A. Nemirovskaya, 1961; N.A. Lopatkin et al., 1969; A.A. Spiridonov, 1972; E. Poutasse, 1966; Yu.V. Belov et al., 2003).

The largest percentage of aneurysms of the renal arteries are localized in the area of the bifurcation of the main trunk or its branches (about 50%), since it is in this place that, as a result of congenital or acquired diseases, degeneration of the elastic structures of the artery wall and its media is noted (S. Ekestrom, 1964). A separate group includes poststenotic aneurysms that form distal to the narrowed segment of the renal artery, which arose on the basis of atherosclerosis, arteritis, or FMD. Constantly remitting fluctuations in blood flow velocity, changes in its shape and turbulence gradually lead to aneurysmal dilatation of the walls of the renal artery. However, not every post-stenotic dilatation of the artery should be regarded as an aneurysm. An aneurysm means only those cases where there are degenerative changes in the walls of the vessel (E.F. Poutasse, 1966).

At the initial stage of their formation, true aneurysms are small and thin-walled. Gradually, as the size of the aneurysm increases, its walls thicken, harden and finally undergo calcification (E.F. Poutasse, 1975).

Aneurysms of interrenal localization are of particular interest, since rupture of these aneurysms can occur in 30% of cases, and 2/3 of these ruptures are fatal (W. Baker et al., 1953; B. Hogbin et al., 1969).

Clinically, aneurysms of the renal arteries can be completely asymptomatic and, in most cases, are an accidental finding during angiography (V.V. Chikov, 1972; A.A. Spiridonov, 1972), or are detected during a general image of the kidneys with calcification of the walls. Nevertheless, the main clinical symptoms are considered to be hypertension, pain, hematuria, systolic murmur in the projection of the renal artery.

Hypertensive syndrome, according to various authors, occurs from 15% - 85% of cases (B. Abeshouse, 1951; S. Ekestrom, 1964; P. Glass et al., 1967; C. McKiel et al., 1966). Until now, the question of the causal relationship of renal artery aneurysms and hypertensive syndrome has not been finally resolved. However, the fact that hypertension is completely stopped after nephrectomy or resection of the aneurysm with adequate reconstruction

of the renal artery indicates a certain relationship of this pathology with vaso-renal hypertension (S. McKiel et al., 1966; E. Poutasse, 1966; A.A. Spiridonov, 1972).

The most frequent clinical sign of pathology, which occurs in 50% of cases, is pain (G.G. Arabidze, 1969). Pain can usually be dull, indefinite in the lumbar region of the corresponding side, without a clear irradiation. However, with complications (rupture, thrombosis), they sharply increase, giving a clinic of acute abdomen, renal colic, kidney infarction, simulating complications of various diseases of the genitourinary system: kidney stones, tumor, cyst, kidney abscess, kidney rupture, acute abdomen, etc.

Another relatively common symptom of renal artery aneurysm is hematuria. In most cases of uncomplicated course, constant intermittent micro-hematuria can be observed. Clinical manifestations of complicated forms depend on the nature of the complication that has occurred: with thrombosis of an aneurysm, the picture of kidney infarction, described above, develops; when an aneurysm breaks into the renal collector, a picture of unilateral profuse bleeding through the urinary tract is observed. In general, the analysis of the uncomplicated and complicated course of the renal artery aneurysm shows that there is practically no clear clinical picture on the basis of which this diagnosis can be confidently made.

The easiest to diagnose, as mentioned above, are calcified aneurysms of the renal arteries. However, the presence of a calcified rounded shadow in the projection of the kidney on an ordinary X-ray image also requires verification of the diagnosis with urolithiasis, calcified mesenteric lymph node, tuberculous kidney abscess and many other diseases. A comparative study of the calyx-pelvic apparatus and the functional state of the kidneys based on the results of excretory urography can provide some help for the differential diagnosis in such cases.

The main method for diagnosing PA aneurysms is contrast X-ray angionography. In recent years, duplex scanning has been used as a screening method.

Aneurysms of the upper limb arteries

These aneurysms account for 34.04% of all peripheral aneurysms. Aneurysms of the subclavian artery account for 14.2%, axillary - 1.4%, brachial - 11.35%, radial - 3.55%, ulnar artery - 3.55%. In most cases, aneurysms of the upper limb arteries are of traumatic or mycotic origin. Aneurysms are localized in the subclavian, axillary and brachial arteries, other localizations are extremely rare.

Subclavian artery aneurysms often develop as a result of poststenotic dilatation caused by exter-

nal compression of the subclavian artery. Often this is joined by secondary atherosclerotic changes, and a variant of the exclusively atherosclerotic nature of aneurysmal lesion of the vessel wall is also possible. In chest exit syndrome, the cause of compression is the clavicle, I or accessory rib. The incidence of aneurysms in this pathology reaches 48.14% of all cases of exit syndrome, and in 18.5% of patients this pathology is not accompanied by embolization of the distal bed, and in 19.6% it is accompanied by distal embolization (when calculating for all cases of observation of the syndrome of exit from the chest).

The mechanism of subclavian artery aneurysm formation as a consequence of the thoracic exit syndrome, cells were first described by W.S. Hoisted in 1956. In the same year, C.J. Schein, H. Hamovici and H. Yang. confirmed this mechanism as a consequence of trauma to the artery when leaving the chest and described the mechanism of arterio-arterial embolism with the development of upper limb ischemia. The treatment of this pathology is the decompression of the artery by the method of resection of the compressing anatomical formation, and in some cases, cervicothoracic sympathectomy is performed to stop ischemia of the limb.

Aneurysms in exit syndrome account for approximately 6.4% of all peripheral aneurysms. This group is mainly represented by male patients.

E.S. Crawford et al. observed aneurysms of the subclavian artery only of atherosclerotic genesis only in 3 of 107 patients with peripheral aneurysms of various localization. With atherosclerotic genesis, treatment involves resection followed by prosthesis.

Axillary artery aneurysms are usually asymptomatic. As a rule, symptoms appear when thromboembolism joins the peripheral arterial bed with the development of ischemia of the distal extremities.

Surgical treatment of aneurysms of this localization involves resection followed by an end-to-end anastomosis or replacement of the resected segment with a synthetic or auto-vein.

Aneurysms of the brachial artery and radialis, ulnar arteries

In most cases, aneurysms of this localization are the result of trauma. S. Matas in 1888 described the classic symptomatology of aneurysms of this localization. Clinical manifestations include both symptoms of vascular origin and peripheral neurological symptoms.

Aneurysms of the radial and ulnar arteries are also based on post-traumatic origin. S. Thorrens, having examined a large group of patients, revealed the atherosclerotic nature of the aneurysms of this

localization in only a small number of them. Clinical symptoms and diagnosis are similar to those of brachial artery aneurysm.

Treatment consists in resection of the aneurysm followed by prosthetics. In the treatment of radialis. ulnar aneurysms, resection or alloying is often performed without restoring the patency of the affected segment, but this procedure is possible only if the patency of the palmar arch is preserved.

Carotid aneurysm is a local expansion of the diameter of the carotid artery with a thinning of the vessel wall. Such an aneurysm is especially dangerous due to the fact that blood supply to the brain is carried out through the carotid arteries and any complication of an aneurysm can cause a stroke. This pathology presents great difficulties in treatment, therefore, many vascular departments try to refuse such patients. Few clinics confidently perform surgical and endovascular interventions for carotid aneurysms. An innovative vascular center among them.

An aneurysm can develop in the cervical part of the carotid artery, or its intracerebral part. Any localization is dangerous to life. A ruptured cervical aneurysm is rare, but a blood clot can form that blocks blood flow through the artery, or pieces of it can cause ischemic strokes. Intracerebral aneurysms are often complicated by ruptures with the development of hemorrhagic stroke.

Numerous articles in the medical literature describe possible complications and prove that timely treatment avoids adverse outcomes associated with the disease.

The reasons: The main cause of aneurysm development is congenital weakness of connective tissue, connective tissue diseases. Sometimes the starting point for the development of dilatation of the carotid artery can be radiation therapy for neck tumors. Dilatation of the internal carotid artery is sometimes observed after stenting or removal of an atherosclerotic plaque.

Types of aneurysms

By localization:

- Carotid artery aneurysm in the bifurcation area
- Internal carotid artery aneurysm
- Aneurysm of the external carotid artery
- Aneurysm of the intracranial section of the internal carotid artery

The form of aneurysm of the carotid artery is:

1. saccular
2. fusiform

Symptoms

The main symptoms of aneurysm of the carotid arteries in the neck are associated with its complications. An aneurysm may not cause any sensa-

tions and is detected by chance during a medical examination or ultrasound of the neck.

- Visual impairment

because of repeated separation of small blood clots, ocular symptoms of an aneurysm of the carotid artery can develop: blurred vision, double vision, dilated pupils, loss of visual fields.

- Headache

Sudden and severe headache pain can be a sign of a ruptured carotid aneurysm as well as other arteries in the brain. This pain is so intense that most patients describe it as “unbearable and most excruciating pain.” The headache is usually accompanied by nausea and vomiting, tension in the occipital muscles, often loss of consciousness and coma. Intracranial aneurysm rupture is associated with a very high mortality rate. Therefore, if such aneurysms are detected, they must be operated as early as possible.

