ISSN 2306-5559 (print)
ISSN 2410-938X (online)

www.vhk.kz

№ 4 (69) 2021

ҚАЗАҚСТАН ХИРУРГИЯСЫНЫҢ ХАБАРШЫСЫ

ВЕСТНИК ХИРУРГИИ КАЗАХСТАНА

BULLETIN OF SURGERY IN KAZAKHSTAN

АЛМАТЫ /ALMATY

№ 4 (69) 2021
Издается с 2005 г.
ISSN 2306-5559 (print)
ISSN 2410-938X (online)

ҚАЗАҚСТАН ХИРУРГИЯ ХАБАРШЫСЫ
ВЕСТНИК ХИРУРГИИ КАЗАХСТАНА
BULLETIN OF SURGERY IN KAZAKHSTAN

әр тоқсанда шығып тұратын А.Н. Сызғанов атындағы Ұлттық ғылыми хирургия орталығының ғылыми-тәжірибелік журналы
ежеквартальный научно-практический журнал Научного центра хирургии им. А.Н. Сызганова
a quarterly scientific-practical journal of the «A.N. Syzganov National Scientific Center for Surgery» JSC

МАЗМҰНЫ

СОДЕРЖАНИЕ

CONTENTS

МАЗМҰНЫ

ОРТАЛЫҚ ТЫНЫСЫ

МЕРЕЙТОЙ

ӘРІПТЕСТІ ЕСКЕ АЛУ

СОДЕРЖАНИЕ

СОБЫТИЯ ЦЕНТРА

ЮБИЛЕЙ

ПАМЯТИ КОЛЛЕГИ

CONTENTS

CENTER EVENTS

ANNIVERSARY

IN MEMORY OF COLLEAGUE

COMPARATIVE ASSESSMENT OF THE TIME OF PATIENTS' STAY IN THE INTENSIVE CARE UNIT AFTER MITRAL VALVE REPLACEMENT WITH PRESERVATION OF THE POSTERIOR LEAFLET AND COMPLETE REMOVAL OF SUBVALVULAR STRUCTURES

https://doi.org/10.35805/BSK2021IV005

Zhumabaev S.A., Raiapov N.O., Asanaliev M.I., Bkhad Zh.A., Urmanbetov K.S., Tursunbekova G.T.

Research Institute of Cardiovascular Surgery and Organ Transplantation of the Ministry of Health of the Kyrgyz Republic, Bishkek, Kyrgyz Republic

Zhumabaev S.A.
orcid.org/ 0000-0002-0673-1045

Raiapov N.O.
orcid.org/ 0000-0003-0818-3684

Asanaliev M.I.
orcid.org/ 0000-0001-9726-1888

Bkhad Zh.A.
orcid.org/ 0000-0003-1724-2092

Urmanbetov K.S.
orcid.org/0000-0002-8785-1398

Tursunbekova G.T.
orcid.org/ 0000-0001-7427-3122

Corresponding author:
Zhumabaev S.A. *- Junior researcher, Research Institute of Cardiovascular Surgery and Organ Transplantation, Bishkek, Kyrgyz Republic.*
E-mail: Sultanmurat-89@mail.ru

Conflict of interest
The authors declare that they have no conflicts of interest

Abstract

The aim *is to evaluate the effectiveness of time spent in the intensive care unit and the use of inotropic drugs after mitral valve replacement surgery with preservation of the posterior leaflet with comparison of complete removal of subvalvular structures.*

Material and methods. *The study included 60 patients, including 28 patients after surgery with preservation of the posterior mitral valve leaflet and 32 patients after surgery with complete removal of subvalvular structures. The average age of the patients was 45.9±12.0 years. Inclusion criteria were the time spent in the intensive care unit after surgery, the use of inotropic drugs, and the duration of use of the ventilator.*

Results. *In comparison, the control group in the intensive care unit received more inotropic drugs. In the main group of renal doses - 21 (75%) patients received dopamine - 2.38±0.21 micrograms per kilogram minute, adrenaline - 0.021±0.003 micrograms per kilogram minute. Cardiotonics were not received at therapeutic doses. Above therapeutic doses - 2 (7.14%) patients received (dopamine) - 8±0.01 micrograms per kilogram minute. In the second group of renal doses - 23 (71.87%) patients received dopamine 2.24±0.54 micrograms per kilogram minute, adrenaline - 0.021±0.001 micrograms per kilogram minute. Therapeutic doses of 5 (15.6%) patients dopamine - 5.2±0.4 micrograms per kilogram minute, adrenaline - 0.04±0.001 micrograms per kilogram minute. Above therapeutic doses of 2 (6.25%) patients, dopamine is 8.2±0.02 micrograms per kilogram minute, adrenaline is 0.07±0.003 micrograms per kilogram minute.*

Keywords
mitral valve replacement, subvalvular structure, posterior cusp, cardiotonic drugs

Артқы жарманы сақтай отырып, митральды қақпақшаны протездеуден және клапан асты құрылымдарын толық алып тастағаннан кейін науқастардың қарқынды терапия бөлімшесінде болу уақытын салыстырмалы бағалау

Жумабаев С.А., Раяпов Н.О., Асаналиев М.И., Бхад Ж.А., Урманбетов К.С., Турсынбекова Г.Т.

Қырғыз Республикасы Денсаулық сақтау министрлігінің Жүрек-қан тамырлары хирургиясы және ағзаларды трансплантациялау ғылыми-зерттеу институты, Бішкек қ., Қырғыз Республикасы

Хат алысатын автор:
Жумабаев С.А. *- Жүрек-қан тамырлары хирургиясы және ағзаларды трансплантациялау ғылыми-зерттеу институтының кіші ғылыми қызметкері, Бішкек қ., Қырғыз Республикасы.*
E-mail: Sultanmurat-89@mail.ru

Мүдделер қақтығысы
Авторлар мүдделер қақтығысының жоқтығын мәлімдейді

Аңдатпа

Жұмыстың мақсаты *- митральды қақпақшаны ауыстыру отасынан кейін артқы жарманы сақтай отырып, клапан асты құрылымдарының толық жойылуын салыстыра отырып, қарқынды терапия бөлімінде өткізілген уақыттың және инотропты препараттарды қолданудың тиімділігін бағалау.*

Материал және әдістер. *Зерттеуге 60 науқас қатысты, олардың 28-і митральді қақпақшаның артқы жармасын сақтай отырып жасалған отадан кейінгі науқастар және 32-сі клапан асты құрылымдарын толығымен алып тастаған отадан кейінгі науқастар. Науқастардың орташа жасы 45,9±12,0 жасты құрады. Қосу критерийлері отадан кейін жан сақтау бөлімінде болған уақыт, инотропты препараттарды қолдану және өкпенің жасанды вентиляция құрылғысын пайдалану ұзақтығы болды.*

Нәтижелер. *Салыстырмалы түрде, жан сақтау бөліміндегі бақылау тобы инотропты препараттарды көбірек қабылдаған. Негізгі топ емдік дозаларда кардиотониктерді қабылдамады. Екінші топта емдік дозаларда 5 науқас (15,6%), дофамин - килограмм минутына 5,2±0,4 микрограмм, адреналин - килограмм минутына 0,04±0,001 микрограмм қабылдады. Емдік дозадан жоғары 2 науқас (6,25%), дофамин - килограмм минутына 8,2±0,02 микрограмм, адреналин - килограмм минутына 0,07±0,003 микрограмм қабылдады.*

Түйін сөздер
митральды қақпақшаны протездеу, клапан асты құрылым, артқы түтік, кардиотоникалық препараттар

Сравнительная оценка время пребывания больных в отделение интенсивной терапии после протезирования митрального клапана с сохранением задней створки и полного удаление подклапанных структур

Автор для корреспонденции:
Жумабаев С.А. - *младший научный сотрудник, НИИ сердечно-сосудистой хирургии и трансплантации органов, г. Бишкек, Кыргызская Республика.*
E-mail: Sultanmurat-89@mail.ru.

Жумабаев С.А., Раяпов Н.О., Асаналиев М.И., Бхад Ж. А., Урманбетов К.С., Турсунбекова Г.Т.
Научно-исследовательский институт сердечно-сосудистой хирургии и трансплантации органов Министерства Здравоохранения Кыргызской Республики, г. Бишкек, Кыргызская Республика

Конфликт интересов
Авторы заявляют об отсутствии конфликта интересов

Аннотация

Цель работы *- оценить эффективность пребывание времени в отделении интенсивной терапии и использование инотропных препаратов после операции протезирования митрального клапана с сохранением задней створки со сравнением полным удалением подклапанных структур.*

Материал и методы. *В исследование включены 60 больных из них 28 пациентов после операции с сохранением задней створки митрального клапана и 32 пациентов после операции с полным удалением подклапанных структур. Средний возраст больных составил 45,9±12,0 лет. Критериями включения были время пребывание в отделение интенсивной терапии после операции, использование инотропных препаратов и длительность использование аппарата ИВЛ.*

Результаты. *По сравнению контрольная группа в отделении интенсивной терапии получали инотропные препараты больше. В основной группе терапевтических дозах не получали кардиотоники. Во второй группе терапевтических дозах 5 (15,6%) пациентов дофамин – 5,2±0,4 микрограмм на килограмм минуту, адреналин – 0,04±0,001 микрограмм на килограмм минуту. Выше терапевтических дозах 2 (6,25%) пациентов дофамин – 8,2±0,02 микрограмм на килограмм минуту, адреналин – 0,07±0,003 микрограмм на килограмм минуту.*

Ключевые слова
протезирование митрального клапана, подклапанная структура, задний ствол, кардиотонические препараты

Relevance

In many ways, in the studies, a parallel was drawn between the dependence of the functioning of the left ventricle and the safety of the mitral valve. However, there were no quantitative criteria by which it would be possible to compare the functional capabilities of the heart during reconstruction and prosthetics of the mitral valve, to assess the compensatory and reserve capabilities of the left ventricular myocardium after these two types of operations. In 1990, N.A. Chigogidze, I.I. Skopin, P.A. Borsh in their studies determined the effect of reconstructive operations on the mitral valve and its prosthetics on the regional and general function of the left ventricle [1]. Using left ventriculography, it was proved that a decrease in the integral function of the left ventricle in patients after mitral valve replacement is mainly associated with impaired contractility of the posterior-basal and diaphragmatic segments directly related to the surgical intervention zone. This, according to the authors, was due to the removal of the chord-papillary apparatus and rigid fixation of the annulus fibrosus to the prosthesis. In addition, the change in the geometric shape and redistribution within the ventricular volume, along with the hyperfunction of the intact myocardium, served as a compensatory mechanism for maintaining the function of the left ventricle during mitral valve replacement. According to the calculations of the intragastric volume by segments, it was determined that the geometric shape of the left ventricle in patients after mitral valve replacement approached the spherical shape, the most unfavorable from the point of view of the energy expenditure of the myocardium. In these conditions, hyperfunctional compensation mechanisms cannot be fully realized. During reconstructive operations on the mitral valve, regional disorders were also observed in the form of a decrease in the segmental ejection fraction. However, both in number and in severity, these segmental disorders were significantly less in comparison with patients who underwent mitral valve replacement. It is also important to note that after reconstructive operations on the mitral valve, the most favorable ellipsoid shape of the left ventricle was preserved. Thus, based on the analysis of the segmental and general function of the left ventricular myocardium in patients after reconstruction of the mitral valve and its prosthetics, it was determined that the mitral valve apparatus is actively involved in the reorganization of the left ventricular cavity, contributing to the most rational distribution of vectorial forces of contraction in the process of translational-rotational movement performed by the heart muscle [1, 2].

The analysis of indicators of invasive monitoring of central hemodynamics made it possible to establish that in the case of complete preservation of the subvalvular structures, there was a more significant decrease in pressure in the pulmonary circulation and the greatest increase in SI and SV, with the possibility of preserving only the posterior valve of the MV observed changes were less distinct, while in the group of people operated on with a routine method, the worst immediate re-

sults of prosthetics were demonstrated. Thus, the need for maximum preservation of the native mitral complex is quite obvious. The result of the implementation of the presented surgical approach, in addition to restoring the closure function of the MV, is the provision of the isovolumic contraction phase, which, according to the results of a number of studies, leads to an improvement or complete normalization of regional and general LV contractility [3,4]. Leaving subvalvular structures will further improve the immediate and long-term results [5]. An uncomplicated early postoperative period was observed in 69 (66.3%) patients. After being transferred to the intensive care unit, they had stable hemodynamics supported by therapeutic doses of cardiotonics, as well as an average mechanical ventilation time of 16 ± 3.8 hours, on the second day they were transferred to the unit [6]. The results on the preservation of the geometry and functional state of the LV are in the group with complete preservation of the subvalvular structures and the anterior and posterior cusps. The time and need for receiving cardiotonic drugs in the postoperative period in the intensive care unit clearly correlates with the preservation or excision of subvalvular structures [7].

The preservation of subvalvular structures is not a new concept, however, some surgical techniques for the treatment of left atrioventricular defect, depending on the nature of the lesion of the leaflets and subvalvular structures, must be adopted to achieve the best immediate and immediate clinical results, are not definitively defined, and are controversial. Therefore, the need for complete removal or preservation of the valves, subvalvular structures of the MV, their role in changing the functional state of the left ventricular myocardium is still being discussed [8].

The aim of the study is to show the feasibility of preserving the posterior leaflet with CPA in patients with mitral valve replacement (MVR).

Complete preservation of the subvalvular structure prevailed of all the types of operations with the preservation of the posterior leaflet in 89 (94.7%) cases, Due to the sharp thickening and shortening of the chords in 5 (5.3%) cases, we had to remove the first-order chords. The amount of chord removal depended on the degree of thickening and shortening of the chordal-papillary apparatus. Of these, in 1 case two were deleted and in 4 - one first-order chord. Nevertheless, being of the opinion that the preserved chordal-papillary apparatus of MV leads to an improvement in myocardial function, it is necessary to completely save the leaflet with subvalvular apparatus [8-9].

As far back as the 1960–70s, it was shown that the preservation of the chord-papillary apparatus of mitral valve (MV) and annulopapillary continuity plays a crucial role in the functioning of the LV. Many surgeons believe that the preserved chord-papillary apparatus of MV allows to leave the sequence of physiological contraction of the left ventricular wall unchanged, improves contractility of the LV myocardium in the near and long-term postoperative period, especially in patients with increased LV and mitral insufficiency [10].

Material and methods

At the Research Institute of Heart Surgery and Organ Transplantation, retrospective analyzes after mitral valve surgery with and without preservation of the posterior cusp of the chordal-papillary apparatus (CPA) of the mitral valve in patients with a defect were selected.

The analysis includes the following parameters: total duration of treatment, intraoperative duration during cardiopulmonary bypass, duration of treatment in the intensive care unit and intensive care, drugs received (inotropic drugs: dopamine, adrenaline).

Divided into 2 groups for comparison. The average age of the patients was 47.4 ± 10.2 years. Of the total number of patients, 40 (66.6%) were female and 20 (33.3%) were male. All patients had heart failure of varying severity, namely, in functional class 2 (FC) there were 2 (3.33%), in 3 FC - 53 (88.3%) and in 4 FC - 5 (8.33%) patients. In 32 (53.33%) cases, there was atrial fibrillation before surgery.

In the overwhelming majority, rheumatism was the cause of MV defect (59 (98.3%) patients), 1 (1.66%) had infective endocarditis. Mitral stenosis or its predominance was diagnosed in 44 (73.33%) patients, insufficiency or its predominance was noted in 11 (18.33%) (Table 1).