Complications

- Transient ischemic attack (microstroke)

One of the important symptoms of the disease is a microstroke or transient ischemic attack (TIA). Clinically, this is manifested by signs of cerebral circulation disorders, which disappear within a day. This may be weakness in an arm or leg, impaired facial expressions, impaired speech, balance, ability to walk, sensitivity in half of the body. The cause of this complication is the detachment of small blood clots from the aneurysm cavity and their transfer to the brain.

- Ischemic stroke

Thrombosis of an aneurysm or separation of a large blood clot leads to the cessation of blood circulation in a large area of the brain and the death of this area. In connection with a stroke, persistent paralysis or cerebral coma develops. Mortality with this complication is at least 40%.

- Compression of the organs of the neck

Large aneurysms can exert pressure on nearby anatomical structures, such as the jugular vein, larynx, vagus nerve, and recurrent nerve. This leads to the appearance of symptoms such as swelling of the face, hoarseness of voice, difficulty in swallowing and speaking, decreased sensitivity of the skin of the neck and face. A ruptured aneurysm can cause sudden compression of the trachea and death of the patient from asphyxiation.

Prognosis

The likelihood of developing fatal complications with carotid aneurysm is very high. Ischemic stroke occurs in half of patients, rupture within a cerebral aneurysm develops in 25% of patients per year. These complications require timely surgery. After surgical treatment, patients in most cases get rid of

the risks associated with an aneurysm of the carotid artery and live a normal life.

Aneurysm of the femoral and popliteal arteries is a complex and very important problem in modern vascular surgery. According to the literature, aneurysms Diagnosis and surgical treatment of patients with atherosclerotic aneurysms of this localization account for about 70 - 80% of the number of aneurysms of all peripheral arteries (Troitsky A.B. et al., 2005).

Aneurysms of the femoral and popliteal arteries are important nosological units, which is associated with their potential danger of developing complications that threaten not only the limb, but also the patient's life. B.S. Gulter and R.G. Darling, when analyzing 45 clinical observations of patients with femoral artery aneurysms in 47% of them, revealed a complicated clinical course. G.E. Tolsted et al. found thrombosis in 43% of patients with aneurysms of the femoral arteries (Spiridonov A.A. et al., 2004),

There are conflicting opinions about the tactics of treating asymptomatic aneurysms. Some authors recommend conservative treatment of such aneurysms. It is estimated that 14 to 24% of asymptomatic popliteal aneurysms become symptomatic annually (Antonello M. et al. 2007). According to R. Pulli et al., 2006, the incidence of acute ischemia of the lower extremities due to thrombosis of the popliteal artery aneurysm was! from 7 to 68% of cases.

Ideally, recommendations should be based on knowledge of the natural course of the disease, but there are practically no such observations. It is known that with an increase in the duration of the disease, the number of complications increases. A. Roggo et al. (1993) report that all patients with 45 aneurysms of the popliteal arteries who were treated “conservatively” developed symptoms of limb ischemia, and this required surgical intervention on average within 4.2 years after diagnosis, with half of the patients during the first two years old. However, there are currently no large enough studies to determine the rate of complications or limb loss.

The results of surgical treatment depend on the underlying conditions. The best long-term results are observed in patients with asymptomatic aneurysms. There is evidence that surgical treatment of asymptomatic aneurysms is significantly better than symptomatic aneurysms (J. Ruch et al., 2006).

Thus, until now there is no clear algorithm for the surgical treatment of patients with femoral and popliteal aneurysms, which leads in a large number of cases to the development of complications (rupture, thrombosis, thromboembolism). In addition, despite the development of a large number of different types of treatment for patients with this disease, there is no unified tactics for the treatment of patients with femoral and popliteal aneurysms,

depending on their location, prevalence and severity of hemodynamic disorders.

All of the above determines the need for further study of the clinical picture of this disease in order to improve the diagnosis and results of surgical treatment of patients with aneurysms of the femoral and popliteal arteries.

The aim of this study was to improve the results of surgical treatment of patients with atherosclerotic aneurysms of the femoral and popliteal arteries.

In accordance with this goal, the following research objectives are formulated:

1. To assess the likelihood of complications in patients with atherosclerotic aneurysm of the femoral and popliteal arteries, depending on the duration of existence.
2. To evaluate the immediate results of surgical treatment of atherosclerotic aneurysms of the femoral and popliteal arteries.
3. To carry out a comparative analysis of the long-term results of surgical treatment of atherosclerotic aneurysms of the femoral and popliteal arteries in asymptomatic patients and patients with a complicated course of the disease.

4. To carry out a comparative analysis of long-term results of surgical treatment of atherosclerotic aneurysms of the femoral and popliteal arteries, depending on the state of the distal arterial! about the channel.
5. To conduct a comparative analysis of long-term results of surgical treatment of atherosclerotic aneurysms of the femoral and popliteal arteries, depending on the type of graft.
6. To clarify the indications and tactics of treatment of atherosclerotic aneurysms of the femoral and popliteal artery.

The expediency of active surgical tactics in patients with atherosclerotic aneurysms of the femoral and popliteal arteries has been substantiated. It has been shown that in patients with atherosclerotic aneurysm of the femoral and popliteal arteries, examination of the abdominal aorta and other peripheral arteries is necessary to exclude their aneurysmal lesions.

The optimal variant of surgical treatment is the operation of resection of the aneurysm of the popliteal arteries with prosthetics, which provides better patency of shunts in the long-term period compared to bypass and ligation of the popliteal artery aneurysm.

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DISCUSSION ISSUES OF SURGICAL TREATMENT USING NEW TECHNOLOGIES FOR RECONSTRUCTION OF PELVIC FLOOR IN THE PROLAPSE OF RECTUM, UTERUS AND VAGINA (literature review)

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Abstract

Currently, the prolapse of the vaginal walls is considered as a result of ruptures of the pubic-cervical and rectovaginal fascias, as well as their separation from the walls of the pelvis. Given the high recurrence rate of the disease, most surgeons prefer the combined methods of surgical treatment of prolapse. These interventions include strengthening the pelvic floor, plasticizing the walls of the vagina and fixing the uterus, cervical stump or vaginal vault in different ways. However, the existing combined methods also do not always contribute to the complete recovery of patients, since they do not always eliminate and do not prevent functional disorders of neighboring organs.

The review presents data on surgical treatment of the pelvic floor for prolapse of the rectum, uterus and vagina. The general assessment of the above literature data suggests the existence of a number of difficulties and unsolved problems in the surgical rehabilitation of women with diseases of the perineum of non-tumor etiology.

Keywords

prolapse of the rectum, genital prolapse, vagina

Тік ішектің, жатырдың және қынаптың пролапсындағы жамбас түбін қалпына келтірудің жаңа технологияларын қолдана отырып хирургиялық емдеу мәселелерін талқылау (әдебиеттерге шолу)

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Аңдатпа

Қазіргі уақытта вагинальды қабырғалардың пролапсы жыныстық-жатыр мойны және ректовагинальды фассияның жарылуы, сондай-ақ олардың жамбас қабырғаларынан бөлінуі нәтижесінде қарастырылады, аурудың рецидивтерінің жоғары пайызын ескере отырып, хирургтардың көпшілігі пролапсты хирургиялық емдеудің аралас әдістерін қалайды. Бұл араласуларға жамбас түбін нығайту және жатырды, жатыр мойнының діңін немесе қынап күмбезін бір жолмен бекіту кіреді. Алайда қолданыстағы аралас әдістер де әрдайым пациенттердің толық сауығуына ықпал ете бермейді, өйткені олар әрдайым көрші ағзалардың функционалдық бұзылуларын жоймайды және алдын алмайды. Шолу кезінде тік ішектің, жатырдың және қынаптың пролапсымен жамбас түбін хирургиялық емдеу туралы мәліметтер келтірілген. Жоғарыда келтірілген әдебиет деректерін жалпы бағалау ісік емес этиологияның перинэя ауруы бар әйелдерді хирургиялық оңалту кезінде бірқатар қиындықтар мен шешілмеген мәселелердің болуын болжайды.

Түйін сөздер

тік ішектің төмен түсуі, генитальды пролапсы, қынап

Дискуссионные вопросы хирургического лечения с использованием новых технологий по реконструкции тазового дна при опущении прямой кишки, матки и влагалища (обзор литературы)

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Аннотация

В настоящее время опущение стенок влагалища рассматривают как результат разрывов лобково-шеечной и прямокишечно-влагалищной фасций, а также их отрыва от стенок таза, учитывая высокий процент рецидивов заболевания большинство хирургов отдают предпочтение комбинированным методам хирургического лечения пролапса. Эти вмешательства предусматривают укрепление тазового дна, пластику стенок влагалища и проведение фиксации матки, культы шейки матки или купола влагалища тем или иным способом. Однако существующие комбинированные методы тоже не всегда способствуют полному выздоровлению больных, так как не всегда ликвидируют и не предупреждают функциональные нарушения соседних органов. В обзоре приведены данные хирургического лечения тазового дна при опущении прямой кишки, матки и влагалища. Общая оценка приведенных литературных сведений позволяет говорить о существовании целого ряда трудностей и нерешенных задач в хирургической реабилитации женщин с заболеваниями промежности неопухолевой этиологии.

Relevance. Modern operative surgery has a variety of pelvic floor reconstruction surgeries for the prolapse of the rectum, uterus and vagina (2.5.11.) Until recently, it was believed that the prolapse of the vaginal walls is a consequence of protrusion or stretching of the pelvic fascia (3.7). Currently, the prolapse of the vaginal walls is considered as a result of ruptures of the pubic-cervical and rectovaginal fascias, as well as their separation from the walls of the pelvis. Given the high recurrence rate of the disease, most surgeons prefer the combined methods of surgical treatment of prolapse. These interventions include strengthening the pelvic floor, plasticizing the walls of the vagina and fixing the uterus, cervical stump or vaginal vault in different ways (1.4.21.). However, the existing combined methods also do not always contribute to the complete recovery of patients, since they do not always eliminate and do not prevent functional disorders of neighboring organs. The number of patients with severe degrees of prolapse and prolapse of the pelvic organs at a young age is 26% today (6.8.9.22). Taking this into account, at the present stage of development of medicine, there is a need for operations with the preservation of organs, which will help to restore relationships with neighboring organs and create conditions for their normal functioning, as well as rehabilitation of specific functions of the woman's body (10, 11, 23.31).

Despite the large number of surgical methods of treatment, there is no univocal opinion on the

tactics of treating patients with rectal prolapse (2, 12, 13, 33). Some types of interventions lead to the occurrence of a large number of relapses of the disease, when using other methods, previous constipation reappears or intensifies. In many patients with rectal prolapse, anal spasm insufficiency was simultaneously revealed, which accompanied rectal prolapse in 30-90% of them and persisted in many patients after surgical correction of rectal prolapse (14, 24, 34). This disease significantly reduces the quality of life of patients, limits their social activity, leads to disability, and sometimes to changes in mental health (15, 26, 35).

For the first time in 1959, C. Wells (13) proposed posterior-loop rectopexy for the surgical treatment of rectal prolapse. A feature of the technique of this surgical intervention is that the rectum is mobilized to the level of levators with the intersection of the lateral rectal ligaments. Then a rectangular polypropylene mesh is attached to the sacrum, and its "wings" are fixed to the lateral surfaces of the intestine. As a result of this, the nerve fibers passing in these ligaments are damaged, the violation of innervation leads to increased constipation in the postoperative period. (16.25). Thus, a rigid fixation of the mobile intestinal wall to the fixed surface of the sacrum is created, which can also be the cause of increased constipation in the long term. After performing posterior loop rectopexy, the recurrence rate of the disease reaches 11.1%, and the motor-evacuation function of the colon worsens in 38-48% of operated patients (16, 27, 28).

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Ключевые слова

опущение прямой кишки, генитальный пролапс, влагалище

A.D. Hoore (40) proposed a new method of rectal fixation - rectosacropexy, reporting its good functional results. The proposed method differs from the posterior-loop rectopexy in that the rectum is mobilized only along the antero-right semicircle, preserving the lateral ligaments of the rectum, which prevents damaging of the rectal wall innervation and development of constipation in the postoperative period. Fixation of the intestine to the sacrum occurs behind its anterior wall according to the type of free plasty, thus the intestine retains mobility and motility, which also serves as the prevention of disorders of the motor-evacuation function of the colon after surgery (17, 36).

According to two systematic reviews that included analysis of 2000 patients, constipation symptoms decrease in the postoperative period in almost half of the operated patients, and the recurrence rate does not exceed 4.8% (18, 29). According to (34), after rectosacropexy, no intensification of constipation symptoms was found, that is, the implementation of this intervention does not cause deterioration of the motor-evacuation function of the colon in the postoperative period. After the posterior-loop rectopexy, in turn, a statistically significant increase in constipation symptoms was found. Thus, Wells operation (13) impairs the motor function of the colon compared to that after rectosacropexy.

(27) proposed a new method of making a "ligament" from an aponeurotic flap of the oblique abdominal muscles for fixing the lowered pelvic organs. The incision is made in the direction of the fibers of the aponeurosis of the oblique muscles of the abdomen, the edges made of the graft flap are sutured to each other around a polyethylene tube 4-5 mm in diameter. Due to this, a strong, 2-layer aponeurotic flap is obtained, much stronger and half the width of a pelvic flap.

Among the surgical methods of treating the prolapse of the pelvic organs, the operation of fixing them to the aponeurosis of the anterior abdominal wall has relatively better results (27,29). According to (29), the principle of surgery using TVM technology (transvaginal mesh conduction) is to form a new artificial pelvic fascia (neofascia) instead of the destroyed old one, which makes it possible to create a reliable frame for the bladder, vagina and rectum. This type of operation is used when it is necessary to create neofascia instead of destroyed ones (pubic-cervical and rectal-vaginal). At the same time, the existing fascial defect is eliminated and reliable fixation of the fascia to the pelvic walls is restored, which prevents pathological protrusion of the vaginal walls with an increase in intra-abdominal pressure. The absence of tension in the vaginal wall when using a polypropylene

mesh (Ethicon) minimizes the risk of developing its degenerative disorders (29, 38). Accordingly, the number of postoperative pyoinflammatory processes, erosions, vaginal stenoses, as well as the risk of postoperative mesh rejection are reduced. The indication for the installation of a mesh implant for complete reconstruction of the pelvic floor is the prolapse of the anterior and posterior walls of the vagina, complete prolapse of the uterus and vaginal walls (29, 33, 38). Contraindications to the installation of mesh implants are purulent-inflammatory diseases of the pelvic organs, severe physical conditions and anemia.

Rectal prolapse causes severe suffering for patients and is an important problem in coloproctology. The protrusion of the rectum through the anus significantly reduces the quality of life of patients, and the accompanying difficulties in emptying the intestine and weakness of the anus pulp lead to pronounced social maladjustment (20, 21, 36). Violation of the innervation of the rectum can serve as one of the prerequisites for increased constipation in the postoperative period.

In Azerbaijan, given the large number of children in families, the recent increase in the number of births at home, when there can be no talk of restoring the integrity of the pelvic floor, a sharp decrease in quality of life of population, hard work of women, unfavorable environmental factors and others, the problem of lowering and prolapse of internal genital organs remains one of the acute ones (27). One of the well-known Russian gynecologists, Professor R. Guseynov (27), wrote about the urgency of this problem for medicine in 1939 in his Ph.D. thesis "Treatment and long-term results in prolapse and prolapse of the uterus and vagina". In the etiology of genital prolapse, the primary role belongs to the pelvic floor muscles insufficiency (PFMI), which can be a congenital or acquired condition as a result of burdened childbirth, factors that contribute to an increase in intra-abdominal pressure (20, 29, 30). Lowering and prolapse of internal genital organs (IGO) is a polyetiological complex disease since not only physical, but also genetic, constitutional, endocrine, and psychological factors play an important role in its development (2, 21, 37). When describing the pathophysiology of pelvic floor muscles insufficiency (PFMI), the main reason is the insufficiency of a key element of the pelvic floor support apparatus - the levator ani muscle (m. Levator ani). As a result of age-related changes, atrophy of the nerve endings develops, followed by denervation and muscle atrophy.

With lowering and prolapse of IGO, the sexual function of women also suffers significantly. The operations performed today for genital prolapse do not always lead to the restoration of the full sexual

activity of patients. (31) studying the effect of anterior colporrhaphy with levatoroplasty on the sex life of patients, found that after this operation, 14% of women did not experience any improvement, and in 20%, sexual function worsened. The concept of surgical treatment of genital prolapse includes the correction of anatomical and topographic defect, restoration of fertility, which is especially important for young women.

To date, a huge number of operations have been proposed, which are carried out by vaginal, abdominal and combined approaches. However, the problem of surgical treatment of prolapse cannot be considered solved. Since despite the variety and multiplicity of the proposed operations, relapses are quite often observed after surgical correction (1, 21, 33)

Genital prolapse is a complex, polyetiologic disease, in which development a physical, genetic and psychological factors play an important role. Of the reasons that affect the condition of the pelvic floor and the ligamentous apparatus of the uterus, the following can be especially highlighted: age, heredity, childbirth, birth trauma, hard physical work and increased intra-abdominal pressure, scars after inflammatory diseases and surgical interventions, psychosomatic effects on smooth muscles and vascular structures in the pelvic region, changes in the production of sex steroids that affect the response of smooth muscles, leading to sclerosis and atrophy of muscle fibers, the development of coarse-fibrous connective tissue and the inability of striated muscles to ensure the integrity of the pelvic floor (27, 29). Due to the close anatomical connections that exist between the internal genital organs, the bladder and the rectum, lowering and prolapse of the internal genitals is almost always accompanied by a violation of the location and functions of these adjacent organs. Dysfunctions of the urinary system are found in 43% of patients, that is, in almost half of patients with genital prolapse, and rectal dysfunction - in 55% of patients with prolapse (3, 28).