Results

When analyzing the study group by the type of mitral defect in patients with insufficiency, the technique of preserving the posterior leaflet and CPA was more often used. Thickened chords together with papillary muscles can obstruct blood flow to the left atrium and create a large gradient between the left atrium and ventricle during diastole; therefore, in patients with severe stenosis, the MV in some cases had to remove completely subvalvular structures (Table 2).

Of all types of operations with preservation of the posterior valve, in 28 (46.66%) cases, complete preservation of GL prevailed. Due to the sharp thickening and shortening of the chords in 5 (5.3%) cases, we had to remove the chords of the first order. The amount of chord removal depended on the degree of thickening and shortening of the CPA. Of these, in 1 case, two were removed and in 4 - one

Table 1.
Clinical characteristics of patients

Indicators	Absol. Number	%
Average age, years	47,4±10,2	
Floor:		
men	20	33,3
women	40	66,6
Functional class:		
II	2	3,33
III	53	88,3
IV	5	8,33
The reason for the defect:		
rheumatism	59	98,3
congenital defect	0	0
infective endocarditis	1	1,66
Heart rhythm:		
sinus rhythm	28	46,6
fibrillation	32	53,33
The nature of the mitral valve defect:		
stenosis	44	73,33
failure	11	18,33

Table 2.
Preservation of subvalve structures

№	Preservation of subvalve structures	Abs.number	%
1	Preservation of the back leaf and chordo-papillary apparatus	28	46,66
2	Complete removal of the leaflet and chordal-papillary apparatus	32	53,33

first order chord. Nevertheless, holding the opinion that preserved CPA MK leads to an improvement in the work of the myocardium [1,2,3]. In the second group, 32 patients were removed under the MV valve structure.

The duration of cardiopulmonary bypass in the main group averaged 85.89±29 minutes, the time of aortic clamping was 59±26 minutes, the control group averaged 88.15±36.6 minutes, the time of aortic clamping was 63.81±31.08 minutes Cold hyperpotassium blood cardioplegia was used to protect the myocardium.

According to the restoration of cardiac activity in the main group, independent recovery of 17 patients (60.71%), as well as in the second group 26 (81.25%). Through fibrillation 11 (39.28%) in the first group, 6 (18.7%) in the second group (Table 3).

In the postoperative period, out of 60 patients, 10 (16.66%) patients had various types of complications (Table 4).

In 10 cases, non-fatal postoperative complications were noted. In patients with heart failure, cardiotonics have been used in therapeutic doses. In 4 cases, higher therapeutic doses and prolonged artificial ventilation were used. One patient developed sternal diastasis after surgery. Conducted osteosynthesis of the sternum, discharged on the 12th day after osteosynthesis (table 4). In the main group of renal doses, 21 (75%) patients received dopamine - 2.38±0.21 μg / kg / min, adrenaline - 0.021 ± 0.003 μg / kg / min. Cardiotonics have not been received at therapeutic doses. Above therapeutic doses - 2 (7.14%) patients received (dopamine) - 8 ± 0.01 μg / kg / min.

Table 3.
Operating indicators

Operating indicators	1st group		2nd group	
Average time of extracorporeal circulation, min	85,89±29		88,15±36,6	
Average time of aortic clamping, min	59±26		63,81±31,08	
Recovery of cardiac activity: %				
Independent	17	60,71%	26	81,25%
Through fibrillation	11	39,28%	6	18,7%

Table 4.
Postoperative complications

Types of complications	1st group		2nd group	
	Absolute	**%**	**Absolute**	**%**
Non-fatal complications:	28	46,66	32	53,33
a) heart failure	1	3,57	7	21,87
b) respiratory failure	0	0	1	3,12
c) diastasis of the sternum	0	0	1	3,12
Fatal complications	0		0	

Table 5.
Use of inotropic drugs

Cardiotonics (inotropic drugs): (dopamine, adrenaline)	1st group (n-26) (μg / kg / min)	№ п	%	2nd group (n-32) (μg / kg / min)	№ п	%	p
No inotropic support		4	14,28		2	6,25	<005
Renal	д-2,38±0,21 а-0,021±0,003	21	75	д -2,24±0,54 а-0,021±0,001	23	71,875	<005
Therapeutic	0		0	д-5,2±0,4 а-0,04±0,001	5	15,6	<005
Higher therapeutic	д-8±0,01 а- 0	2	7,14	д-8,2±0,02 а-0,07±0,003	2	6,25	<005

Table 6.
Hospital stay

Stay before and after surgery	1 group No. 28	2 group No. 32
1) general, day	22,07±7,41	20,1±7,6
2) before surgery, day	9,85±5,11	8,18±4,44
3) after surgery, day	12,2±4,5	12±6,3
Hours spent in the intensive care unit, hours	42±22	48,75±41,11

In the control group with renal doses, 23 (71.87%) patients received dopamine 2.24 ± 0.54 μg / kg / min, adrenaline - 0.021 ± 0.001 μg / kg / min. Therapeutic doses of 5 (15.6%) patients dopamine - 5.2 ± 0.4 μg / kg / min, adrenaline - 0.04 ± 0.001 μg / kg / min. Above therapeutic doses in 2 (6.25%) patients, dopamine - 8.2 ± 0.02 μg / kg / min, adrenaline - 0.07 ± 0.003 μg / kg / min (Table 5).

The table shows that in the postoperative period the indicators changed significantly. However, there was a decrease in the use of cardiotonics in the first group, mainly at renal doses.

Hospital stay in the first group spent days 22.07 ± 7.41, before surgery 9.85 ± 5.11 days, after surgery 12.2 ± 4.5 days and in the second group 20.1 ± 7.6 days, before surgery 9 , 85 ± 5.11 days, after surgery 12.2 ± 4.5 days (Table 6).

Extubation after surgery in the 1st group on the first day, 25 (89.28%) patients were extubated. There were 26 (84.37%) patients in the control group (table 7).

Conclusions

Thus, according to the data obtained as a result of the analysis of the immediate postoperative results of MVR with the preservation of GL compared to the complete removal of CPA, the use of inotropic drugs decreases, the time spent in the A&R department decreases. And also immediately after the operating room heart failure is significantly reduced (Table 4). The operative technique of preserving the posterior cusp with its subvalvular structure is easy to perform surgically and does not lengthen the time of artificial circulation (Table 3).

Table 7.
Extubation after surgery

Day	1 group No. 28	2 group No. 32
the first	89,28%	84,37%
second	10,71%	12,5%
third	0	0
fourth	0	3,25%

References

1. Chigogidze N.A., Skopin I.I., Borsh P.A. Regional and general function of the left ventricle of the heart after reconstructive surgery of mitral valve replacement // Thoracic and cardiovascular surgery. - 1990. -No. 5. -P. 29-33.Straub U., Feind P., Huwer H. Et all. Postoperative assessment preservation and changes in cardiac geometry following mitral valve replacement // Eur. J. Cardiothorac. Surg. - 1966. -Vol. 10. - P . 734-740.
2. Morimoto N., Aoki M., Murakami H., Nakagiri K., Yoshida M., Mukohara N.. Mid-term echocardiographic comparison of chordal preservation method of mitral valve replacement in patients with mitral stenosis. J. Heart Valve Dis. 2013; 22 (3): 326–332.
3. Lawrence H.C., Tchantchaleishvili V., Rajab T.K. Evolution of the concept and practice of mitral valve repair. Ann. Cardiothorac. Surg. 2015; 4 (4): 315–321. DOI:10.3978/j. issn.2225-319X.2015.04.09.
4. Nurbay Zh.N., Novikov VK, Gordeev ML Prosthetics of the mitral valve with preservation of subvalvular structures // Bulletin of surgery. -2010 No. 2. –S. 97-100.
5. Bockeria, L.A. Mitral valve replacement in young children with CHD / L.A. Bockeria, K. V. Shatalov, A. A. Svobodov, T. I. Musatova and others // Thoracic and cardiovascular surgery. - M., - 2003. -№3.-C.16-19.

6. Rakimbaev A., Dzhundubaev M., Bebezov I., Kalieva R., Seitahunova E., Toktosunova D. Preservation of the subvalvular apparatus during mitral valve replacement. International scientific review. 2016; 22 (3): 324–330. 16.
7. Coutinho GF, Bihun V, Correia PE, Antunes PE, Antunes MJ. Preservation of the subvalvular apparatus during mitral valve replacement of rheumatic valves does not affect long-term survival. //Eur J, Cardiothorac, Surg. 2015. V. 48 . N6. P. 861-7.
8. Lafci G., Cagli K., Cicek O. F., Korkmaz K., Turak O., Uzun A., Yalcinkaya A., Diken A., Gunertem E. Papilary muscle repositioning as a subvalvular apparatus preservation technique in mitral stenosis patients with normal left ventricular systolic function //Tex Heart Inst J. 2014. V. 41. N1. P. 33-39.
9. Timala RB, Joshi D, Aryal M, Bhandari K, Singh Y, Sharma J. Effects of subvalvular apparatus preservation in mitral valve replacement among rheumatic patients: early and mid-term follow up. J Inst Med 2016, 38: 2-3.
10. Toktosunova D. B., Djundubaev M. K., Seytahunova E. D., Ahmedova I. A. Remodeling of the left heart in patients with rheumatic mitral valve disease after mitral valve replacement with preservation of subvalvular structures // J. Scientific Research Institute of Heart Surg. and Organ Transplantation. 2020. 4. 40-44.

MODERN PRINCIPLES OF DIAGNOSIS AND SURGICAL TREATMENT OF ISCHEMIC MITRAL INSUFFICIENCY

https://doi.org/10.35805/BSK2021IV011

Musaev S.A.
Scientific Center of surgery named after acad. M.A. Topchubashov, Baku, Azerbaijan Republic

Musaev S.A.
orcid.org/0000-0001-9699-3614

Corresponding author:
Musaev S.A. *- doctoral student of the Scientific Department of Cardiac Surgery, Scientific Center of Surgery named after acad. M.A. Topchubashov, Baku, Azerbaijan Republic. E-mail: seymur1974.musayev@gmail.com*

Conflict of interest
The authors declare that they have no conflicts of interest

Abstract

The purpose *of the study is to evaluate and analyze the results of surgical treatment of patients with ischemic mitral insufficiency.*

Material and methods. *The results of the examination and surgical treatment of 35 patients with ischemic mitral insufficiency are analyzed. In the operative period, in order to identify the degree of mitral insufficiency and the valvular apparatus, an echocardiography was performed, where the diameter of the fibrous ring, the interpapillary distance, the annulopapillary distance, the area of the cusp tension, and the depth of the coaptation of the valves were determined.*

Results. *A preoperative examination proved the presence of mitral valve insufficiency with regurgitation of varying degrees. 15 patients underwent myocardial revascularization, 20 patients underwent myocardial revascularization + various options for correction of ischemic mitral insufficiency. After the operation, a significant improvement in the spatial-geometric correlation of the LV and mitral valve by reducing the tension forces acting on the valves and in the group of patients undergoing myocardial revascularization + various options for the correction of ischemic mitral insufficiency as the elimination of regurgitation.*

Conclusion. *In patients with ischemic heart disease after echocardiographic studies, having determined the degree of mitral insufficiency with its moderate and severe degree, it is necessary to have a surgical correction of the mitral valve in its apparatus; the use of myocardial revascularization + various options for the correction of ischemic mitral insufficiency gives more tantalizing results than isolated myocardial revascularization.*

Keywords
ischemic mitral insufficiency, isolated myocardial revascularization, mitral valve reconstruction

Митральды ишемиялық жеткіліксіздіктің диагностикасы мен хирургиялық емінің заманауи қағидалары

Мусаев С.А.
Акад. М.А. Топчубашов атындағы ғылыми хирургия орталығы, Баку қ., Әзірбайжан Республикасы

Хат алысатын автор:
Мусаев С.А. *- акад. М.А. Топчубашов атындағы ғылыми хирургия орталығының кардиохирургия ғылыми бөлімінің докторанты, Баку қ., Әзірбайжан Республикасы. E-mail: seymur1974.musayev@gmail.com*

Мүдделер қақтығысы
Авторлар мүдделер қақтығысының жоқтығын мәлімдейді

Аңдатпа

Жұмыстың мақсаты - *ишемиялық митральды жеткіліксіздігі бар науқастарды хирургиялық емдеу нәтижелерін бағалау және талдау.*

Материал және әдістер. *Митральды ишемиялық жеткіліксіздігі бар 35 науқасты тексеру және хирургиялық емдеу нәтижелері талданды. Ота кезеңінде митральды жеткіліксіздіктің дәрежесін және клапан аппаратын анықтау үшін эхокардиография жасалды, онда сақиналы фиброздың диаметрі, папилляр аралық қашықтық, аннулопапиллярлық қашықтық, жапырақшалардың тартылу аймағы және жапырақтың коаптациясы тереңдігі анықталды.*

Нәтижелер. *Ота алдындағы кезеңде жүргізілген тексеру әр түрлі дәрежедегі регургитациямен митральды қақпақшаның жеткіліксіздігінің болуын дәлелдеді.15 науқасқа миокард реваскуляризациясы, 20 науқасқа миокард реваскуляризациясы+ишемиялық митральдық жеткіліксіздікті түзетудің әртүрлі нұсқалары, қақпақшаға әсер ететін кернеу күшін төмендету және миокард реваскуляризациясы + ишемиялық митральды жеткіліксіздікті түзетудің әртүрлі нұсқалары орындалған науқастар тобында, сонымен қатар регургитацияны жойылды.*

Қорытынды*. Жүректің ишемиялық ауруы бар науқастарда эхокардиографиялық зерттеулерден кейін митральды жеткіліксіздік дәрежесін анықтау және оның орташа және ауыр дәрежесінде митральды қақпақшаны хирургиялық түзету қажет; миокард реваскуляризациясын қолдану + ишемиялық митральды жеткіліксіздікті түзетудің әртүрлі нұсқалары оқшауланған миокард реваскуляризациясына қарағанда жақсы нәтиже береді.*

Түйін сөздер
ишемиялық митральды жеткіліксіздік, оқшауланған миокард реваскуляризациясы, митральды қақпақшаның реконструкциясы

Современные принципы диагностики и хирургического лечения ишемической митральной недостаточности

Мусаев С.А.
Научный центр хирургии им. М.А. Топчубашова, г. Баку, Азербайджанская Республика

Автор для корреспонденции:
Мусаев С.А. *– докторант научного отделения кардиохирургии, Научный центр хирургии им. акад. М.А. Топчубашова, г. Баку, Азербайджанская Республика. E-mail: seymur1974.musayev@gmail.com*

Конфликт интересов
Авторы заявляют об отсутствии конфликта интересов

Аннотация

Цель исследования *- оценить и проанализировать результаты хирургического лечения пациентов с ишемической митральной недостаточностью.*

Материал и методы. *Анализируется результаты обследования и хирургического лечения 35 больных с ишемической митральной недостаточностью. В операционном периоде для выявления степени митральной недостаточности и клапанного аппарата проводили с эхокардиографией, где были определены диаметр фиброзного кольца, межпапиллярное расстояние, аннулопапиллярное расстояние, площадь натяжения створок и глубина коаптации створок.*