Thus, due to the topographic and anatomical proximity, common innervation and blood circulation, as well as supporting structures, lowering and prolapse of the internal genitals almost always occur with dysfunction of the pelvic organs. Therefore, treatment methods should pursue the goal of not only anatomical correction of the identified changes in individual organs, but also the elimination of functional disorders of the pelvic organs as a whole. To date, about 500 different types of operations and their modifications have been proposed for the treatment of genital prolapse. However, the problem of surgical treatment of lowering and prolapse of the internal genital organs is still cannot be

considered solved. Since, despite the large number of described operations after surgical correction, relapses of the disease are quite often observed, the frequency of which, according to different authors, ranges from 1.6% to 40%.

Various authors, who retrospectively studied the long-term results of surgical treatment of lowering and prolapse of the internal genital organs, found that after anterior and posterior colporrhaphy, relapses are observed in 33.3%, and after anterior colporrhaphy using the Marlex loop - in 26% of cases; after vaginal hysterectomy with fixation of the sacrospinal ligament - only 8%; colposacropexy with posterior colporrhaphy gives 1.1%, colposacropexy without colporrhaphy - 7.9%; Manchester surgery - 16%, Dartig-Webster surgery - 12.2%, McCall culdoplasty - 5% of cases of recurrence of lowering and prolapse of the uterus and vaginal walls (3, 13, 27, 29). The final decision can be influenced by numerous factors: the nature of prolapse, features of etiology and pathogenesis, the degree of involvement of adjacent organs, their condition, age and profession of the patient, general health, the presence and type of concomitant pathology, combination with other gynecological diseases, menstrual condition, generative and reproductive functions, combination with other surgical diseases, the need for several simultaneous surgical interventions, the degree of operational risk, the preparedness of the surgeon and others. Relapses after operations fixing the uterus to the anterior abdominal wall range from 6.7 to 33.3% (3, 7, 27, 29).

(7), giving a high assessment of the Manchester operation, considers it possible to use it in women under 40 and in old age, and not only with incomplete prolapse of the uterus, but also with complete prolapse. The author considers this operation highly effective, since it is designed to strengthen the ligamentous apparatus and the muscles of the pelvic floor. In addition, when it is performed, the altered cervix is amputated. When talking about the effectiveness of the Manchester operation, one should not overlook the recurrence of prolapse after this operation (3, 27, 29).

Zakharov E.I. (11) performed ventrofixation of the uterus to the anterior abdominal wall using a nylon mesh covering the uterus in the form of a stocking. Tkachenko D.F. (24) used the method of fixation of the uterus and vagina to the anterior-superior spines of the iliac bones by means of an alloplastic graft made of lavsan. Synthetic meshes were also used to fix the vaginal stump to the promontorium in the treatment of uterine prolapse. Using alloplastic materials (nylon, aivalon, lavsan, teflon) to replace a tissue defect and strengthen the anterior abdominal wall in the treatment of hernias, a number of authors have obtained stable positive

results (24). In the last decade, the operation of sacral colpopexy with synthetic grafts, carried out with an abdominal approach with a high efficiency (80% -99%), has become widespread (13). But when performing these operations, serious complications are noted, such as injury to large vessels with significant bleeding, osteoarticular inflammatory processes, damage to the sciatic nerve, rectum, bladder, cases of intestinal obstruction are described. There are also cases of graft rejection or removal due to infection; in a large percentage of cases, urinary incontinence is not eliminated, recurrences of cystocele and rectocele are frequent (25). Despite all this, the technique of sacral colpopexy is likely to be used in the future, mainly in cases of prolapse of the vaginal stump or cervix after hysterectomy or recurrence of vaginal prolapse after vaginal extirpation of the uterus.

The Neugebauer-Lefort operation is the most widespread and used to this day, which consists in stitching the wound edges of the anterior and posterior walls of the vagina together after excision of their mucous membranes (27,29). The disadvantages of these operations, as many gynecologists emphasize, are the following points: the lack of the possibility of sexual activity, subsequent examination of the cervix or any other manipulations, as well as a significant number of relapses in the presence of secondary healing. It can also not be used if functional urinary incontinence is present at the same time. This operation can be performed only in old age, with complete prolapse of the uterus (25, 27, 29, 31).

With the improvement of laparoscopic technique, sacral fixation of the vaginal vault began to be performed with a good result in 90% of cases. After such an operation, a functioning vagina with minimal dyspareunia is preserved, the Douglas space is obliterated, which allows avoiding enterocele in the future. The disadvantages of these operations are technical difficulties, the possibility of injury to large vessels, sciatic nerve, rectum; cases of transplant rejection and its infection have also been described. According to (27) according to the World Health Organization, approximately 10.0% of women have prolapse of the uterus. Among the surgical methods of treatment of prolapse of the uterus, the shortening of the round ligaments and their fixation to the posterior surface of the uterus are relatively better results. Meanwhile, after these operations, the recurrence of the disease ranges from 5 to 12% (27).

In view of the above, a new "two-storey" ventrosuspension of the uterus has been proposed. The round ligaments of the uterus are mobilized with holders 2 cm away from the inguinal canals and cut off (13, 27, 29, 40). The proximal part of the round

ligaments of the uterus is excreted through the aponeurotic - muscular-peritoneal layer 4-5 cm above the symphysis. The distal part is fixed to the cervix. Thus, the "first floor" of the operation is performed. The proximal parts of the round ligaments of the uterus are fixed to each other and to the aponeurosis, which is the "second floor" of this operation.

During 2001-2004 3 similar operations were performed without any significant postoperative complications. The new method of ventrosuspension of the prolapsed uterus to the anterior abdominal wall is not technically difficult and can be recommended for use in practical surgery (3, 13, 27, 31). In posthysterectomy vaginal prolapse, especially recurrent, it is advisable to perform plastic surgery using synthetic grafts, as these patients have weakness of connective tissues and the ligamentous apparatus is hardly to differentiate. If laparotomy is indicated for any other reason, the best intervention is to fix the vagina to the sacrum. In other cases, vaginal access is indicated. We recommend giving preference to sacrospinal fixation on both sides using a synthetic mesh. In this case, the operation can be performed for any length of the vagina and maintains its physiological position. When fixing the prolapsed organs of the small pelvis to the sacrum using a synthetic mesh in order to increase reliability, as well as to prevent and stop bleeding that has arisen, it is recommended to use a metal plate with spikes (39).

The disadvantage of operations associated with shortening the round ligaments and fixing the uterus to the anterior abdominal wall or pelvic walls is that they do not eliminate the causes of prolapse of the genitals and are unreliable, fundamentally incorrect and logically unjustified. Operations fixing the uterus are not widely used today, since they are non-physiological due to the unnatural position of the vaginal axis, and the uterus, fixed to the anterior abdominal wall, turns into an immobile organ. The disadvantages of operations aimed at strengthening the supporting apparatus - the pelvic floor, as many researchers emphasize, are: the lack of the possibility of sexual activity, subsequent examination of the cervix or any other manipulations, as well as a significant number of relapses in the presence of secondary healing, the presence of urinary incontinence (3, 7, 13, 29, 39).

Thus, in the domestic and foreign literature, the issues of surgical treatment of these diseases using traditional methods of surgery and a detailed description of the technique of various interventions of vaginal or abdominal approaches are widely covered (7). It is assumed that ethnicity is a significant risk factor for prolapse of pelvic organs (PPO); however, the origin of the pelvic organs in different ethnic groups, especially in Asian populations,

is not well understood. The aim of this study was to compare the stages of prolapse, descent of the pelvic organ, and hiatal dimensions between East Asian and Caucasian women with PPO symptoms.

According to (36), the pelvic prolapse is the prolapse of the pelvic organs in isolation or in combination with the prolapse of the perineum. It is one of the leading health problems affecting women of all ages. The prolapse of the perineum is the cause of difficult defecation and incontinence of intestinal contents (27, 29, 39). The development of pelvic prolapse depends on many factors, the main of which are childbirth, age, and an increase in body mass index (3). These factors lead to an increase in intra-abdominal pressure, and later to dysfunction of the complex of muscles that levitate the anus and pelvic ligaments and, as a result, to prolapse of the perineum (30). Obstructive defecation and intestinal incontinence are the main manifestations of the syndrome of prolapse of the perineum (21). Despite the fact that the syndrome of prolapse of the perineum was described several decades ago, it is still not always diagnosed and difficult to treat (29, 40).

Sacrocolporectopexy has been widely used in recent years for the surgical treatment of prolapse of the pelvic organs in recent years (3, 31). However, there are no data on its effectiveness in correcting perineal prolapse in the literature. In research (39) substantiated the advantages of surgical treatment of PPO in women using abdominal sacrocolporectopexy in terms of improving anatomical and functional results, compared with perineoplasty with the patient's own tissues. However, studies have shown that this technique does not allow correcting the prolapse of the rectal mucosa, which is present in 52% of patients with prolapse of the perineum. In this category of patients, additional excision of the excess rectal mucosa is necessary. In the course of work, the possibility of simultaneous execution of abdominal sacrocolporectopexy and transanal excision of the rectal mucosa using stapling technologies (STARR) was shown.

(18) in her dissertation work analyzed the effectiveness of various methods of surgical treatment of perineal prolapse syndrome in a comparative aspect in the postoperative period and in the long-term period of 3 years. The work proved that with the existing prolapse of the rectal mucosa, its additional excision by transanal access is necessary. Normal defecation is a complex process involving voluntary and involuntary processes in four different phases: the basal phase, the pre-defecatory phase that induces the urge to defecate, the expulsive phase, and stopping defecation (18). In PPO syndrome, there is a "vicious circle" of straining and defecation, which leads to even greater tension and

progression of anatomical abnormalities. Chronic repetitive straining leads to a gradual descent of the perineum and displacement of the anterior rectal wall into the anal canal and caudally outward, which leads to a feeling of inadequate emptying, this, in turn, leads to increased straining, and later to prolapse of the rectal mucosa, which entails the release of mucus, blood, maceration of the perianal region (13, 18, 29).

The pelvic floor (PF) is formed by muscles, fascia and ligaments, interconnected with each other and the bones of the pelvis, forming a single anatomical space. It includes the levator muscles, the coccygeal muscles covered with fascia, the perineal membrane, the superficial and deep perineal muscles, and the perineal body. In the literature (1, 18, 39), three types of fascia are described: visceral, parietal and endopelvic, which forms tendon arches on the lateral walls of the pelvis. The muscles that lift the anus include the iliococcygeal, pubo-rectal, pubo-coccygeal muscles, further subdivided into pubo-perineal, pubovaginal, pubic-anal type I striated muscles. The perineal membrane is a triangular-shaped fibromuscular structure that attaches anteriorly to the pubic bones. The deep and superficial transverse muscles of the perineum perform a supporting function, m. bulbospongiosus and m. ischiocavernosus - sexual function. Arcus tendinous levator ani and arcus tendinous pelvic fascia attach the muscles to the pelvic walls.

Considering the etiology and pathogenesis of pelvic prolapse, it is necessary to dwell on the integral, muscular-elastic, theory of the function and dysfunction of the pelvic floor, developed by the Australian researcher Peter P. Petros. According to this theory, PPO and its symptoms, stress urinary incontinence, constipation, some forms of bowel incontinence and pelvic pain are due to weakness of the ligaments that support the vagina as a result of damage to the connective tissue. The main etiological factor is childbirth, leading to a weakening of connective tissue, which is aggravated with age.

The vagina in the pelvic cavity is located like a suspension bridge that hangs on ligaments, and is supported by muscles from below. Since the vaginal ligaments are simultaneously supporting structures for the bladder and rectum, their damage affects the location of the latter. 18-25% of women with prolapse of the perineum have obstructive defecation (OD) and 32% of women with OD have PPO. In this case, the patients complain of the need for constant strong straining during bowel movements, a feeling of obstruction in the rectum during bowel movements, a feeling of incomplete emptying of the rectum during bowel movements. Complaints of mucous discharge, bleeding, perineal irritation, chronic anal pain and itching of the perineum are

also not uncommon due to prolapse of the anterior rectal wall. Up to 30% of women with PPO suffer from intestinal incontinence (II). II factors are similar to those leading to PPO. These are childbirth, aging of the body, an increase in body mass index, hysterectomy, frequent straining, dysfunction of connective tissue.

In 21% of women with PPO, prolapse of the genitals is noted, they also have a correlation between the degree of prolapse and II. With rectal prolapse, II is observed in 50% of patients. 38% of women with II have PPO. To exclude pathology from the rectum and colon, endoscopic research methods are also carried out: sigmoidoscopy, colonoscopy. Straining sigmoidoscopy according to the method proposed by A. Parks allows diagnosing prolapse of the rectal mucosa. Despite its importance, physical examination does not provide all the necessary information about PF defects (3).

To diagnose various dysfunctions in PPO, additional research methods are used: - ultrasound examination; - X-ray examination (cystourethrography at rest and during emptying, defecography, as well as a combination of these methods - cystourethrodefecography); - magnetic resonance imaging (MRI) of the pelvic bottom; - functional tests: anorectal manometry, studies of the terminal motor activity of the pudendal nerve, electromanometry. The most common way to visualize PF is ultrasound. There are various techniques: transverse or introital, transvaginal, transrectal (3, 12, 9). With the

help of perineal and transvaginal ultrasound, it is possible to diagnose various defects of the levator ani muscles, including their ruptures, impaired contractility, an increase in the angle between them as a result of divergence, hypermobility of the urethra, its shape, and prolapse of the bladder neck. An intravaginal scan measures the anorectal angle and the angle between the levator muscles (9, 12) Transrectal ultrasound is the gold standard for anal sphincter imaging.

Studies have shown the benefits of abdominal sacrocolporectopexy in the surgical treatment of perineal prolapse in women. The high efficiency of this technique for correcting the level of the perineum and rectocele is shown. Based on the studies carried out during the work, it was shown that as a result of abdominal sacrocolporectopexy, there is no correction of the prolapse of the rectal mucosa (3, 9, 27, 29, 31, 39). The general assessment of the given literature data suggests the existence of a number of difficulties and unsolved problems in the surgical rehabilitation of women with diseases of the perineum of non-neoplastic etiology (9, 15, 16, 40).

Thus, to date, no effective method has been developed for the surgical correction of perineal prolapse and rectocele with rectal mucosal prolapse associated with it, and there are no guidelines for the treatment of these disorders. There is no unified view of the methods of postoperative management of patients with the aim of their medical rehabilitation.

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МАСТЕР-КЛАСС

«ИМПЛАНТАЦИЯ БЕЗЭЛЕКТРОДНОЙ СИСТЕМЫ ДЛЯ ЭЛЕКТРОКАРДИОСТИМУЛЯЦИИ MICRA VR»

07.09.2020 в отделении интервенционной кардиологии и аритмологии ННЦХ имени А.Н. Сызганова прошел очередной мастер-класс: «Имплантация безэлектродной системы для электрокардиостимуляции Micra VR». Мастер-класс проводил Баимбетов Адиль Кудайбергенович, заведующий отделением рентгенохирургии, интервенционной кардиологии и аритмологии.

Данная инновационная технология была разработана и внедрена в клиническую практику в последние годы. Суть и новшество этой технологии заключается в том, что внутрь сердца имплантируется (вживляется) миниатюрный электрокардиостимулятор размером 2,5x0,5 см, абсолютно без электродов. Преимущество этого стимулятора, что он без длинных электродов.

Данная технология показана пациентам, которые нуждаются в стимуляторах, но отсутствуют сосудистые доступы для проведения электродов, а также, когда есть другие причины, из-за которых невозможно имплантировать стандартный кардиостимулятор с электродами.

Операция прошла успешно. Миниатюрный электрокардиостимулятор имплантирован в правый желудочек 59-летней

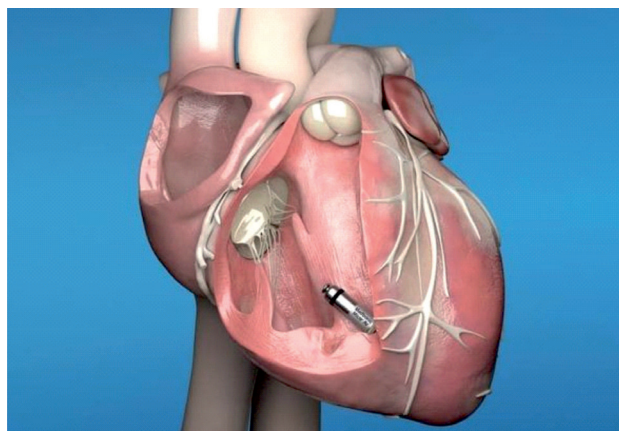
пациентки. У нее диагностировано сложное заболевание сердца, несколько раз прооперирована по этому поводу и выявлены проблемы с сосудистыми доступами для имплантации ЭКС. В нашей клинике это вторая операция по имплантации Micra VR. В Казахстане в данный момент были имплантированы в общей сложности 8 таких дорогостоящих аппаратов.

На операции присутствовали и помогала техническая поддержка компании «Медтроник».

Причина проведения мастер-класса: внедрение в клиническую практику новой инновационной технологии - имплантации безэлектродной системы кардиостимулятора!

Польза в первую очередь, пациенту имплантируется безэлектродный кардиостимулятор, при невозможности имплантации электрокардиостимулятора стандартным способом. И еще отсутствуют электроды что минимизируется риски и осложнения связанные с электродами.

Присутствовали около 10 врачей аритмологов и кардиологов алматинских клиник и центров!



АМАНБАЕВ АҚСҰЛТАН АМАНБАЙҰЛЫНЫҢ 80-ЖЫЛДЫҚ МЕРЕЙТОЙЫНА

Аманбаев Ақсұлтан Аманбайұлы қазіргі Отырар ауданы, Шәуілдір елді мекенінде қарапайым қазақтың отбасында дүниеге келген.