Результаты. *Проведенное в предоперационном периоде обследования доказали о наличии недостаточности митрального клапана с регургитацией различной степени.15 пациентам выполнены реваскуляризация миокарда, 20 пациентам реваскуляризация миокарда+ различные варианты коррекции ишемической митральной недостаточности.. После операции отмечены значительное улучшение пространственно-геометрических соотношений ЛЖ и митрального клапана за счет уменьшения сил натяжения, воздействующих на створки, а в группе больных выполненных реваскуляризация миокарда+ различные варианты коррекции ишемической митральной недостаточности так же устранение регургутации.*

Заключение. *У больных с ишемической болезни сердца после эхокардиографических исследований определив степени митральной недостаточностьи при ее умеренной и тяжелой степени необходимо хирургическая коррекция митрального клапана; применение реваскуляризация миокарда+ различные варианты коррекции ишемической митральной недостаточности дает более хорошие результаты чем изолированное реваскуляризация миокарда.*

Ключевые слова
ишемическая митральная недостаточность, изолированное реваскуляризация миокарда, реконструкция митрального клапана

Relevance

Relevance of the safety and efficacy of surgical treatment of patients with ischemic heart disease, complicated by the development of heart failure due to post-infarction remodeling of the left ventricular cavity (LV) and ischemic heart failure (IHF), remains one of the most relevant in modern cardiac surgery. Life expectancy in patients with ischemic mitral valve insufficiency (MV) is unfavorable: the 5-year survival rate is, according to different data, only 25-69%. The main causes of mortality are severe heart failure, recurrent to drug therapy, recurrent and myocardial, and fatal ventricular arrhythmias [1, 2]. Therefore, a comprehensive solution of the problem (surgical reconstruction of the LV cavity, correction of MV and modern effective pharmacotherapy after surgery) can be considered as the main direction for improving the results of treatment of patients in this category. One of the most important factors of their success in such an integrated approach is the choice of tactics for IHF, determined by preoperative analysis of the causes of its development. At present, many researchers agree that the main cause of chronic IHF is the unfavorable distribution of hypo zones. and the discs of the etiology and myocardium LV, leading to its violation of the functional and spatial-geometric relations of the structures of MV and LV [1, 3-5]. This pathology is based on the concept of LV remodeling, causing its dislocation of papillary bases and restriction of the systolic movement of the MV sashes. wall, that is, at the level of attachment of the posterior papillary muscle. Dislocation of this mouse in the apical and posterior-lateral direction leads to excessive tension of the predominantly basal chords in the systole and a decrease in the amplitude of the systolic movement of the valves and the lower level of the fibrous ring is located closer to the apex, which underlies the formation of mitral insufficiency. In the foreign literature, this mechanism of the occurrence of IHF is described as an increase in theothering forces, limiting their mobility of the MV valves in systole (due to the tension of the papillary masses and chords), due to negative remodeling of the cavity LV [6, 8]. Subsequently, against the background of progression of miratral insufficiency, fibrous changes and reduction of contractility, its further expansion of the LV cavity occurs, which underlies the dilatation of the fibrous ring MV, and increased regurgitation [1, 4].

Material and methods

The results of the surgery were analyzed. Treatment of 35 patients with ishem common mental deficiency. Angina pectoris II functionational class (FC by classification CCS) was diagnosed in 11

(31.4%) patients.III – IV FC – in 24 (68.6%). Cordial failure II FC (according to the classification NYHA) was detected in 5 (14.3%) patients. III – IV FC - in 30 (85.7%), 26 (74.3%) patients ejection fraction LV was less than 0.4. Preoperative assessment of significance mitral insufficiency and its causes development was performed using echocardiography the graphs, in whose protocol were included we are parameters that give quantitative characteristic of spatial interrelations relationship of mitral valve structures (diameter of the annulus, interpapillary distance annulopapillary distance, tension area of the valves, coaptation depth of the valves), which allows to objectively evaluate its function. Diagnosis of ischemic mitral insufficiency. Operative assessment of significance miratral failure and its causes development is of paramount importance to determine the optimal tactics of surgery therapeutic treatment [4]. In our research their size and configuration of the LV cavity,its local and global juice of rati bridge, central hemodynem and ki, the state of the valve apparatus. Hearts were assessed with transtor fecal and transesophageal echocardiography (EchoCG) (Vivid 7, «GE», USA). In addition to generally accepted indicators, parameters were included in the EchoCG protocol that give a quantitative characterization of the spatial interrelationships of MV structures, which allows an objective assessment of its function: - fibrous ring diameter - distance between the extreme and points and the front and rear hemispheres of the MV ring and the fringe.

Annulopapillary distance (APD) - the distance from the posterior medial papillary heads to the anterior her hemispheres of the fibrous ring MV; the area of the tension of the valves (ATV) - flat area, bounded flat bone fibrous rings MV and his systole; - interpapillary distance (IPD) - distance between papillary bases in a two-chamber apical projections. The importance of these indicators to determine division tactics of surgical treatment I emphasize many authors [8-10]. So, E. Agricola et al. indicate that the CDC and with most closely related to the severity mitral regurgitation and the degree of remodeling LV [6]. Importance of defining Len and CDC emphasize t in their research A. A. Calafiore et al. In their opinion, with initial CDC less than 10 mm and ital this failure is usually ineffective. is positivity and in the postoperative period does not increase. According to their opinion, when the initial CDC is less than 10 mm, the neutral insufficiency is, as a rule, insignificant and does not increase in the postoperative period. If this indicator exceeds 10 mm, then the regurgitation on the MV is more significant and after the operation increases progressively [11]. The results of the preoperative examination of our patients testified to the presence of postinfarct remodeling of the LV cavity, a decrease in its contractile function and a substantial deformation of the MV structures (Table 1). The increase in the volume of LV, the transformation of its cavity from the ellipsoid into the spherical (sphere index of 1.34 + 0.18) led to an increase in ADP and CDC, which contributed to the development of miral regurgitation. Regurgitations We used a multi-component pentor classification, taking into account the area of regurgitation jets, the ratio of areas of regimentation and area of the atrium, the regurgitation fraction and the effective orifice area. Grade II was detected in 16 (21.6%) patients, Grade III in 40 (54.1%) and Grade IV mitral insufficiency in 18 (24.3%).

The indications for surgical treatment of ischemic mitral insufficiency were determined by the state of the coronary arteries, the contractile function of the left ventricle and the degree of insufficiency of the mitral valve.The effect of mitral regurgitation due to rupture of the papillary mouse with the development of refractory heart failure and pulmonary edema necessitates urgent surgical intervention. We operated on 3 (8.6%) patients with acute ischemic mitral insufficiency on average 99.1 + 29.4 h after the development of myocardial ischemia. Most researchers will appreciate that if intensive therapy allows stabilization of hemodynamics, the surgical treatment should be carried out no earlier than 4-8 weeks after myocardial ischemia. During this time, the final formation of the scar occurs, the left ventricular ejection fraction and the mitral insufficiency stabilize. significantly improves the results of the operation [3, 9, 11].

Chronic ischemic mitral insufficiency, grade III – IV, of course, is the basis for interventions on the mitral valve, which we performed in 25 (71.4%) patients. The feasibility of surgical correction with moderate mitral and fatigue (II degree) is not so clear. On the one hand, an increase in the volume of surgery, duration of cardiopulmonary bypass and myocardial ischemia increase the risk associated with the intervention.

On the other hand, uncorrected ischemic mitral insufficiency is one of the reasons for the progression of cardiac insufficiency in the late postoperative period [2, 5, 9–12]. In such a situation, accurate topical diagnostics of the causes of ischemic mitral insufficiency, assessment of the state of the contractile function of the LV and the pulmonary circulation, determination of the possibility of performing complete myocardial revascularization allow us to determine the feasibility of intervention on MV. Correction of moderate mitral insufficiency in combination with coronary artery bypass grafting (cab) was performed in 20 (57.1%) patients. The basis for the combined operation was postinfunctional remodeling of the cavity LV, unfavorable changes in the spatial-geo-

metric relations MV and LV (interpapillary distance – IPD, coaptation depth of cusps – CDC, annulopillary distance – APD, area of cusp tension – ACT), the expansion of the fibrous ring of the mitral valve and clinical picture of angina due to severe multiple coronary artery disease.

Results

All operations were performed under conditions of CPB and pharmaco-cold cardioplegia. The operation of choice was various options for reconstructive interventions on MV (14 - 56%). Patients were monitored during surgery by monitoring the electrocardiogram and intracardiac hemodynamics using a Swan-Ganz catheter and transesophageal EchoCG. Since 2015, in order to reduce the period of myocardial ischemia, distal anastomoses were formed on a working heart without cardiopulmonary bypass (14-7 cases) or under conditions of parallel perfusion (10 cases). The index of revascularization was 2.6±0.7.

Thus, CABG combined with plastic MV - in 25 (71.4%). The nature of plastic surgery on mitral valve was as follows: valvuloplasty edge to edge - in 4 (16%) patients, papillotomy - in 2 (8%), resection of the posterior cusps in 3 (12,%), implant-free annuloplasty - in 6 (24 %), annuloplasty on the support ring - in 13 (52%). We consider that reconstructive interventions on MV should be justified by a high probability of a satisfactory end result and functional stability of the valve in the long-term period after the operation. It is important to accurately represent the anatomy of vice and possible ways to eliminate it. The correction should be fairly simple and easily accomplished, since an increase in the time of myocardial anoxia and artificial blood circulation has a negative effect on the result. All reconstructive interventions on the leaflets and subvalvular structures of MV were completed by annuloplasty of the fibrous ring. For this purpose, 19 (76%) patients used the Annulo Flo semi-rigid support ring (“Carbomedics”, USA), 5 (20%) used a suture technique, the meaning of which was to “shrink” the back of the fibrous ring with the thread etibond 2 – 0.

Discussion

According to some researchers, the results of valve replacement operations with preservation of annulopapillary continuity are comparable to reconstructive interventions, which is especially important for patients with reduced myocardial myocardial reserves [1, 2, 4]. Results of surgical correction of ischemic mitral insufficiency independs on the experience of treating this pathology,existing in the clinic, the volume of surgical interventions and approaches to the choice of the MV lesion correction method. In the 70s of the XX century, mortality in the correction of ischemic mitral insufficiency and resection of LV aneurysm averaged 45%. In the 80s, this indicator dropped to 25% and currently varies from 6 to 17% [5, 7, 9, 10]. The differences in the results reflect the difference in the experience of such operations, as well as in the tactics of performing the combined interventions [1, 9]. The most frequent perioperative complications in our study were acute cardiovascular insufficiency, cardiac arrhythmias, and respiratory failure, which required prolonged artificial respiration. According to a comparative analysis of the direct results of plastics MV revealed advantage of acb + valvuloplasty operations. The clinical picture of acute cardiovascular and respiratory failure was statistically significantly more common in patients undergoing isolated CABG + valvuloplasty. Mortality among these patients was also higher than e - 3 (12%) versus 1 (10%) (p> 0.05). The prevalence in the study group was 11.4%. In most cases (n = 3), acute cardiovascular insufficiency due to initially low functional reserves of the myocardium. Evaluating the original the clinical condition of the deceased patients, it should be noted that they have pronounced post-infarction remodeling of the LV cavity and a decrease in contractility myocardium (Table 1).

Practically, all of their deceased patients (5 out of 6) had a combined correction of coronary disease,mitral insufficiency and remodeling of the LV cavity. In 2 patients, the operation was of an emergency nature.The results confirm the opinion most researchers that low myocardial functional reserves are one of the key risk factors for death in patients undergoing ischemic remodeling of the LV cavity, and with mitral insufficiency [3, 4, 7, 10, 12]. Evaluating the results of EchoCG after surgery, it is necessary to note a statistically significant decrease in the LV cavity and an increase in the ejection fraction, and in patients after the MV plasty, a

Table 1.
Preoperative clinical characteristics of patients died

Class of angina (CCS)	3.2±0.6
Functional class (by NYHA)	3.3±0.4
Emission fraction LV, %	29.6±3.5
Degree of immoral failure	2.5±0.3
End diastolic volume index LV, m l / m^2	131.4±29.3
End sistolic volume index LV, m l / m^2	84,5±23,1

significant improvement in the spatial-geo- metric ratios of LV and MV by reducing the tension forces acting on the flaps. The result of the geometric reconstruction of the LV and the valve apparatus is the restoration of the normal function of MV.

Conclusion

Surgical treatment IMI is a complex section of cardiac surgery. The need to take into account many structural and functional reasons makes it difficult development of a single algorithm in the provision of surgical care to patients in this difficult category. Effective performing IMI operations from surgeons requires mastering all modern methods and restoring coronary blood flow, correcting post-infarction remodeling of the LV cavity and mitral insufficiency. It is necessary to consider justified the natural desire of surgeons to preserve their own patient valve with the possibility of reliable reconstruction. Despite the increased risk associated with combined surgery, the results of postoperative examination objectively indicate the normalization of MV function and a significant improvement in intracardiac hemodynamics.

References

1. Sharlaimov S.A. Clinical Echocardiographic Surgery Results myocardial revascularization and mitral annuloplasty in patients with ischemic-mitral regurgitation I-II degree / Sharlaimov S.A., OrekhovE.N., Sukhanov S.G. // Pathology of blood circulation and cardiac surgery.-2012-№2-C. 53-57.
2. Sukhanov S.G., Chragyan V.A., Harutyunyan V.B. Principles of diaS.G. gnosis and surgical treatment of ischemic mitral insufficiency. The Bulletin of Bakoulev Center Cardiovascular Diseases. 2015; 16 (6): 41-48.
3. Kvasnikova I.P. Features of surgical treatment of patients with coronary heart disease, age group 70 years and older. The Bulletin of Bakoulev Center Cardiovascular Diseases.2017; 18 (3): 264-270
4. Castleberry AW, Williams JB, Daneshmand MA, et al. Surgical revascularization is associated with maximal survival in patients with ischemic mitral regurgitation: a 20-year experience. Circulation. 2014;129:2547–56.
5. Skopin I.I., Tsiskaridze I.M.. Trends in the surgical treatment of mitral valve insufficiency - an informational and analytical review. The Bulletin of Bakoulev Center Cardiovascular Diseases. 2016; 17 (3): 27-46.
6. MacHaalany J, Senechal M, O'Connor K, et al. Early and late mortality after repair or replacement in mitral valve prolapse and functional ischemic mitral regurgitation: a systematic review and meta-analysis of observational studies. Int J Cardiol. 2014;173:499–505.
7. Acker MA, Parides MK, Perrault LP, et al. Mitral-valve repair versus replacement for severe ischemic mitral regurgitation. N Engl J Med. 2014;370:23–32.
8. Calafiore AM, Refaie R, Iacт AL, et al. Chordal cutting in ischemic mitral regurgitation: a propensity-matched study. J Thorac Cardiovasc Surg. 2014;148(1):41–6.
9. Murashita T, Okada Y, Kanemitsu H, et al. Mid-term outcomes of chordal cutting in combination with downsized ring annuloplasty for ischemic mitral regurgitation. Ann Thorac Cardiovasc Surg. 2014;20(6):1008–15.
10. Fattouch K, Lancellotti P, Castrovinci S, et al. Papillary muscle relocation in conjunction with valve annuloplasty improve repair results in severe ischemic mitral regurgitation. J Thorac Cardiovasc Surg. 2012;143(6):1352–5.

https://doi.org/10.35805/BSK2021IV016

COMPARATIVE EVALUATION OF IMMEDIATE RESULTS OF PLASTIC ATRIAL SEPTAL DEFECT IN ADULT PATIENTS, LIVING IN HIGH ALTITUDE CONDITIONS

Abdramanov K.A.
orcid.org/0000-0002-6706-9104

Kokoev E.B.
orcid.org/0000-0002-9558-8729

Alimbekov E.A.
orcid.org/ 0000-0002-6639-3439

Arzibaeva P.M.
orcid.org/0000-0001-8023-2845

Alisherov R.T.
orcid.org/0000-0002-0205-1472

Corresponding author:
Kokoev E.B. *- Junior Researcher, Head of the Department of Adult Cardiac Surgery and Arrhythmology, Southern Regional Scientific Center for Cardiovascular Surgery, Jalal-Abad, Kyrgyz Republic.*
E-mail: emilbek.kokoev@gmail.com

Conflict of interest
The authors declare that they have no conflicts of interest

Abdramanov K.A., Kokoev E.B., Alimbekov E.A., Arzybaeva P.M., Alisherov R.T.
Southern Regional Scientific Center of Cardiovascular Surgery, Jalal-Abad, Kyrgyz Republic

Abstract

The article gives a comparative assessment of the results of surgery for atrial septal defect (ASD) surgery in patients living in low and high altitude conditions, sizes of the right ventricle were practically equal, but at the same time higher than the normal.

Objective. *To conduct a comparative analysis of the direct results of ASD plastic in patients living in low, medium and high mountains*

Material and methods. *The study material included 30 patients with ASD living in highlands; the control group consisted of 30 patients living in flat areas. Using clinical methods and instrumental studies, an analysis of operated patients, ASD plastic in adult patients with complicated pulmonary hypertension, heart failure, cardiac arrhythmias and functional tricuspid insufficiency was performed.*

Results. *The authors studied pulmonary arterial pressure (PAP) indices between the groups both in the preoperative and postoperative periods, the analysis showed significant differences. The parameters of the right ventricle (RV) in the preoperative period had significant differences, however, in the postoperative period, the sizes of the right ventricle were practically equal, but at the same time higher than the normal.*

Conclusion. *Our observation data show a significant decrease in PAP in patients living in high altitude conditions. However, the decrease in the PAP indicators remained slightly higher than the standard indicators.*

Keywords
atrial septal defect, high altitude, adults

Биік тау жағдайында өмір сүретін ересек науқастардың жүрекшеаралық перде ақауының пластикасының ерте нәтижелерін салыстырмалы бағалау

Хат алысатын автор:
Кокоев Э.Б. *- оңтүстік аймақтық жүрек-қан тамырлары хирургиясы ғылыми орталығының кіші ғылыми қызметкері, ересектер кардиохирургиясы және аритмология бөлімінің меңгерушісі, Жалал-Абад қ., Қырғыз Республикасы*
E-mail: emilbek.kokoev@gmail.com

Мүдделер қақтығысы
Авторлар мүдделер қақтығысының жоқтығын мәлімдейді

Абдраманов К.А., Кокоев Э.А., Алимбеков Э.А., Арзибаева П.М., Алишеров Р.Т.
Оңтүстік аймақтық жүрек-қан тамырлары хирургиясы ғылыми орталығы,
Жалал-Абад қ., Қырғыз Республикасы

Аңдатпа

Мақалада аласа және биік тауларда тұратын науқастарда жүрекшеаралық пердесінің ақауы (ЖПА) хирургиясының нәтижелерін салыстырмалы бағалау қарастырылған.

Материалдар және әдістер. *Зерттеу материалына биік таулы жерлерде тұратын 30 науқас, бақылау тобына жазық жерлерде тұратын 30 пациент кірді. Клиникалық әдістерді және аспаптық зерттеулерді қолдана отырып, операция жасалған науқастарды талдау, асқынған өкпе гипертензиясы, жүрек жеткіліксіздігі, жүрек ырғағының бұзылуы және үшжармалық функционалдық жеткіліксіздігі бар ересек пациенттерде ЖПА пластикасы жасалды.*

Нәтижелер. *Авторлар операцияға дейінгі кезеңде де, операциядан кейінгі кезеңде де топтар арасындағы өкпе артериялық қысымының (ӨАҚ) көрсеткіштерін зерттеді, талдау айтарлықтай айырмашылықтарды көрсетті. Операция алдындағы кезеңде оң жақ қарыншаның (ОЖҚ) көрсеткіштері айтарлықтай айырмашылықтарға ие болды, алайда операциядан кейінгі кезеңде оң жақ қарыншаның өлшемдері іс жүзінде бірдей болды, бірақ сонымен қатар нормадан жоғары болды.*

Қорытынды. *Біздің бақылау деректеріміз биік тау жағдайында тұратын науқастарда өкпе артериясы қысымының (ӨАҚ) айтарлықтай төмендеуін көрсетеді. Дегенмен, ӨАҚ көрсеткіштерінің төмендеуі стандартты көрсеткіштерден сәл жоғары болып қалды.*

Түйін сөздер
жүрекшеаралық пердесінің ақауы, биік таулар, ересектер

Сравнительная оценка непосредственных результатов пластики дефекта межпредсердной перегородки у взрослых пациентов, проживающих в условиях высокогорья

Абдраманов К.А., Кокоев Э.Б., Алимбеков Э.А., Арзибаева П.М., Алишеров Р.Т.
Южный региональный Научный Центр сердечно-сосудистой хирургии, г. Жалал-Абад, Кыргызская Республика

Аннотация

В статье рассматривается сравнительная оценка результатов операции пластики дефекта межпредсердной перегородки (ДМПП) у больных, проживающих в условиях низкогорья и высокогорья.

Материалы и методы. *В материал исследования входили 30 больных с ДМПП, проживающих в условиях высокогорья в контрольную группу, входили 30 больных проживающих в равнинной местности. С использованием клинических методов и инструментальных исследований выполнен анализ оперированных пациентов, пластики ДМПП у взрослых пациентов осложненной легочной гипертензией, сердечной недостаточностью, нарушением ритма сердца и функциональной трикуспидальной недостаточностью.*

Результаты. *Авторами были изучены показатели легочно-артериальное давления (ЛАД) между группами как в дооперационном, так и послеоперационном периоде, проведенный анализ показал достоверные различия. Показатели же правого желудочка (ПЖ) в дооперационном периоде имели достоверные различия, однако в послеоперационном периоде размеры правого желудочка практически стали равными, но при этом выше нормы.*

Заключение. *Данные наших наблюдений показывают достоверное снижение легочно-артериального (ЛАД) давления у пациентов, проживающих в условиях высокогорья. Однако снижение показателей ЛАД осталось немного выше нормативных показателей.*

Автор для корреспонденции:
Кокоев Э.Б. *- младший научный сотрудник, заведующий отделением взрослой кардиохирургии и аритмологии, Южный Региональный Научный Центр Сердечно-Сосудистой Хирургии, г. Жалал-Абад, Кыргызская Республика.*
E-mail: emilbek.kokoev@gmail.com

Конфликт интересов
Авторы заявляют об отсутствии конфликта интересов

Ключевые слова
дефект межпредсердной перегородки, высокогорье, взрослые

Relevance

In most cases, the clinical course of ASD is asymptomatic. Over time, most adult patients develop heart failure, which is directly related to an increase in left ventricular stiffness and a decrease in diastolic filling [1,2], which in turn lead to an increase in left-right shunt through ASD and volume overload of the right ventricle (RV). The main symptoms of the disease are shortness of breath, decreased exercise tolerance, fatigue and palpitations [3]. Long-term cardiac overloads gradually lead to various complications in the form of supraventricular and ventricular cardiac arrhythmias, thromboembolism and pulmonary hypertension [4,5,6].

Approaches to indications for surgical correction of congenital heart defects (CHD) have undergone significant changes over time. In 2008, it was proposed to operate on almost all defects with a left-to-right discharge of blood. In 2010, the indication for ASD correction was the ratio Qp/Qs> 1.5, PVS 1.5 (II a C). At the present time, approaches to operability have become more tougher, which are based on the assessment of PVS (PVS <2.3 Wood units) (II a C) [7].

According to the international consensus adopted in 2005, high-altitude pulmonary hypertension (PH) is a syndrome that affects children and adults who live for a long time at altitudes above 2500 meters and is characterized by an average pulmonary artery pressure of 30 mm Hg and above or systolic pulmonary arterial pressure (PAP) 50 mm Hg and higher, measured at high altitude, right ventricular hypertrophy, heart failure, moderate hypoxemia, absence of excessive erythrocytosis (hemoglobin concentration <19 g/l in women and <21 g/l in men) [8].

Multicenter studies carried out in high altitude conditions confirm the role of hypoxia in the genesis of a number of congenital heart anomalies. It has been proven that the higher the altitude of the area of residence above sea level, the more frequent the occurrence of such defects as patent ductus arteriosus (PDA) [9], ASD, ventricular septal defect (VSD) [10].

There are numerous studies on prevalence of ASD and hemodynamic parameters in patients living in high mountainous areas, but there are no studies evaluating the results of operations performed in patients living in midland and high altitude conditions. In this connection, we studied the results of surgical treatment of ASD in patients living in the middle and high mountains.

Purpose of the study: to conduct a comparative analysis of the direct results of ASD plastic in patients living in low, medium and high mountains.

Material and methods

In this work, we analyzed 60 observations in patients over 30 years old who were operated at the Southern Regional Scientific Center for Cardiovascular Surgery of the Ministry of Health of the Kyrgyz Republic from 2010 to 2018. All patients underwent ASD plastic surgery under conditions of artificial circulation and blood cardioplegia. The study included a total of 60 patients.

Table 1. Comorbidities in patients with ASD

Comorbidities	1 group	2 group
Chronic obstructive bronchitis	12(40%)	18(60%)
Peptic ulcer and duodenal ulcer	2(6,6%)	5(16,6%)
Varicosity of lower limbs	4(13,3%)	2(6,6%)
Iron deficiency anemia	2(6,6%)	19(63,3%)

Table 2. The distribution of patients by functional class in groups

Group #	FC I	FC II	FC III	FC IV
1 (n= 30)	-	28 (93,3%)	2 (6,6%)	-
2 (n= 30)	-	18 (60%)	10 (33,3%)	2 (6,6%)

To perform a comparative analysis, the patients were divided into 2 groups. The first group consisted of 30 patients, of which: 25 female and 5 males from 30 to 63 years old living in a flat area, the second group included 30 patients aged 30 to 66 years, of which 19 are female and 11 are males living in high altitude conditions.

The examined patients were diagnosed with the following concomitant diseases, which are presented in table 1.

According to our data, iron deficiency anemia in patients of group 2 was observed in 100% of cases, which is, respectively, associated with living in high mountains [11].

Preoperative diagnostics included general clinical research methods such as electrocardiography (ECG), echocardiography, and chest x-ray.

The data were analyzed using a statistical software package (Excel, Statistica 7). Values were statistically significant at $p < 0.05$.

The clinical condition of patients was assessed in accordance with the classification of the New York Heart Association (NYHA). The distribution of patients by functional class (FC) in groups is presented in Table 2.

It was revealed that 6.6% of patients in group 1 belonged to FC III. In group 2, the proportion of patients belonging to FC III increased to 33.3%. FC IV was observed in 2 patients, which amounted to 6.6%. It should be noted that patients with FC IV required long-term preoperative preparation with cardiotonic support with dopamine and diuretics.

When analyzing the ECG in some patients, the following cardiac arrhythmias were initially identified (Table 3).

An echocardiographic study revealed that the majority of patients in the study groups showed enlargement of the right heart and functional insufficiency of the tricuspid valve (ITV) of varying degrees (Table 4).

Results

All patients underwent atrial septal defect plastic under extracorporeal circulation and blood cardioplegia. In the first group of patients in 19 cases and in the second group in 23 cases, the tricuspid valve plastic surgery was performed according to De Vega, and 1 patient underwent coronary artery bypass grafting. In the dynamics after the operation, there was a significant decrease in the RV and pulmonary blood pressure (PBP) indices in both groups. The data are presented in table 5.

Comparative analysis between the groups showed significant differences both in the preoperative and postoperative periods in terms of PBP. RV indices in the preoperative period had significant differences, however, in the postoperative period, the size of the right ventricle practically became equal, but at the same time higher than the norm (Fig. 1, 2).

When comparing the indicators of CTI and Ind. Moore, a significant decrease was noted according to the Moore index and an unreliable, insignificant decrease in the CTI Fig. 3).

In the 1st and 2nd groups there was a significant ($p < 0.05$) decrease in the degree of PH in the early postoperative period.

In the preoperative period, cardiac arrhythmias were detected: in the 1st group of patients in the form of ventricular extrasystoles of 12 patients and

Table 3. Identified cardiac arrhythmias in patients

Group #	Ventricular extrasystoles	Atrial fibrillation
1 (n= 30)	12(40%)	1(3,3%)
2 (n= 30)	16(53,3%)	2(6,6%)

Table 4. Degree of ITV in patients

Degree of ITV	Group #1	Group #2
I-II	11	7
II	18	16
III	1	5
IV		2

Group #1	Before surgery	After surgery	p
RV	3,9±0,5	2,7±0,3	p<0,05
PBP	58,9±9,08	30,3±4,9	p<0,05
Group #2	**Before surgery**	**After surgery**	**p<0,05**
RV	4,3±0,5	2,7±0,2	p<0,05
PBP	65,83±10,9	37,6±5,7	p<0,05