Мақтаарал ауданында орыс орта мектебін алтын медальмен бітіріп, Алматыдағы медицина институтының емдеу факультетіне оқуға емтихансыз қабылданды. 1962 жылы институтты үздік бітіргеннен кейін Түркістан, Түлкібас аудандарында дәрігер-хирург болып жұмыс істеді. Аудандық ауруханаларда 8 жыл хирург қызметін атқарып, мол тәжірибе жинақтады, сөйтіп өмірдің үлкен мектебінен өтті. Осы кездерде Мәскеу, Киев, Алматы қалаларының жетекші клиникаларында тағылымдамадан өтіп, білімін жетілдірді, білгір оташылардың тәжірибелерінен үйренді, нәтижесінде хирургияның қыр-сырын терең меңгере түсті.

1969-1974 жылдары Қазақ клиникалық және экспериментальды хирургиялық ғылыми-зерттеу институтының (қазіргі А.Н.Сызғанов атындағы Ұлттық ғылыми хирургиялық орталық) кардиохирургия бөлімінің клиникалық ординатурасы мен аспирантурасында ғылым негіздерін игереді.

Аспирантураны бітірген соң, өзі оқу бітірген ғылыми орталықта 15 жыл үзбестен кардиохирург, аға ғылыми қызметкер болып еңбек етті. Көп жылдар бойы жинақталған бай тәжірибе негізіндегі 50-ден астам ғылыми-зерттеу еңбектері еліміздің жүрек ауруына шалдыққан тұрғындарына мезгілінде ота жасалып, дендерін сауықтыруға үлкен көмегін тигізді.

Ақсұлтан Аманбайұлы 1984 жылы Үкімет құрамындағы жоғары лауазымды мемлекеттік қызметке шақырылды. Сол кездегі Қазақ КСР Министрлер Кеңесінің төрағасы Н.Ә. Назарбаевтың келісімімен, Министрлер Кеңесінің қаулысымен үкімет аппаратының оқу-ағарту және денсаулық сақтау бөлімі бастығының орынбасары қызметіне тағайындалды.

1987-1990 жылдары Қазақ КСР Министрлер Кеңесінің қаулысымен Денсаулық сақтау министрінің орынбасары және 4-ші Бас басқармасының бастығы, Қазақ КСР Министрлер Кеңесінің Емдеу-сауықтыру бірлестігінің бастығы қызметтерін атқарды.



1990 жылы Қазақ КСР Денсаулық сақтау министрі болып қызмет атқарды.

(1991-1992) Президент Жарлығымен Денсаулық сақтау министрі болып екінші рет тағайындалған қызметінде де абыройлы еңбек өнегесін көрсетті.

Ол Қазақстанның денсаулық сақтау саласын басқарған жылдары елімізде көптеген нысан іске қосылды: перинаталдық орталықтар (Алматы, Қостанай, Көкшетау қалаларында), диагностикалық орталық (Қарағанды, Семей, Жамбыл, Шымкент, Алматы қалаларында), республикалық 1000 төсектік клиникалық аурухана (қазіргі Алматыдағы №7 қалалық аурухана), Республикалық урология ғылыми-зерттеу институты, Республикалық халықтық емдеу орталығы, Радиациялық медицина мен экология институты, Республикалық ана мен бала денсаулығын қорғайтын ғылыми-

зерттеу орталығы, Алматы медицина институтында жоғары білімді медбикелерді дайындайтын факультет, Алматы медицина институты филиалының базасында Фармацевтика институты, Қ.А.Яссауи атындағы Түркістан университетінде медицина факультеті, облыстарда медучилишелер ашылды.

«Парасат», «Құрмет» ордендерімен, «Қазақстан Республикасының Тәуелсіздігіне – 20 жыл», «Қазақстан Республикасының Тәуелсіздігіне – 25 жыл» мерекелік медальдарымен, Қазақ КСР Жоғарғы Кеңесі Президиумының, Қазақ КСР Министрлер Кеңесінің Алғыс хатымен, «Кеңес Одағы денсаулық сақтау ісінің үздігі», «Қазақстан Республикасы денсаулық сақтау ісінің үздігі», «Қазақстан Республикасы денсаулық сақтау саласына қосқан үлесі үшін» төсбелгілерімен марапатталды. Ардагер ағамызға «Оңтүстік Қазақстан облысының құрметті азаматы», «Отырар ауданының құрметті азаматы» атақтары берілген. 2013 жылы С.Ж.Асфендияров атындағы Қазақ ұлттық медицина университетінің «Даңқ галереясына» кіргізілді. А.Н.Сызғанов атындағы Ұлттық ғылыми хирургия орталығының Алтын медальмен марапатталды (2014 жылы), хирургияға сіңірген еңбегі үшін «Құрметті профессор» атағы берілді (2015 жылы).



А.Н. Сызғанов атындағы ҰҒХО-ның ұжымы, «Қазақстан хирургиясы хабаршысы» журналының редакторлар алқасы Аманбаевты А.А. мерейтойымен құттықтап, зор денсаулық, бақыт және творчестволық табыс тілейді

К 60-ЛЕТИЮ СО ДНЯ РОЖДЕНИЯ КОНЫСОВА МАРАТА НУРЫШЕВИЧА

Коньсов Марат Нурышевич родился 8 сентября 1960 года в п. Кулагино Индерского района Гурьевской (ныне Атырауской) области Республики Казахстан в семье служащих. После окончания средней школы Марат Нурышевич в 1977 году поступил на первый курс лечебного факультета Актюбинского Государственного медицинского института (ныне Западно-Казахстанская медицинская академия им М.Оспанова). Во время учебы в институте начал свою первую трудовую деятельность санитаром, затем фельдшером на станции скорой медицинской помощи, а затем медбратом в отделении анестезиологии, реанимации и интенсивной терапии Актюбинской областной клинической больницы. Интерес к хирургии проявился в молодом человеке рано, начиная со 2



сле окончания клинической ординатуры в 1995 г Коньсов М.Н защитил кандидатскую диссертацию на тему «Пути улучшения результатов хирургического лечения дивертикулов пищевода».

С 1995-2000гг по возвращению на родину в Казахстан Коньсов М.Н возглавил хирургическую службу Атырауской областной больницы. За этот период в хирургическом отделении впервые в Атырауской области начали выполняться эндовидеохирургические операции (1994г), операции на пищеводе и желудке в тч при онкопатологии. Марат Нурышевич стоял у истоков развития таких направлений в хирургии как: пластика пищевода из желудка и толстой кишки при доброкачественных и злокачественных новообразованиях, обширные и ком-

бинированные резекции желудка и гастрэктомии при раке желудка, органосохраняющие операции на желудке (селективная проксимальная ваготомия изолированная и с дренирующими желудок операциями), операции на печени и поджелудочной железе, реконструктивные вмешательства на внепеченочных желчных протоках в тч при травмах и высоких стриктурах, операции на кишечнике. Одной из любимых операций у Марата Нурышевича остаются до сих пор операции на щитовидной железе в том числе с использованием ультразвукового скальпеля (сделано более 1тыс таких операций в различных разделах общей, сосудистой и лапароскопической хирургии). Интерес к сосудистой хирургии стал воплощаться после знакомства с известными казахстанскими сосудистыми хирургами: профессорами Джакуповым У.А и Султаналиевым Т.А. Под влиянием этих замечательных хирургов дальнейшую свою судьбу в хирургии Марат Нурышевич связал с сосудистой хирургией. В 2000г М.Н.Коньсов поступил в докторантуру в отдел хирургии магистральных сосудов Научного центра сердечно-сосудистой хирургии им А.Н.Бакулева (руководитель-заслуженный деятель науки РФ профессор А.А Спиридонов) и в 2004 г защитил докторскую диссертацию на тему «Хирургическое лечение хронических окклюзий брюшной аорты».

Вернувшись на родину после защиты докторской диссертации Марат Нурышевич продолжил работать заведующим плановым хирургическим отделением Атырауской областной больницы с профильными сосудистыми койками в ее составе. В ноябре 2007 г в связи с развитием в Казахстане Государственной программы развития кардиологии и кардиохирургии Марат Нурышевич был приглашен на должность главного врача и директора для открытия вновь создаваемой клиники и дальнейшего развития сердечно-сосудистой хирургии. Впервые под руководством Марата Нурышевича открыты одно из первых в регионе сосудистое и кардиохирургическое отделение.

После окончания в 1985 г интернатуры по хирургии Марат Нурышевич свою трудовую деятельность в качестве врача-хирурга начал в Балыкшинской центральной районной больнице Гурьевской области, (1985-1988гг), а затем в экстренно-хирургическом отделении Объединенной городской больницы скорой медицинской помощи в г Атырау (1988-1992гг). Экстренная хирургия органов грудной и брюшной полости круг интересов Марата Нурышевича сохраняются и до настоящего времени. Марат Нурышевич постоянно консультирует и оперирует тяжелых больных во всех хирургических стационарах Атырауской области являясь главным внештатным специалистом Управления здравоохранения и председателем Атырауского филиала Казахстанского общества хирургов.