Table 5.
RV and PBP parameters before and after surgery

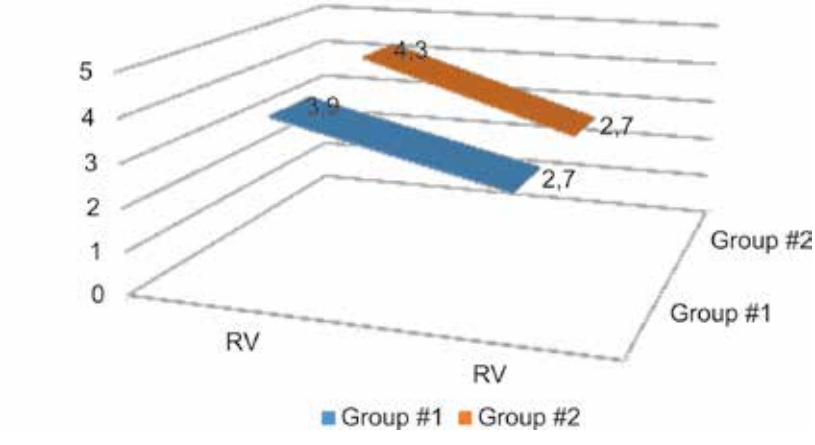


Figure 1.
PBP decrease.
Right ventricle before and after surgery

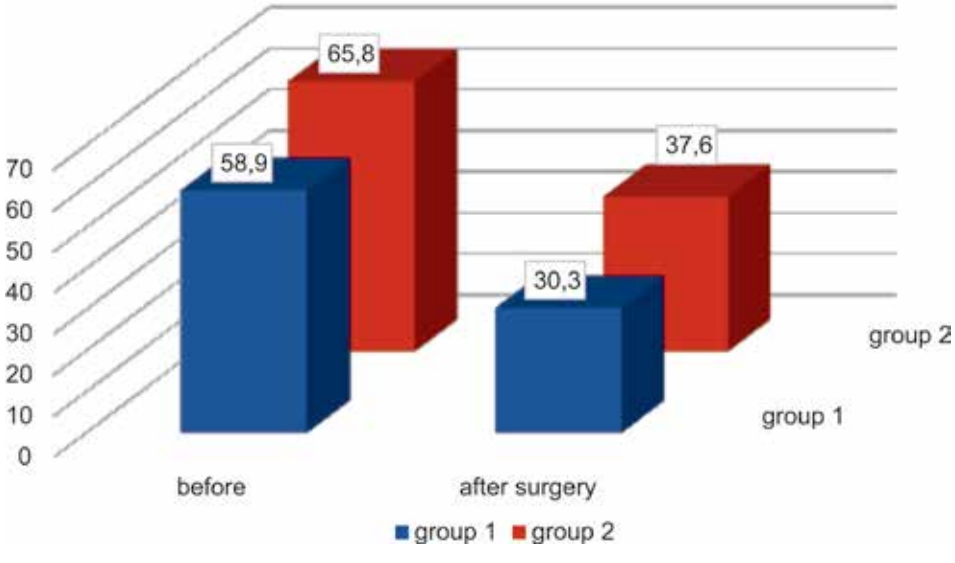


Figure 2.
PBP before and after surgery

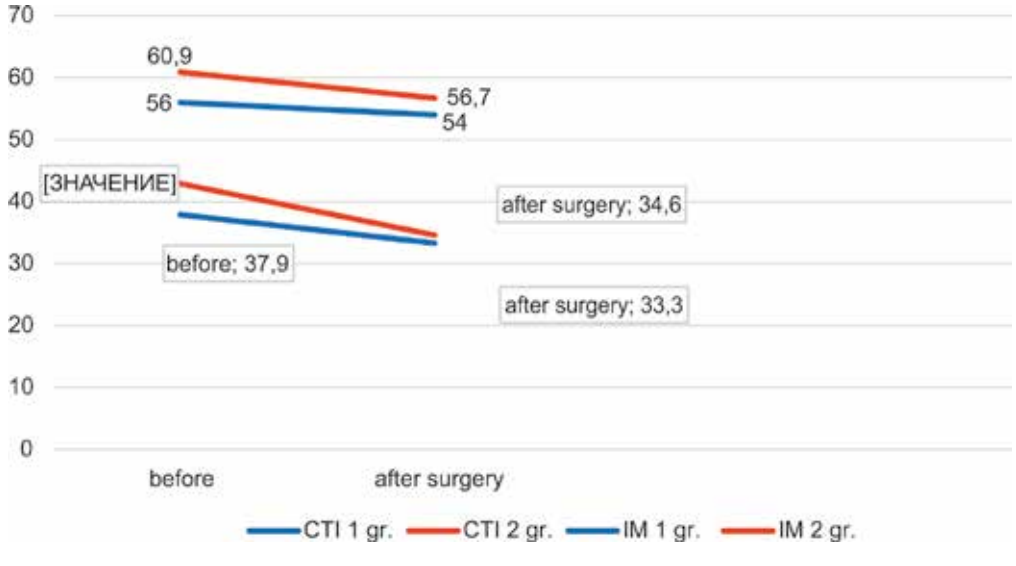


Figure 3.
CTI and Moore index before and after surgery

atrial fibrillation in 1 patient. In the postoperative period, against the background of drug therapy, the sinus rhythm was restored. In group 2, atrial fibrillation was detected in 2 patients and ventricular extrasystoles in 16 patients. In 1 patient in the postoperative period, despite the ongoing therapy, atrial fibrillation was preserved.

Discussion

Functional failure of tricuspid valve (TV) with ASD from moderate to severe is a common problem in daily practice. Surgical treatment of ASD with TV plastic should be performed in a timely manner in accordance with the recommendations given in the current guidelines [12]. A variety of transcatheter devices are currently undergoing clinical trials to provide alternative treatment options for patients at high risk of surgical repair of TV. Despite promising early data on safety and efficiency, further research is needed for most devices aimed at restoring TV function [13]. Based on the above, surgical correction is still the main treatment for ASD.

Undoubtedly, in patients operated on at an older age, the risk of postoperative cardiovascular complications increases, especially in residents of the highlands, while children and young patients have an excellent result [14].

Despite numerous publications on remaining cardiac arrhythmias in the postoperative period [15,16,17], according to the results of our studies, in most patients, despite arrhythmias of varying complexity and gradation in the preoperative period, which predominantly determine the severity of heart failure, by the time of discharge only atrial fibrillation persisted in one patient.

PH is the next major complication of ASD. Several researchers claim the presence of residual pulmonary hypertension in adult patients in the postoperative period [18]. Suzuki et al. note a decrease in PAP after ASD closure even in a patient carrying the BMPR2 mutation [19]. Our observation data show a significant decrease in PAP in patients living in high altitude conditions. However, the decrease in the PAP indicators remained slightly higher than the standard indicators.

Conclusions

1. Patients living in high altitude conditions generally had a higher NYHA class.
2. Indicators of pulmonary arterial pressure are significantly higher in the inhabitants of the highlands over the patients living in the low mountains.
3. In the early postoperative period, there is a significant decrease in pulmonary arterial pressure and indicators of the RV, CTI and Moore's index.
4. Despite the positive dynamics of a decrease in the size of the RV, there was no significant difference between the inhabitants of the low and high mountains.

References

1. Fleg J.L., Shapiro E.P., O'Connor F., Taube J. et al. Left ventricular diastolic filling performance in older male athletes // JAMA. 1995. Vol. 273. P. 1371–1375.
2. Swinne C.J., Shapiro E.P., Lima S.D., Fleg J.L. Age-associated changes in left ventricular diastolic performance during isometric exercise in normal subjects // Am. J. Cardiol. 1992. Vol. 69. P. 823–826.
3. 2018AHA/ACC Guideline for the Management of Adults With Congenital Heart Disease A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. Circulation. 2019;139:e698–e800. DOI: 10.1161/CIR.0000000000000603
4. Abdyzhaparova E.K., Dzhishambaev E.D. Heart rhythm disturbances in patients with secondary atrial septal defect after transcatheter defect correction [Narushenie ritma serdca u bol'nyh s vtorichnym defektom mezhpredserdnoj peregorodki posle transkateternoj korrekcii poroka]// Eurasian Journal of Cardiology. S. 3-7. Bishkek 2016
5. Vasilyeva O.Ya., Vorozhtsova I.N., Gorlova A.A., Selivanoval.Kh. Arterial thromboembolism of the systemic circulation [Arterial'nye trombojembolii bol'shogo kruga krovoobrashhenija]// Clinical Medicine 2017; 95 (9). S. 773-779. DOI http://dx.doi.org/10.18821/0023-2149-2017-95-9-773-779.
6. Van Dissel A.C., Mulder B.J.M., Bouma B.J. The Changing Landscape of Pulmonary Arterial Hypertension in the Adult with Congenital Heart Disease. Journal of Clinical Medicine, 2017; 6(4), 40.http://doi.org/10.3390/jcm6040040.
7. Blok I.M., van Riel A.C., Schuuring M.J. et al. The role of cystatin C as a biomarker for prognosis in pulmonary arterial hypertension due to congenital heart disease. Int. J. Cardiol.2016; 209:242–247. doi: 10.1016/j.ijcard.2016.02.003.
8. Leon-Velarde F, Maggiorini M, Reeves JT, et al.Consensus statement on chronic and subacute highaltitude diseases. High Alt Med Biol. 2005;6:147-157.
9. Garci A., Moreno K., Ronderos M., Sandoval N., Caicedo M., Dennis R., Differences by Altitude in the Frequency of Congenital Heart Defects in Colombia. Pediatr Cardiol (2016) 37:1507–1515. DOI 10.1007/s00246-016-1464-x.
10. Zheng J., Gang Yi., Li D. Prevalence and composition of CHD at different altitudes in Tibet: a cross-sectional study. Published online by Cambridge University

Press: 10 April 2017 Volume 27, Issue 8. October 2017, pp. 1497-1503. DOI: https://doi.org/10.1017/S1047951117000567/

11. Uzgenova K.A. Frequency and risk factors for the formation of gestational anemia in women of different heights [Chastota i faktory riska formirovanija gestacionnoj anemii u zhitel'nic raznyh vysot]. Medicine and education in Siberia. No. 5 - 2014 14.00.00 Medicalsciences. UDC 618.3-06
12. Clinical guidelines. Atrial septal defect [Klinicheskie rekomendacii. Defekt mezhpredserdnoj peregorodki]. ICD 10: Q 21.1 Year of approval (frequency of revision): 2016 (revision every 3 years)
13. Besler Ch., Seeburger J., Thiele H., Lurz Ph. Treatment options for severe functional tricuspid regurgitation: indications, techniques and current challenges. e-Jornal of cardiology Practice. Vol. 16, N° 31 - 28 Nov 2018.
14. National guidelines for the management of children with congenital heart disease [Nacional'nye rekomendaciipo vedeniju detej s vrozhdennymiporokami serdca]. Moscow, 2014.-356 p.
15. Shaalan A, Elrakhawy HM, Alassal MA, Wakeel EEE (2017) Improvement after Surgical Closure of Secundum Atrial Septal Defects in Adults. J Clin Exp Cardiolog 8: 493. doi:10.4172/2155-9880.1000493.
16. Congenital heart defects in adults: structure, features, anatomy, clinical picture, diagnostics, results of surgical treatment. Diss. Doctor of med. sciences. p. 348. Amirkulov B.D. [Vrozhdennye poroki serdca u vzroslyh: struktura, osobennosti, anatomija, kliniki, diagnostiki, rezul'taty hirurgicheskogo lechenija. Diss. Doktora med. nauk.s. 348. AmirkulovB.D.]
17. Bockeria L. A., Marasulov Sh. I., Tatevosyan K. Yu., Tkacheva A. V., Gorbachevsky S. V. Immediate results of surgical treatment of atrial septal defect in patients over 40 years old [Neposredstvennye rezul'taty hirurgicheskogo lechenija defekta mezhpredserdnoj peregorodki u bol'nyh starshe 40 let]//Thoracic and cardiovascular surgery 2008, No. 3, pp. 28-33
18. Roxanne D Zwijnenburg 1, Vivan J M Baggen 1, Maarten Witsenburg 2, Eric Boersma 3, Jolien W Roos-Hesselink 2, Annemien E van den Bosch. Risk Factors for Pulmonary Hypertension in Adults After Atrial Septal Defect Closure. Am J Cardiol. 2019 Apr 15;123(8):1336-1342. doi: 10.1016/j.amjcard.2019.01.011. Epub 2019 Jan 24
19. Hiroshi Suzuki, Haruo Hanawa, Tsukasa Torigoe, Seiichi Sato. Improvement of pulmonary arterial hypertension following medication and shunt closure in a BMPR2 mutation carrier with atrial septal defectJ Cardiol Cases. 2017 Apr 26;16(1):11-13. doi: 10.1016/j.jccase.2017.03.005.

https://doi.org/10.35805/BSK2021IV022

SOME INNOVATIVE TECHNOLOGIES FOR THE CORRECTION OF VALVULAR HEART DISEASES. REVIEW

Sagatov I.Y., Kudaibergen A.B., Momynov B.M.
JSC «A.N. Syzganov National Scientific Center for Surgery», Almaty, Kazakhstan

Sagatov I.Y.
orcid.org/0000-0002-4668-1513

Kudaibergen A.B.
orcid.org/0000-0002-2725-7530

Momynov B.M.
orcid.org/0000-0002-6008-0298

Corresponding author:
Momynov B.M. *– Resident of Cardiac Surgery Department, JSC "A.N. Syzganov National Scientific Center for Surgery".*
E-mail: bakhytzhan.momynov@gmail.com

Conflict of interest
The authors declare that they have no conflicts of interest

Abstract

Valve defects or congenital/acquired heart defects are damage to the valve and/or subvalvular structures, which leads to impaired hemodynamics and the development of heart failure. Asymptomatic valvular heart disease is present in 2.5% of the population; with age, this figure rises to 13%. In the absence of permanent treatment, lesions of the heart valves significantly reduce the quality and duration of life. The European Society of Cardiology (ESC) and the American Heart Association (AHA) regularly review the effectiveness of new surgical treatments and reflect their findings in international guidelines. Today, minimally invasive surgery is the most effective and safe way to treat patients with valvular heart disease. The article presents two new methods for the treatment of valvular heart disease. Transapical mitral valve repair on a beating heart with neochord implantation (TOP-MINI) is a new MVP option that has been approved for patients with severe mitral regurgitation due to prolapse of the leaflet (s) or chord (grades 2-4). The new procedure with the NeoChord DS1000 device results in a significant reduction in mitral regurgitation and in reverse remodeling of the left ventricle and left atrium after 6 months of follow-up. Also reviewed is Minimally Invasive Aortic Valve Replacement (MAVR), which has been shown to be beneficial in improving patient satisfaction by minimizing pain and earlier recovery. Sutureless valves are preferred over traditional aortic valve replacement (AVR) due to the reduced operation time and the need for blood transfusion. The Perceval valve (Sorin, Sallugia, Italy) is a self-expanding bovine pericardial prosthesis placed in a nitinol stent designed to facilitate aortic valve implantation. A systematic review and meta-analysis demonstrated that the early clinical and hemodynamic characteristics of the Perceval valve are satisfactory and comparable to those of conventional AVRs.

This literature review was carried out in accordance with the PRISM statement. The databases searched in this review included Pubmed, Web of Science, Scopus and Cochrane databases for systematic reviews.

Keywords
mitral valve, correction

Жүректің қақпақшалы ауруын түзетудің инновациялық кейбір технологиялары. Әдебиет шолуы

Сағатов І.Е., Құдайберген А.Б., Момынов Б.М.
«А.Н. Сызғанов атындағы Ұлттық ғылыми хирургия орталығы» АҚ, Алматы қ., Қазақстан

Хат алысатын автор:
Момынов Б.М. *– кардиохирургия бөлімінің дәрігер-резиденті, «А.Н. Сызғанов атындағы Ұлттық ғылыми хирургия орталығы» АҚ.*
E-mail: bakhytzhan.momynov@gmail.com

Мүдделер қақтығысы
Авторлар мүдделер қақтығысының жоқтығын мәлімдейді

Аңдатпа

Қақпақшалардың жүре пайда болған немесе туа біткен ақаулары – бұл гемодинамиканың бұзылуына және жүрек жеткіліксіздігінің дамуына әкелетін қақпақшалардың және/немесе қақпақша асты құрылымдардың зақымдануы. Асимптоматикалық жүрек ақаулары халықтың 2,5% - ында кездеседі, жасына қарай бұл көрсеткіш 13% - ға дейін артады. Жүрек клапандарының зақымдануын тұрақты емдеу болмаған жағдайда, өмір сүру сапасы мен ұзақтығын айтарлықтай төмендетеді. Еуропалық кардиология қоғамы (Еуропалық Кардиология қоғамы, ESC) және Американдық жүрек қауымдастығы (American Heart Association, AHA) емдеудің жаңа хирургиялық әдістерінің тиімділігін үнемі зерттеп отырады және халықаралық ұсыныстарда өз зерттеулерінің нәтижелерін көрсетеді. Бүгінгі таңда минималды инвазивті хирургия жүрек қақпақшасы бар науқастарды емдеудің ең тиімді және қауіпсіз әдісі болып табылады. Мақалада жүрек клапанының патологиясын емдеудің екі жаңа әдісі келтірілген. Неохордты (TOP-MINI) имплантациялау арқылы жұмыс істейтін жүректегі митральды қақпақшаны трансапикальды қалпына келтіру - бұл РМК-нің жаңа нұсқасы, ол жапырақтың немесе аккордтың (2-4 градус) пролапсына байланысты ауыр митральды жеткіліксіздігі бар науқастар үшін мақұлданған. NeoChord ds1000 құрылғысы бар жаңа процедура 6 айлық бақылаудан кейін митральды жеткіліксіздіктің және сол жақ қарыншаның және сол жақ атриумның қайта қалпына келу дәрежесінің айтарлықтай төмендеуіне әкеледі. Сондай-ақ, аорта қақпақшасын (MAVR) минималды инвазивті ауыстыру әдісі қарастырылған, ол ауырсынуды азайту және ертерек қалпына келтіру арқылы пациенттердің қанағаттануын арттырудың артықшылығын көрсетті. Жіксіз клапандар операция уақытын қысқарту және қан құю қажеттілігі есебінен дәстүрлі аорта қақпағын (AVR) ауыстырған жөн. Perceval клапаны (Сорин, Саллуджия, Италия) - бұл аорта қақпақшасын имплантациялауды жеңілдету үшін жасалған нитинол стентіне орнатылған өзін-өзі кеңейтетін бұқа перикардты протез. Жүйелі шолу және мета-анализ Perceval клапанының ерте клиникалық және гемодинамикалық сипаттамалары қанағаттанарлық және қарапайым AVR-мен салыстырылатындығын көрсетті.

Бұл әдебиетті шолу PRISM мәлімдемесіне сәйкес жүргізілді. Осы шолуда ізделген дерекқорларға жүйелі шолулар үшін Pubmed, Web of Science, Scopus және Cochrane дерекқорлары кірді.

Түйін сөздер
митральды қақпақша, түзету

Некоторые инновационные технологии коррекции клапанных пороков сердца. Обзор литературы

Сагатов И.Е., Кудайберген А.Б., Момынов Б.М.
АО «Национальный научный центр хирургии им. А.Н. Сызганова», г. Алматы, Казахстан

Аннотация

Пороки клапанов или врожденные/приобретенные пороки сердца – это поражение клапана и/или подклапанных структур, которое приводит к нарушению гемодинамики и развитию сердечной недостаточности. Бессимптомные клапанные пороки сердца присутствуют у 2,5% населения, с возрастом эта цифра возрастает до 13%. При отсутствии постоянного лечения поражения клапанов сердца существенно снижает качество и продолжительность жизни. Европейское общество кардиологов (European Society of Cardiology, ESC) и Американская кардиологическая ассоциация (American Heart Association, AHA) регулярно изучают эффективность новых хирургических методов лечения и отражают результаты своих исследований в международных рекомендациях. На сегодняшний день минимально инвазивная хирургия является наиболее результативным и безопасным способом лечения пациентов с клапанными пороками сердца. В статье представлены два новых методы по лечению клапанной патологии сердца. Трансапикальное восстановление митрального клапана на работающем сердце с имплантацией неохорды (TOP-MINI) - это новый вариант ПМК, который был одобрен для пациентов с тяжелой митральной недостаточностью из-за пролапса створки (листов) или хорды (2-4 степени). Новая процедура с устройством NeoChord DS1000 приводит к значительному снижению степени митральной недостаточности и обратного ремоделирования левого желудочка и левого предсердия через 6 месяцев наблюдения. Также рассмотрен метод минимально инвазивной замены аортального клапана (MAVR), которая продемонстрировала преимущество в отношении повышения удовлетворенности пациентов за счет минимизации боли и более раннего выздоровления. Бесшовные клапаны предпочтительнее традиционной замене аортального клапана (AVR) за счет сокращения времени операции и необходимости переливания крови. Клапан Perceval (Sorin, Саллуджия, Италия) - это саморасширяющийся протез из бычьего перикарда, установленный в нитиноловый стент, разработанный для упрощения имплантации аортального клапана. Систематический обзор и метаанализ продемонстрировали, что ранние клинические и гемодинамические характеристики клапана Perceval являются удовлетворительными и сопоставимы с таковыми у обычных AVR.

Этот обзор литературы был проведен в соответствии с заявлением PRISM. Базы данных, в которых проводился поиск в этом обзоре, включали Pubmed, Web of Science, Scopus и Cochrane для систематических обзоров.

Автор для корреспонденции:
Момынов Б.М. *– врач-резидент отделения кардиохирургии, АО «Национальный научный центр хирургии им. А.Н. Сызганова».*
E-mail:
bakhytzhan.momynov@gmail.com

Конфликт интересов
Авторы заявляют об отсутствии конфликта интересов

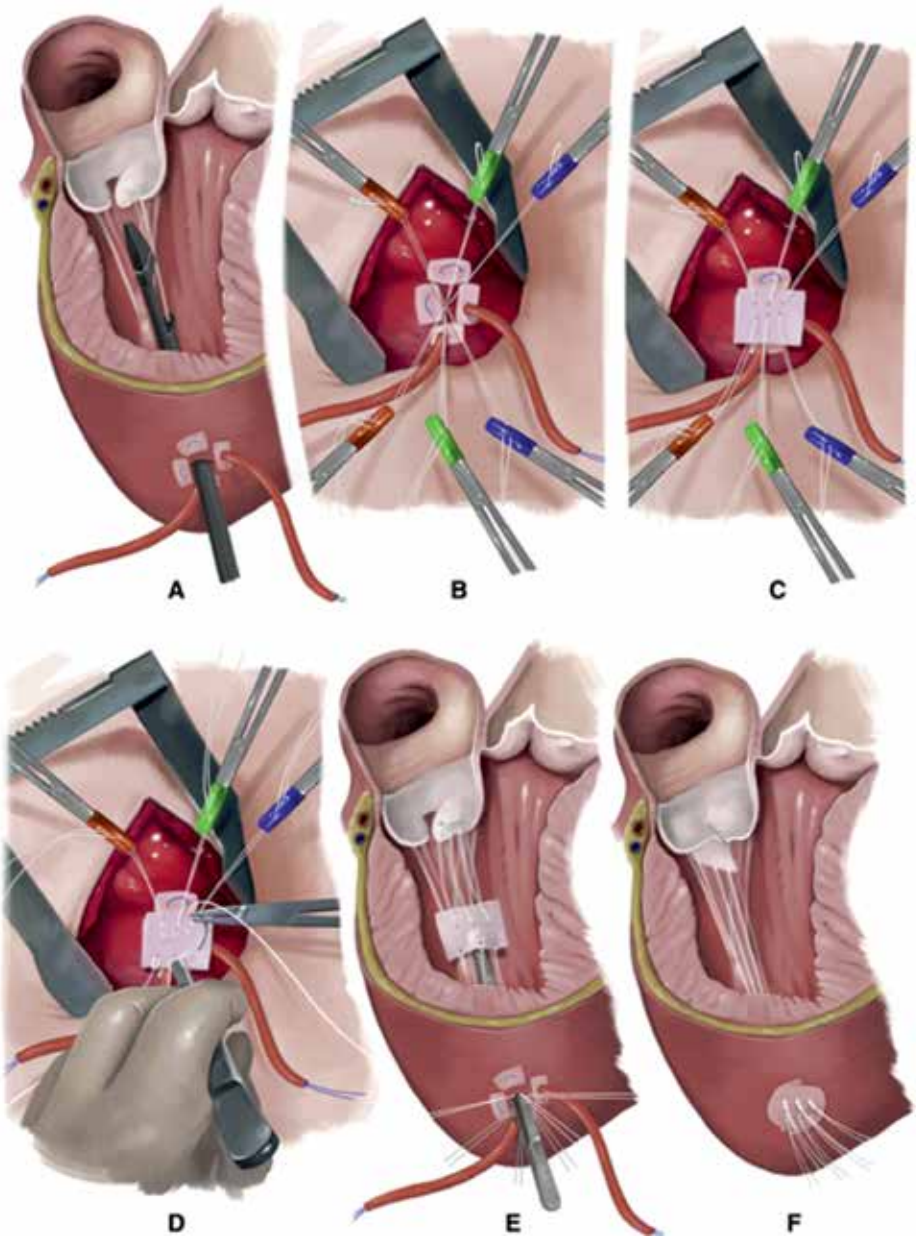
Ключевые слова
митральный клапан, коррекция

Relevance

Valvular disease or congenital/acquired heart disease are lesions of the valve and/or subvalvular structures that leads to impaired hemodynamics and the development of heart failure. Asymptomatic valvular heart disease are present in 2.5% of the population with age this figure increases to 13%. In the absence of permanent treatment of heart valve lesions significantly reduces the quality and duration of life. The European Society of Cardiology (ESC) and the American Heart Association (AHA) regularly study the effectiveness of new surgical methods of treatment and reflect the results of their research in international recommendations. For today minimally invasive surgery is the most effective and safe way to treat patients with valvular heart disease. New methods of correction that can be developed in Kazakhstan for the general development of cardiac surgical care to the population of the country. This literature review was carried out in accordance with the PRISM statement. The databases searched in this review included Pubmed, Web of Science, Scopus and Cochrane databases for systematic reviews.

The first method

The method is a transapical restoration of the mitral valve on a working heart with implantation of a neochord (TOP-MINI) - this is a new version of the MVR that has been approved for patients with severe mitral insufficiency due to prolapse of the leaf or chord (2-4 degrees). The procedure is performed using the NeoChord DS1000 system (NeoChord, Inn., Eden Prairie, MN) under the control of direct 2D and 3D transesophageal echocardiography (TEE) both for implantation and for adjusting the tension of the neochord. According to research at a hospital in Padua, Italy, from November 2013 to December 2014. During this period 111 patients were examined. The mechanism of MR development was primary or degenerative in 96 patients (86%) and secondary or functional in 12 patients (11%). Among 96 patients with primary MR, isolated posterior leaf prolapse (PML) was evident in 72 patients (75%), anterior leaf prolapse (AML) - in 13 cases (14%) and disease of both leaflets - in 11 (11%). Of the patients with primary MR Neochord implantation was performed in 49 cases (51%), while traditional surgical replacement of MVR or MV was performed in 6 (6%). Currently 16 patients (17%) are listed for traditional open heart



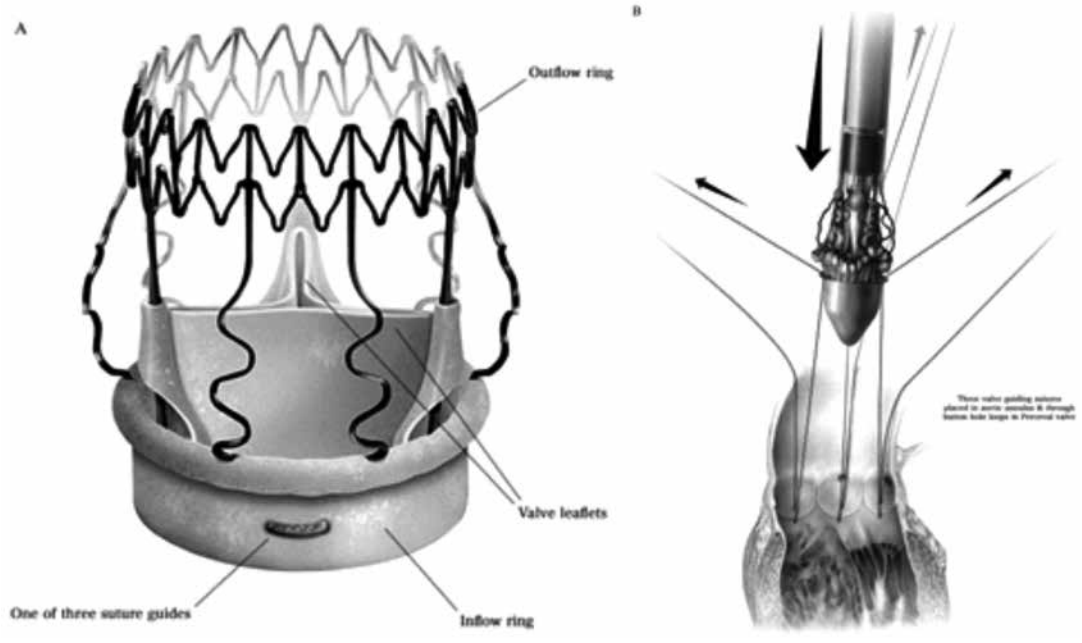
A, Insertion of the NeoChord DS1000 device (NeoChord, Inc, Eden Prairie, Minn) through a left minithoracotomy and a posterolateral ventriculotomy to sequentially release 3 expanded polytetrafluoroethylene chords to the free edge of the prolapsing A2. B, The loop and the end of each single expanded polytetrafluoroethylene chord are secured with colored mosquito surgical hemostat forceps. C, The loop and the end of each neochord are then secured to one of the long sides of a properly shaped rectangular pericardial patch. D, The chords attached to the anterior leaflet are now looped, and 3 more chords are then sutured to the other long side of the patch, which becomes the new free edge of the anterior mitral leaflet. E, The patch is then hoisted, driven with the help of forceps, inside the left ventricle by gently pulling on the 3 neochords, until it is positioned against the ventricular side of the anterior leaflet. F, The final result with the new augmented anterior leaflet. (Figure designed by Fabrizio Lavezzi.) https://doi.org/10.1016/j.jtcvs.2019.02.027

surgery, while 19 (20%) are scheduled for Neochord implantation. Six patients (6%) were treated with medication because MR was not serious enough to require intervention.

According to the Department of Cardiac Surgery, Medicover Hospital, Warsaw, Poland. Twenty-one patients with severe mitral insufficiency due to posterior valve prolapse (81% male; average age: 60.7 years ± 12.7 years) underwent surgery on the NeoChord DS1000 system. There were 12 (57.1%) patients with type A (isolated central prolapse/flail), 8 (38.1%) patients with type B (multi-segment disease) and 1 (4.8%) patient with type C (posterior/paracommisural region) prolapse MV. A pathological leaflet was available in 12 (57.1%) patients. The average number of neochords was 3 (2-6). Echocardiography was used to evaluate the morphology of the left heart and the degree of MR before and 6 months after chord implantation. Early success of the procedure was achieved in 100% of patients. At 6-month follow-up, minor mitral insufficiency (traces and mild) was detected in 17 (81.0%) patients, moderate MR - in 4 (19.0%) patients; the average values of the left sections of the size and volume, mitral E and E' velocity of the lateral annular space MV significantly decreased.

The second method

Minimally invasive aortic valve replacement (MAVR) has taken advantage of satisfaction by minimizing pain and earlier recovery. Sutureless valves are preferred over traditional aortic valve replacement (AVR) due to the reduction in surgery time and the need for transfusion.



Source: Aortic Valve Replacement Using a Perceval Sutureless Aortic Bioprosthesis David Heimansohn, MD, and Sina Moainie, MD; https://doi.org/10.1053/j.optechstcvs.2017.09.004

The Perceval valve (Sorin, Sallugia, Italy) is a self-expanding bovine pericardial prosthesis placed in a nitinol stent designed to facilitate aortic valve implantation. This meta-analysis assesses the clinical, hemodynamic outcomes and survival of the sutureless Perceval.