В 1992 Марат Нурышевич поступил в клиническую ординатуру в отделение хирургии пищевода и желудка Российского научного центра хирургии РАМН (руководитель-академик РАН, профессор Черноусов АФ). Во время прохождения ординатуры в молодом человеке проявился интерес к научной работе. По-

Сосудистая хирургия и ангиология стали самостоятельными службами и были подготовлены специалисты в тч зарубежом. Впервые под руководством Марата Нурышевича открыта первая ангиографическая лаборатория (в настоящее время рентгенхирургическая лаборатория) которая дала возможность для развития рентгенэндоваскулярной хирургии и в тч в ангиологии и сосудистой хирургии.

Врач-хирург высшей категории. Общий и сердечно-сосудистый хирург. Организатор здравоохранения высшей категории. Отличник Здравоохранения Республики Казахстан, обладатель медали «Алтын Даригер» и нагрудного знака «За особые заслуги в профсоюзе работников здравоохранения РК. Делегат и участник съездов хирургов и сердечно-сосудистых хирургов России, Казахстана, Европейского общества сосудистых хирургов. Член «Казахстанского общества сосудистых хирургов (с 2011г), «Казахстанского общества эндоскопических хирургов» и входит в ряд российских ассоциаций и обществ: сердечно-сосудистых хирургов России (2003г), Российского общества ангиологов и сосудистых хирургов (с 2001г), член «Российского общества хирургов (с 2015г) За большой общественно-значимый вклад в прогресс, развитие и процветание Республики Казахстан удостоен диплома Президиума Совета Большой

Медицинской Энциклопедии «Лучшие люди» (2010) (памятная медаль). В 2015 году в номинации «Жыл адамы-2015» (Человек-Года) присужден диплом и статуэтка «Жыл- даригер» В 2016г награжден дипломом Казахстанского общества сосудистых хирургов «За вклад в развитие сосудистой хирургии Казахстана». В честь 25-летия Независимости Республики Казахстан награжден почетной медалью –«Тәуелсіздігіні 25 жылдығына тосбелгі», благодарственные письма акимов Атырауской области и города Атырау. Конысов М.Н – один из ведущих хирургов и организаторов здравоохранения Атырауской области, обладает большим практическим опытом в различных разделах общей, сердечно-сосудистой и эндоскопической хирургии. Под руководством Конысова М.Н положено начало развитию кардиохирургической, ангиохирургической, интервенционной кардио-ангиологической и рентгенхирургической службы, а также эндоскопической хирургии в Атырауской области. Конысов МН стоит у истоков развития в Атырауской области интервенционной аритмологической службы (2015г) и чрезкожной пункционной рентгенхирургии с 2015г. Конысов М.Н автор более 60 научных работ по различным разделам абдоминальной, торакальной, сосудистой, эндоскопической и рентгенэндоваскулярной хирургии.

Казахстанское общество сосудистых хирургов, редакционная коллегия журнала Вестник Хирургии Казахстана, медицинская общественность Казахстана, сердечно поздравляют Марат Нурышевича с юбилеем и желают крепкого здоровья, счастья и дальнейших творческих успехов.

К 60-ЛЕТИЮ СО ДНЯ РОЖДЕНИЯ САГАНДЫКОВА ИРЛАНА НИГМЕТЖАНОВИЧА

Сагандыков И.Н. родился 22 сентября 1960 года в с. Шариптогай Кокпектинского района Восточно-Казахстанской области Республики Казахстан в многодетной семье. После окончания средней школы, до призыва в Советскую Армию, работал в комсомольско-молодежной овцеводческой бригаде «Ушкын» фермы №3 совхоза «Чигилек» Кокпектинского района ВКО Казахской ССР.

После демобилизации из рядов Советской Армии в декабре 1980 г. принят слушателем подготовительного отделения Семипалатинского государственного медицинского института. В сентябре 1981 года поступил на 1 курс лечебного факультета этого же вуза. В 1987 году завершил учебу по специальности «Лечебное дело», затем в течении года проходил интернатуру по хирургии при Областной клинической больнице г. Семипалатинск.

С 1988 года врач – сосудистый хирург отделения сосудистой хирургии ОКБ г. Семипалатинск. Под руководством заведующего отделением Масалимова Е.О., а также при творческом содружестве с талантливым ангиохирургом профессором Джакуповым В.А.- ННЦХ им. А.Н.Сызганова г. Алматы, Ирлан Нигметжанович твердо освоил первые шаги этой сложной, красивой науки – ангиологии и сосудистой хирургии.

С 1992 г. - аспирант Научного центра хирургии Российской академии медицинских наук имени академика Б.В. Петровского г. Москвы. В 1995 году под руководством профессора, академика РАН Гавриленко А.В. он успешно защитил кандидатскую диссертацию по шифру 14.00.44 «сердечно-сосудистая хирургия» по теме «Влияние факторов риска на результаты операций в бедренно-подколенной зоне».

В январе 1994 года назначен заведующим отделения сосудистой хирургии ОКБ г. Семей. По совместительству работал ассистентом кафедры госпитальной хирургии Семипалатинского государственного медицинского института.

В 2009 году приглашен в г. Астана в АО «Республиканский научный центр неотложной медицинской помощи» старшим врачом-сосудистым хирургом, с 2010 года - заведующий отделения сосудистой хирургии АО «РНЦНМП».

В настоящее время - заведующий центра сосудистой хирургии Национального научного онкологического центра, куратор резидентуры по циклу «Ангиохирургия», преподаватель хирур-



гии Школы медицины Назарбаев Университета, Вице-президент Казахского общества сосудистых хирургов, член Российского общества ангиологов и сосудистых хирургов, Евро-Азиатской ассамблеи ангиологов и сосудистых хирургов. Врач-ангиохирург высшей квалификационной категории.

Проходил обучение и стажировку в России, Литве, Израиле, Южной Корее, Германии, США.

Сагандыков И.Н. вместе с молодой командой ангиохирургов и интервенционных рентгенхирургов под руководством профессора Т.А.Султаналиева в Клинике внедрили высокотехнологичные медицинские услуги – операции при двусторонних стено-окклюзионных пораже-

ниях сонных артерий, двусторонней патологической извитости внутренних сонных артерий, имплантации стент-графтов при аневризмах грудной и брюшной аорты, гибридные технологии. Он принимает активное участие в трансплантации органов, восстановлении магистрального кровотока травмированных сосудов при политравмах, а также поражения сосудов у онкологических больных, заболевания сосудов детского возраста. Свыше 10 лет регулярно вылетает по линии Республиканской санитарной авиации во все регионы Республики Казахстан, оказывает консультативную и хирургическую помощь в акушерской практике и родовспоможении. Высокая работоспособность, умение ориентироваться в сложной обстановке, профессионализм, человечность, коммуникабельность – вот основные черты характера Сагандыкова И.Н.

Участвовал в работе многих международных Конгрессов по сосудистой хирургии (Афины, Рим, Москва, Санкт-Петербург, Новосибирск, Саратов, Челябинск). Был организатором ряда конференций по сосудистой хирургии в Казахстане.

За добросовестный труд Сагандыков И.Н. был отмечен Почетной Грамотой Министра Здравоохранения РК; Знаком «ДЕНСАУЛЫҚ САҚТАУ ІСІНІҢ ҮЗДІГІ» (Отличник здравоохранения Республики Казахстан); Нагрудным знаком «ДЕНСАУЛЫҚ САҚТАУ ІСІНЕ ҚОСҚАН ҮЛЕСІ ҮШІН» (За вклад в развитие здравоохранения), медалью «25 лет вывода Советских войск из Афганистана»;

Он пользуется заслуженным авторитетом среди коллег, пациентов, персонала, студентов. Его жизнь – семья, любимая работа.

Казахстанское общество сосудистых хирургов, редакционная коллегия журнала Вестник Хирургии Казахстана, медицинская общественность Казахстана, сердечно поздравляют Ирлана Нигметжановича с юбилеем и желают крепкого здоровья, счастья и дальнейших творческих успехов.

ТРЕБОВАНИЯ ДЛЯ АВТОРОВ ЖУРНАЛА «ВЕСТНИК ХИРУРГИИ КАЗАХСТАНА»

Уважаемые авторы!

С 1 апреля 2018 года все статьи на публикацию принимаются на государственном или русском языках с обязательным переводом всей статьи на английский язык. Статьи без версии на английском языке будут отклонены.

Также учитывая требования Консультативной Комиссией (CSAB) Scopus об интернационализации авторов и аудиторией редколлегия журналов рекомендуют публиковать статьи в соавторстве с учеными дальнего и ближнего зарубежья.

В журнале публикуются научные статьи и заметки, экспресс-сообщения о результатах исследований в различных областях естественно-технических и общественных наук.

Решение о публикации принимается редакционной коллегией журнала после рецензирования, учитывая научную значимость и актуальность представленных материалов. Статьи, отклоненные редакционной коллегией, повторно не принимаются и не рассматриваются. Рукописи, оформленные не по правилам, возвращаются авторам без рассмотрения.