After applying the inclusion and exclusion criteria, 14 out of 66 relevant articles were selected for evaluation. Of these 14 studies, 2505 patients were enrolled. Current data on the Perceval valve in aortic valve disease are limited to observational studies only. Minimally invasive surgery was performed in 976 patients, of which 336 - through the right anterior thoracotomy. The most commonly used Perceval M and L seamless valves, 782 and 770, respectively. Serious adverse event rates included 30-day mortality (0 to 4.9%), cerebrovascular accident (0 to 3%), permanent pacemaker insertion (0 to 17%), moderate to severe paravalvular leakage (0 up to 8.6%) and reoperation (from 0 to 4.8%). The postoperative mean aortic valve gradient ranged from 9 to 15.9 mm Hg, and the postoperative NYHA class I or II ranged from 82 to 96%. Annual survival rates ranged from 86% to 100%; and 5-year survival rates ranged from 71.3% to 85.5% in two studies.

Conclusions

The new procedure with the NeoChord DS1000 device is possible in properly selected patients and results in a significant reduction in mitral regurgitation and in reverse remodeling of the left ventricle and left atrium after 6 months of follow-up.

A systematic review and meta-analysis demonstrated that the early clinical and hemodynamic characteristics of the Perceval valve are satisfactory and comparable to those of conventional AVRs. However, long-term data on the longevity and hemodynamics of the Perseval valve are somewhat limited. Large-scale randomized trials are recommended to accurately assess the long-term stability and complications associated with the Perseval valve.

References

1. L. H. Ling, M. Enriquez-Sarano, J. B. Seward, J. Tajik, H. V. Schaff, K. R. Bailey, R. L. Frye, and A. J. Tajik, “Clinical outcome of mitral regurgitation due to flail leaflet,” N. Engl. J. Med. 335(19), 1417–1423 (1996).
2. E. Hayek, C. N. Gring, and B. P. Griffin, “Mitral valve prolapse,” Lancet 365(9458), 507–518 (2005).
3. L. A. Freed, D. Levy, R. A. Levine, M. G. Larson, J. C. Evans, D. L. Fuller, B. Lehman, and E. J. Benjamin, “Prevelence and clinical outcome of mitral valve prolapse,” N. Engl. J. Med. 341(1), 1–7 (1999).
4. R. R. Moss, K. H. Humphries, M. Gao, C. R. Thompson, J. G. Abel, G. Fradet, and B. I. Munt, “Outcome of mitral valve repair or replacement: A comparison by propensity score analysis,” Circulation 108, II90–II97 (2003).
5. P. Bajona, W. E. Katz, R. C. Daly, K. J. Zehr, and G. Speziali, “Beating-heart, off-pump mitral valve repair by implantation of artificial chordae tendineae: An acute in vivo animal study,” J. Thorac. Cardiovasc. Surg. 137(1), 188–193 (2009).
6. I. Bahar, A. Akgul, M. A. Ozatik, K. M. Vural, A. E. Demirbag, M. Boran, and O. Tasdemir, “Acute renal failure following open heart surgery: Risk factors and prognosis,” Perfusion 20(6), 317–322 (2005).
7. R. Freeman, B. King, and M. H. Hambling, “Infective

complications of open-heart surgery and the monitoring of infections by the NBT test," Thorax 28(5), 617–621 (1973).
8. M. F. Newman, J. P. Mathew, H. P. Grocott, G. B. Mackensen, T. Monk, K. A. Welsh-Bohmer, J. A. Blumenthal, D. T. Laskowitz, and D. B. Mark, "Central nervous system injury associated with cardiac surgery," Lancet 368(9536), 694–703 (2006).
9. A. Iribarne, R. Easterwood, E. Y. H. Chan, J. Yang, L. Soni, M. J. Russo, C. R. Smith, and M. Argenziano, "The golden age of minimally invasive cardiothoracic surgery: Current and future perspectives," Future Cardiol. 7(3), 333–346 (2011).
10. http://www.neochord.com/ for NeoChord DS1000.
11. T. Feldman, E. Foster, M. Qureshi, B. Whisenant, J. Williams, D. Glower, and L. Mauri, "TCT-788 the EVEREST II randomized controlled trial (RCT): Three year outcomes," J. Am. Coll. Cardiol. 60(17), B229–B230 (2012). Medical Physics, Vol. 42, No. 1, January 2015, 468.
12. http://www.abbottvascular.com/int/mitraclip.html#overview for MitraClip percutaneous mitral valve repair system.
13. http://www.mitralign.com/themitralignsystem for the mitralign system.
14. J. Harnek, J. G. Webb, K.-H. Kuck, C. Tschope, A. Vahanian, C. E. Buller, S. K. James, C. P. Tiefenbacher, and G. W. Stone, "Transcatheter implantation of the MONARC coronary sinus device for mitral regurgitation: 1- year results from the EVOLUTION phase I study (clinical evaluation of the Edwards lifesciences percutaneous mitral annuloplasty system for the treatment of mitral regurgitation)," JACC: Cardiovasc. Interv. 4(1), 115–122 (2011).
15. C. A. Linte, J. White, R. Eagleson, G. M. Guiraudon, and T. M. Peters, "Virtual and augmented medical imaging environments: Enabling technology for minimally invasive cardiac interventional guidance," IEEE Rev. Biomed. Eng. 3, 25–47 (2010).
16. G. M. Guiraudon, D. L. Jones, D. Bainbridge, and T. M. Peters, "Mitral valve implantation using off-pump closed beating intracardiac surgery: A feasibility study," Interact. Cardiovasc. Thorac. Surg. 6(5), 603–607 (2007).
17. J. Ender and S. Sgouropoulou, "Value of transesophageal echocardiography (TEE) guidance in minimally invasive mitral valve surgery," Ann. Cardiothorac. Surg. 2(6), 796–802 (2013).
18. Brown JM, O'Brien SM, Wu C, et al. Isolated aortic valve replacement in North America comprising 108,687 patients in 10 years: changes in risks, valve types, and outcomes in the Society of Thoracic Surgeons National Database. J Thorac Cardiovasc Surg 2009;137:82-90.
19. Flameng W, Herregods MC, Hermans H, et al. Effect of sutureless implantation of the Perceval S aortic valve bioprosthesis on intraoperative and early postoperative outcomes. J Thorac Cardiovasc Surg 2011;142:1453-7.
20. Concistre G, Santarpino G, Pfeiffer S, et al. Two alternative sutureless strategies for aortic valve replacement: a two-center experience. Innovations (Phila) 2013;8:253-7.
21. Lorusso R, Gelsomino S, Renzulli A.Sutureless aortic valve replacement: an alternative to transcatheter aortic valve implantation? Curr Opin Cardiol 2013;28:158-63.
22. Martens S, Zierer A, Ploss A, et al. Sutureless Aortic Valve Replacement via Partial Sternotomy. Innovations (Phila) 2010;5:12-5.
23. Sadowski J, Kapelak B, Pfitzner R, et al. Sutureless aortic valve bioprothesis '3F/ATS Enable'--4.5 years of a single-centre experience. Kardiol Pol 2009;67:956-63.
24. Santarpino G, Pfeiffer S, Concistrй G, et al. The Perceval S aortic valve has the potential of shortening surgical time: does it also result in improved outcome? Ann Thorac Surg 2013;96:77-81; discussion 81-2.
25. Cao C, Ang SC, Indraratna P, et al. Systematic review and meta-analysis of transcatheter aortic valve implantation versus surgical aortic valve replacement for severe aortic stenosis. Ann Cardiothorac Surg 2013;2:10-23.
26. Vahanian A, Otto CM. Risk stratification of patients with aortic stenosis. Eur Heart J 2010;31:416-23.
27. Leon MB, Smith CR, Mack M, et al. Transcatheter aortic-valve implantation for aortic stenosis in patients who cannot undergo surgery. N Engl J Med 2010;363:1597-607.

COMPARATIVE ANALYSIS OF THE RESULTS OF PLASTIC INGUINAL HERNIA LAPAROSCOPIC AND TRADITIONAL METHODS

https://doi.org/10.35805/BSK2021IV027

Akhmet D.D.[1], Baimakhanov Zh.B.[2], Nurlanbayev E.K.[2], Matkerimov A.Zh.[2], Chormanov A.T.[2], Baimakhanov B.B.[2]

[1]NC JSC «S.D. Asfendiyarov Kazakh National Medical University», Almaty, Kazakhstan
[2]JSC «A.N. Syzganov National Scientific Center for Surgery», Almaty, Kazakhstan

Akhmet D.D.
orcid.org/0000-0002-6942-9855

Baimakhanov Zh.B.
orcid.org/0000-0002-2682-5591

Nurlanbayev E.K.
orcid.org/0000-0001-8758-5061

Matkerimov A.Zh.
orcid.org/0000-0001-8492-2958

Chormanov A.T.
orcid.org/0000-0003-3513-1935

Baimakhanov B.B.
orcid.org/0000-0003-0049-5886

Corresponding author:
Akhmet D.D. *– resident physician, NC JSC "S.D. Asfendiyarov Kazakh National Medical University", Almaty, Kazakhstan*
E-mail:diyar.akhmet@mail.ru

Conflict of interest
The authors declare that they have no conflicts of interest

Keywords
inguinal hernia, laparoscopic hernioplasty, traditional methods of hernioplasty

Abstract

Purpose of the study. *Conduct a retrospective comparative analysis of the results of laparoscopic and traditional methods of inguinal hernia repair, patients treated at the surgical department of "A.N. Syzganov National Scientific Center of Surgery", Almaty, Kazakhstan.*

Materials and methods. *In the period from January 2017 to December 2020, 137 patients were operated at the "A.N. Syzganov National Scientific Center of Surgery" in a planned manner for inguinal hernia and all patients were divided into 2 main groups: operated by traditional methods and laparoscopic method.*

Results. *The data of the analysis suggests that the laparoscopic method of hernioplasty has an advantage over the traditional methods.*

Conclusion. *Based on a comparative analysis of the indicators of patients in both groups, it can be concluded that the duration of the operation for laparoscopic hernia repair is 92.3 minutes, significantly more than with traditional methods, which is 79.4 minutes.*

Despite this, the duration of analgesic therapy in the postoperative period with laparoscopic hernia repair is 2.4 days, and the duration of hospital stay after surgery is 3 days, much less than with traditional methods, in which the duration of analgesic therapy in the postoperative period is 3, 3 days, and the duration of hospital stay after surgery is 4.6 days. This analysis suggests that laparoscopic hernioplasty has an advantage over traditional methods.

Лапароскопиялық және дәстүрлі шап жарығының пластикасы нәтижелерін салыстырмалы талдау

Ахмет Д.Д.[1], Баймаханов Ж.Б.[2], Нурланбаев Е.К.[2], Маткеримов А.Ж.[2], Чорманов А.Т.[2], Баймаханов Б.Б.[2]

[1]«С.Д. Асфендияров атындағы Қазақ Ұлттық медицина университеті» АҚ, Алматы қ., Қазақстан
[2]«А.Н. Сызғанов атындағы Ұлттық ғылыми хирургия орталығы» АҚ, Алматы қ., Қазақстан

Хат алысатын автор:
Ахмет Д.Д. *– дәрігер-резидент, «С.Ж. Асфендияров атындағы Қазақ Ұлттық медицина университеті» Ке АҚ, Алматы қ., Қазақстан.*
E-mail: diyar.akhmet@mail.ru

Мүдделер қақтығысы
Авторлар мүдделер қақтығысының жоқтығын мәлімдейді

Түйін сөздер
шап жарығы, лапароскопиялық герниопластика, герниопластиканың дәстүрлі әдістері

Аңдатпа

Материал және әдістер. *2017 жылғы қаңтардан 2020 жылғы желтоқсан айына дейін А.Н.Сызғанов атындағы Ұлттық ғылыми хирургия орталығында 137 науқасқа жоспарлы түрде шап жарығы бойынша ота жасалды. Барлық науқастар негізгі 2 топқа бөлінді - дәстүрлі және лапароскопиялық әдіспен ота жасалғандар.*

Нәтижелер. *Талдау деректері герниопластиканың лапароскопиялық әдісінің дәстүрлі әдісіне қарағанда артықшылығының болуына көз жеткізеді.*

Қорытынды. *Екі топтағы науқастардың көрсеткіштерін салыстырмалы талдау негізінде лапароскопиялық герниопластика бойынша операцияның ұзақтығы 92,3 минутты құрайды, бұл дәстүрлі әдістермен салыстырғанда айтарлықтай ұзағырақ, яғни 79,4 минут.*

Осыған қарамастан, лапароскопиялық герниопластика бойынша операциядан кейінгі кезеңде анальгетикалық терапияның ұзақтығы 2,4 күнді, ал операциядан кейін ауруханада болу ұзақтығы 3 күнді құрайды, бұл дәстүрлі әдістермен салыстырғанда әлдеқайда аз, операциядан кейінгі кезеңде анальгетикалық терапия ұзақтығы, кезеңі 3, 3 күн, ал операциядан кейін ауруханада болу ұзақтығы 4,6 күн болды. Бұл талдау лапароскопиялық герниопластиканың дәстүрлі әдістерден артықшылығы бар екенін көрсетеді.

Сравнительный анализ результатов пластики паховых грыж лапароскопического и традиционных методов

Автор для корреспонденции:
Ахмет Д.Д. – врач-резидент, НАО «Казахский Национальный медицинский университет имени С.Д. Асфендиярова», г. Алматы, Казахстан.
E-mail: diyar.akhmet@mail.ru

Конфликт интересов
Авторы заявляют об отсутствии конфликта интересов

Ахмет Д.Д.[1], Баймаханов Ж.Б.[2], Нурланбаев Е.К.[2], Маткеримов А.Ж.[2], Чорманов А.Т.[2], Баймаханов Б.Б.[2]
НАО «Казахский Национальный медицинский университет им. С.Д. Асфендиярова», г. Алматы, Казахстан
АО «Национальный научный центр хирургии им. А.Н. Сызганова», г. Алматы, Казахстан

Аннотация

Цель исследования *- провести ретроспективный сравнительный анализ результатов лапароскопических и традиционных методов пластики паховых грыж у пациентов, пролеченных в хирургических отделениях Национального научного центра хирургии имени А.Н. Сызганова, Алматы, Казахстан.*

Материалы и методы. *В период с января 2017г. по декабрь 2020г. в «ННЦХ им. А.Н. Сызганова» 137 пациентов прооперированы в плановом порядке по поводу паховой грыжи, и все пациенты были разделены на 2 основные группы: прооперированных традиционными методами и лапароскопическим методом.*

Результаты. *Данные анализа позволяют предположить, что лапароскопический метод герниопластики имеет преимущество над традиционными методами.*

Выводы. *На основании сравнительного анализа показателей пациентов обеих групп можно сделать вывод, что продолжительность операции по лапароскопическойгерниопластике составляет 92,3 минуты, что значительно больше, чем при традиционных методах, составляющих 79,4 минуты.*

Несмотря на это, продолжительность анальгетической терапии в послеоперационном периоде при лапароскопической герниопластике составляет 2,4 дня, а продолжительность пребывания в стационаре после операции - 3 дня, что намного меньше, чем при традиционных методах, при которых продолжительность анальгетической терапии в послеоперационном периоде составляет 3, 3 дня, а продолжительность пребывания в стационаре после операции - 4,6 дня. Этот анализ показывает, что лапароскопическая герниопластика имеет преимущество перед традиционными методами.