Рукопись направляется на отзыв члену редколлегии и одному из указанных рецензентов; в спорных случаях по усмотрению редколлегии привлекаются дополнительные рецензенты; на основании экспертных заключений редколлегия определяет дальнейшую судьбу рукописи: принятие к публикации в представленном виде, необходимость доработки или отклонение. В случае необходимости рукопись направляется авторам на доработку по замечаниям рецензентов и редакторов, после чего она повторно рецензируется, и редколлегия вновь решает вопрос о приемлемости рукописи для публикации. Переработанная рукопись должна быть возвращена в редакцию в течение месяца после получения авторами отзывов; в противном случае рукопись рассматривается как вновь поступившая. Рукопись, получившая недостаточно высокие оценки при рецензировании, отклоняется как не соответствующая уровню или профилю публикаций журнала.

Авторы несут ответственность за достоверность и значимость научных результатов и актуальность научного содержания работ. Не допускается **ПЛАГИАТ** – умышленно совершаемое физическим лицом незаконное использование чужого творческого труда, с доведением до других лиц ложных сведений о себе как о действительном авторе.

Редакция принимает на рассмотрение рукописи только на английском языке, присланные через официальный сайт журнала www.vhk.kz.

Материал статьи – абстракт на казахском, русском и английском языках, список литературы, рисунки, подписи к рисункам и таблицы, оформляется одним файлом; дополнительно каждый рисунок оформляется в виде отдельного файла. Если пересылаемый материал велик по объему, следует использовать программы для архивирования. Все страницы рукописи, в том числе таблицы, список литературы, рисунки и подписи к ним, следует пронумеровать.

Представленные для опубликования материалы должны удовлетворять следующим требованиям:

1. Содержать результаты оригинальных научных исследований по актуальным проблемам в области физики, математики, механики, информатики, биологии, медицины, геологии, химии, экологии, общественных и гуманитарных наук, ранее не опубликованные и не предназначенные к публикации в других изданиях. Статья сопровождается разрешением на опубликование от учреждения, в котором выполнено исследование.
2. Размер статьи 7-10 страниц (статьи обзорного характера – 15-20 стр.), включая аннотацию в начале статьи перед основным текстом, которая должна отражать цель работы, метод или методологию проведения работы, результаты работы, область применения результатов, выводы (**аннотация** не менее **20** предложений (150×300 слов) - (на английском языке) через 1 компьютерный интервал), таблицы, рисунки, список литературы (через 1 компьютерный интервал, размер шрифта – 14), напечатанных в редакторе Word, шрифтом Times New Roman, поля – верхнее и нижнее – 2 см, левое – 3 см, правое – 1,5 см. Количество рисунков – 5-10.

Структура должна соответствовать международной формуле IMRAD, где I – introduction (вступление), M – Methods (методы), R – Results (исследование), A – и, D – conclusion+ discussion (заключение, обсуждение результатов и выводы).

Название • Отображает суть работы • Краткое • Без аббревиатур.

Необходимо официально закрепить название организации на английском и сокращение

Резюме • Структурировано • Без аббревиатур • Передает структуру статьи – Зачем (актуальность) – Какими методами? – Что получено – Как это изменило картину знаний. Именно его читают в первую очередь, только хорошее резюме может привлечь внимание!

Вступление • Актуальность работы • Какая задача поставлена • Почему

Методы • Перечисление • Если известные - дать ссылку • Если модифицировали – указать как • Описывать так что бы могли повторить • Статистика!

Результаты • Допускается не хронологическое, а логическое повествование • Основные, а не все что были сделаны •

Иллюстрируются минимально необходимыми сводными данными (исходные могут быть в дополнительных материалах)

Обсуждения • Не повторять результаты • Сопоставить полученные данные с имеющимися • Обсудить возможные причины и следствия

Функции списка литературы: • Аргументировать идею • Сопоставить с существующими аналогами • Обозначить место данного исследования • Избежать плагиата • Для журнала и ученого = признание • Часто указаны только собственные работы или очень старые (самоцитирование допускается только 10-15% от общего списка литературы) • Кочующие ошибки

Различайте • Ссылки • Список литературы • Библиография
Что могут цитировать • Книги, (монографии, главы) • Статьи научных журналов • Материалы конференций • Патенты • Диссертации • Неопубликованные данные • СМИ • Веб ресурсы (протоколы, веб странички) Источник должен быть надежным и легко доступным.

Статья начинается на английском языке. В начале, посередине страницы, идет название статьи прописными жирными буквами, название статьи должно быть коротким и емким, согласно проведенного анализа около 30-40 символов на английском языке.

Далее на следующей строчке – инициалы и фамилии авторов обычным жирным шрифтом, затем на следующей строчке – название организации(ий), в которой выполнена работа, город, страна, затем на новой строчке – адреса E-mail авторов. С красной строки идут ключевые слова (**Key words**), а на новой строчке – сама аннотация (**Abstract** – не менее **150** и более **300 слов**).

Далее, после отбивки одной строки, начинается на русском языке. В начале статьи вверху слева следует указать индекс **УДК, МРНТИ**.

Затем, посередине страницы, пишется: 1) название статьи; 2) авторы; 3) название организации; с красной строки – **Ключевые слова**, затем – **Аннотация** (оформление шрифтов, как на английском языке).

Отбиваем одну строку и начинается сама **статья**. Следом за статьей идет список **Литературы**. Ссылки на литературные источники даются цифрами в прямых скобках по мере упоминания (не менее 20).

Для каждой статьи обязателен DOI (Digital Object Identifier) - это цифровой идентификатор документа. DOI выполняет функцию гиперссылки, которая всегда помогает найти нужный документ, даже если сайт, где он находился ранее, был впоследствии изменен. Благодаря этому индексу поиск научной информации в Интернете стал проще и эффективнее. Каждое издание, журнал размещает на своих веб-страницах в интернете, как текущие, так и архивные номера, и материалы. Таким образом, в открытом доступе можно увидеть резюме, которые включают в себя название статьи, фамилию, имя, отчество автора, аннотацию и ключевые слова, место выполнения работы, а также выходные данные опубликованных статей (название журнала, год издания, том, номер, страница).

Список литературы оформляется следующим образом:
В ссылках на книги указывается ISBN (10- или 13-значный). Сокращаются названия только тех журналов, которые указаны: http://images.webofknowledge.com/WOK46/help/WOS/0-9_abrvjt.html.

Для всех ссылок на статьи, опубликованные в международных рецензируемых журналах следует указывать DOI (Digital Object Identifier). DOI указываются в PDF версии статьи и/или на основной интернет-странице статьи, также можно воспользоваться системой поиска CrossRef: <http://www.crossref.org/guestquery/>. Ниже приводятся примеры оформления ссылок:

Статья в международном журнале:

1. Campry TS, Anders T. (1987) SNAP receptors implicated in vesicle targeting and fusion, *Environ Pollut*, 43:195-207. DOI: 10.1016/0269-7491(87)90156-4 (in Eng)

Статья в русскоязычном журнале, не имеющая англоязычной версии:

2. Ivanova TV, Samoilova NF (2009) *Electrochemical Energetics [Elektrohimicheskaya energetika]* 9:188-189. (In Russian)

Книги:

Timrat TA (2008) *Soil pollution: origins, monitoring and remediation*, second edition. Springer, Germany. ISBN: 978-3-540-70777-6

Материалы конференции:

Monin S.A. (2012) Treatment techniques of oil-contaminated soil and water aquifers. *Proceedings of International Conference on Water Resources and Arid Environment*, Riyadh, Saudi Arabia. P.123.

Патенты:

Barin AB, Mukamedzhan NT (2000) A method for determination of 1,1-dimethylhydrazine and nitrosodimethylamine [Metodopredeleniya 1,1-dimetilgidrazina initrosodimetilamina]. Preliminary Patent of the Republic of Kazakhstan [Predvaritelnyi patent Respubliki Kazakhstan]. (In Russian)

Стандарты, ГОСТы:

RMG 61-2003. Indexes of accuracy, precision, validity of the methods of quantitative chemical analysis, methods of evaluation [GSI.Pokazatelitochnosti, pravilnosti, retsizionnosti metodik kolichestvennogo himicheskogo analiza. Metodyotsenki]. Moscow, Russia, 2003. (In Russian)

На сайте <http://www.translit.ru/> можно бесплатно воспользоваться программой транслитерации Русского текста в латиницу, используя различные системы. Программа очень простая, ее легко использовать для готовых ссылок. К примеру, выбрав вариант системы Библиотеки Конгресса США (LC), мы получаем изображение всех буквенных соответствий. Вставляем в специальное поле весь текст библиографии на русском языке и нажимаем кнопку «в транслит».

В конце статьи дается резюме на казахском языке. Оформляется аналогично русскому варианту. Посередине страницы пишется: 1) название статьи; 2) авторы; 3) название организации; с красной строки – **Өзекті сөздер**, после – **Аннотация**.

Последняя страница подписывается всеми авторами, ставится дата.

3. Статьи публикуются только на английском языке.

4. В случае переработки статьи по просьбе редакционной коллегии журнала датой поступления считается дата получения редакцией окончательного варианта. Если статья отклонена, редакция сохраняет за собой право не вести дискуссию по мотивам отклонения.