Ключевые с лова
Паховая грыжа, лапароскопическая герниопластика, традиционные методы герниопластики

Relevance

A hernia is a congenital or acquired defect in the muscular-aponeurotic integrity of the abdominal wall, which makes it possible for any formation to protrude through it, which does not occur here under normal conditions [1]. Inguinal hernia is the most common type of hernia (about 70% of the total) [2]. An inguinal hernia is a type of hernia of the anterior abdominal wall, in which the hernial sac is in the inguinal canal [3]. The main criterion for a hernia is the presence of a defect in the abdominal wall in the region of the inguinal canal. In this case, the presence of a hernial sac is not necessary, although usually the components of a hernia are: a hernial gate, a hernial sac, the contents of a hernial sac. The contents of the hernial sac can be represented by any organ of the abdominal cavity, but most often - by a strand of the greater omentum or a loop of the small intestine. An inguinal hernia can be unilateral: left- or right-sided, or it can have bilateral localization. Inguinal hernias are congenital and acquired, oblique and straight. Congenital inguinal hernia is always oblique and is formed only as a result of non-closure of the vaginal process of the peritoneum. The emergence of acquired oblique and straight inguinal hernias is largely due to the anatomical weakness of the anterior and posterior walls of the inguinal canal [6, 8]. A hernia is not classified depending on the size of the hernial protrusion or the size of the hernial orifice, but may be accompanied by the presence or absence of the hernial sac descending into the scrotum. The contents of the hernial sac may or may not be adjusted into the abdominal cavity, hence the division of inguinal hernias into reducible and non-reducible hernias. An inguinal hernia is diagnosed annually: in Kazakhstan - 30,000 patients; in the Russian Federation - 220,000 patients; in the USA - 500,000 - 700,000 patients; in Germany - 180,000 patients [4]. Operations for inguinal hernias rank first in terms of frequency among elective surgical interventions [7]. Every year in the world about 20 million operations to remove inguinal hernias are performed [5]. Relapses in practical surgery occur after traditional methods of hernioplasty in 2–20%, and recurrences in 35–40% of patients, while after prosthetic techniques, relapse averages 1–5% [9, 10, 11]. There is a wide selection of plastic of the inguinal canal, and all these methods can be divided into 2 groups: traditional and laparoscopic. The question of the advantages of one or another plastic method remains relevant.

Purpose of the study

Conduct a retrospective comparative analysis of the results of laparoscopic and traditional methods of inguinal hernia repair, patients treated at the surgical departments at A.N. Syzganov National Scientific Center for Surgery, Almaty, Kazakhstan.

Materials and methods

In the period from January 2017 to December 2020 in A.N. Syzganov NSCS 137 patients were operated in a planned manner for inguinal hernia.

As presented, all patients were divided into 2 main groups: Group 1 - 83 patients operated on by traditional methods of hernia repair; Group 2 - 54 patients operated on by the laparoscopic method (Fig. 1.).

The average age of patients in group 1 is 59.6 years (max = 88, min = 17); The average age of patients in group 2 is 50.9 years (max = 81, min = 19);

In both groups, hernia repair methods were performed using the «Ultra PRO» synthetic mesh made of monocryl-prolene composite material.

The choice of tactics of surgical treatment was largely determined by the presence of concomitant pathology in the anamnesis and the size of the hernial protrusion.

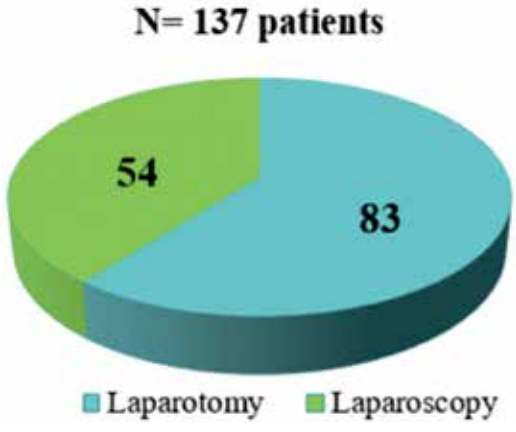


Figure 1.
The main groups of patients presented in the comparative analysis.

Results

Conducting a comparative analysis of the data of 137 patients operated in a planned manner since January 2017 to December 2020 about an inguinal hernia at A.N. Syzganov NSCS «between the two groups in terms of: gender ratio; localization of inguinal hernia: right-sided, left-sided and bilateral; the size of the hernial protrusion; the size of the hernia gate; the presence of lowering of the hernial sac into the scrotum - no statistical difference was found (p = ns) (Table 1).

	Laparotomy N = 83	Laparoscopy N = 54	Deviation
Number of patients	83	54	
Right-sided localization	42	33	ns
Left-sided localization	32	15	ns
Bilateral localization	8	6	ns
Time since last surgery (months)	96(384/1)	78(228/12)	ns
Hernia size (sm)	5,4(15/3)	4,3(12/3)	ns
Sizes of the hernia gate (sm)	3,5(8/2)	3,7(10/2)	ns
Lowering the hernial sac into the scrotum	14	6	ns

Table 1.
Patient indices without a statistically significant difference (p = ns)

	Laparotomy N = 83	Laparoscopy N = 54	Deviation
Number of patients	83	54	
Age (years)	59,6 (88/17)	50,9 (81/19)	P < 0.05
Concomitant pathology	58	12	P<0.05
Reversibility of the hernia into the abdominal cavity	65/18	51/3	P<0.05
The presence of previous surgical interventions in the abdominal cavity	37	12	P < 0.05
Hernia recurrence	25	4	P < 0.05
Plastic with synthetic mesh "Ultra PRO"	21/62	54	P < 0.05
Duration of surgery (min)	79,2(195/30)	92,3(160/30)	P < 0.05
Duration of analgesic therapy in the postoperative period	3,3(8/1)	2,4(5/1)	P < 0.05
Duration of stay after surgery	4,6(16/1)	3(6/1)	P < 0.05

Table 2. Indicators of patients with the revealed statistical difference (p <0.05)

Figure 2.
Diagram of comparative analysis of the indicator of the duration of the operation of 2 groups

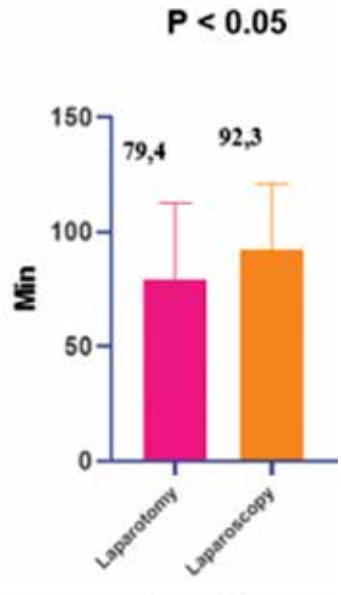


Figure 3.
Diagram of comparative analysis of the duration of analgesic therapy after surgery for 2 groups

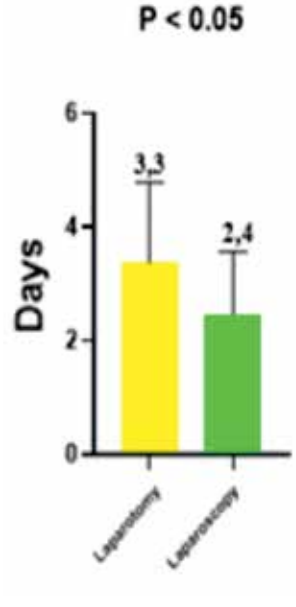
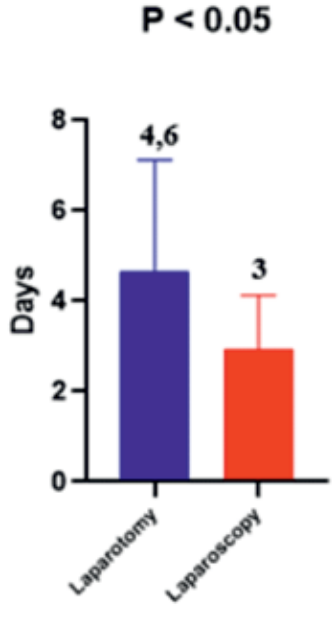


Figure 4.
Diagram of comparative analysis of the indicator of the duration of the patient's stay in the hospital after surgery for 2 groups



According to the index of reducibility of the hernial protrusion into the abdominal cavity in patients of group 1, out of 83 patients, in 65 the hernial protrusion was reduced into the abdominal cavity, in 18 patients there was the inappropriateness of the hernial protrusion. In patients of group 2, out of 54 patients, in 51 patients, the hernial protrusion was reduced into the abdominal cavity, in 3 patients there was an inappropriateness, which indicates the presence of a statistical difference ($p < 0.05$) (Table 2).

Out of 83 patients in group 1, 37 had previous surgical interventions in the abdominal cavity; in patients of group 2, 12 of 54 patients had previous surgical interventions in the abdominal cavity, which indicates the presence of a statistical difference ($p < 0.05$) (Table 2).

Hernia recurrence in patients of group 1 was observed in 25 out of 83 patients; in group 2, hernia recurrence was observed in 4 out of 54 patients, which indicates the presence of a statistical difference ($p < 0.05$) (Table 2). Hernia repair using a synthetic mesh «Ultra PRO» made of composite material monocryl-prolene, in patients of group 1 - out of 83, 21 patients were performed; that regarding group 2, mesh hernia repair was performed in all 54 patients, which indicates the presence of a statistical difference ($p < 0.05$) (Table 2).

The average duration of the operation (minutes) in patients of group 1 is 79.2, the longest operation lasted 195 minutes, the least lasting 30 minutes. In patients of group 2, the average duration of the operation was 92.3 minutes, the longest operation lasted 160 minutes, the least lasting 30 minutes, which indicates the presence of a statistical difference ($p < 0.05$) (Fig. 2).

Analgesic therapy in the postoperative period in patients of group 1 was carried out on average for 3.3 days. The most prolonged analgesics were prescribed within 8 days, the least long - within 1 day. In group 2 patients, analgesic therapy was carried out on average for 2.4 days. The most prolonged analgesics were prescribed within 5 days, the least long - within 1 day, which indicates the presence of a statistical difference ($p < 0.05$) (Fig. 3).

With regard to the length of stay of the patient in the hospital after the operation, the patients of group 1- needed to be in the hospital for an average of 4.6 days. The longest patients stayed in the hospital after surgery for 16 days, the least long for 1 day; Patients in group 2 - needed to be in the hospital for an average of 3 days. The longest patients stayed in the hospital after surgery for 6 days, the least long for 1 day, which indicates the presence of a statistical difference ($p < 0.05$) (Fig. 4).

During the observation period, postoperative complications were not observed in any group.

Conclusion

Based on a comparative analysis of the indicators of patients in both groups, it can be concluded that the duration of the operation for laparoscopic hernia repair is 92.3 minutes, significantly more than with traditional methods, which is 79.4 minutes (Fig. 2).

Despite this, the duration of analgesic therapy in the postoperative period with laparoscopic hernia repair is 2.4 days, and the duration of hospital stay after surgery is 3 days, much less than with traditional methods, in which the duration of analgesic therapy in the postoperative period is 3, 3 days, and the duration of hospital stay after surgery is 4.6 days. (Fig. 3, 4). This analysis suggests that laparoscopic hernioplasty has an advantage over traditional methods.

References

1. Tension-free hernioplasty / Under total. ed. V.N. Egieva. - M.: Medpraktika - 2002 .-148 p.
2. “European Hernia Society’s Guidelines for the Management of Inguinal Hernias in Adult Patients”, Hernia Journal, 2009.
3. Shalashov S.V., Kulikov O.K. Inguinal hernia in adults: A guide for physicians /Novosibirsk: Nauka, 2011. –136 p.
4. Protasov A.V. [et al]. Features of classifications of hernias in modern surgery (literature review) // Endoscopic surgery. –2007. - No. 4. - P. 49–52.
5. Greyasov V.I., Chuguevsky V.M., Ivanov S.A. Modern methods of treatment of hernias of the anterior abdominal wall [Text]: Almanac of the Institute of Surgery.2015-S. 27-35.
6. Zhebrovsky V.V., Elbashir M.T. Surgery of abdominal hernias and eventrations / Simferopol, 2002. -438 p.
7. Plastic surgery of the inguinal canal according to Liechtenstein and its modifications / D.V. Chizhov [and others] // Herniology. - 2004. - No. 1. - P. 43–51.
8. Yoffe I.L. Surgical treatment of inguinal hernias / - Moscow: Medicine, 1968 .- 172 p.
9. Egiev V. N. Tension-free hernioplasty. - M .: Medpraktika, 2002 .-148 p.
10. Chizhov D.V. [and others]. Plastics of the inguinal canal according to Liechtenstein and its modifications // Herniology. - 2004. - No. 1. - P. 43–51.
11. Protasov A.V. [et al.]. Features of classifications of hernias in modern surgery (literature review) // Endoscopic surgery. – 2007. - No. 4. - P. 49–52.

https://doi.org/10.35805/BSK2021IV032

EVALUATION OF IMMUNOLOGICAL CHANGES IN PATIENTS WITH DIFFUSE FORM OF AUTOIMMUNE THYROIDITIS DURING LASER PHOTODYNAMIC THERAPY

Aghayev R.M.
orcid.org/0000-0003-0954-1439

Sadikhov F.G.
orcid.org/0000-0002-6779-8796

Aliyev F.C.
orcid.org/0000-0001-6803-5443

Corresponding author:
Sadikhov F.Q. *- researcher, Department of Endocrine Surgery, Scientific Center for Surgery named after Academician M.A. Topchubashov, Baku, Republic of Azerbaijan. E-mail: fetta.sadixov@gmail.com*

Conflict of interest
The authors declare that they have no conflicts of interest

Aghayev R.M., Sadikhov F.G., Aliyev F.C.
Scientific Surgery Center named after Acad. M. A. Topchubashov, Baku, Azerbaijan Republic

Abstract

The purpose of the study. *To study the nature and dynamics of changes in humoral and local immunity during laser photodynamic therapy in patients with diffuse forms of autoimmune thyroiditis.*

Materials and methods. *Laboratory tests of blood plasma were performed on 160 patients with long-lasting autoimmune thyroiditis in different age groups to determine humoral and local immunity. Here, information on the level of immunoglobulins A, G, M (IgA, IgG, IgM), the amount of interleukin-1 β (IL-1 β), tumor necrosis factor α (TNF-α) was determined in blood samples by the immunoenzyme method. The dynamics of laboratory parameters in all three groups of patients were studied on days 7 and 15 of treatment. These values were determined using reactives from "Vector-Best" LLC (Russia).*

Results. *In elderly patients with long-term autoimmune thyroiditis, a downward trend in TNF indices has been observed, which is an indication of the severity of the pathological process. The higher the amount of α2-MG in autoimmune thyroiditis and diffuse toxic urination, and the slower the normalization during treatment, the higher the probability of recurrence of the process.*

Conclusion. *The combined use of modern laser technology in the treatment of patients with autoimmune thyroiditis expands the possibilities of conservative therapy and complements the arsenal of effective methods of treatment of this disease. The simplicity of the methods, ease of application, reliability, the absence of thermal effects on the thyroid gland creates ample opportunities for the application of this method in clinical practice.*

Keywords
autoimmune thyroiditis, immunoglobulin, tumor necrosis factor α, interleukin-1 β, lactoferrin

Аутоиммунды тиреоидиттің диффузиялық түрімен ауыратын науқастарда лазерлі фотодинамиялық терапия кезіндегі иммунологиялық өзгерістерді бағалау

Агаев Р.М., Садыхов Ф.Г., Алиев Ф.Х.
Академик М.А. Топчубашов атындағы ғылыми хирургия орталығы, Баку қ., Әзірбайжан Республикасы

Хат алысатын автор:
Садыхов Ф.Г. *- академик М.А. Топчубашов атындағы ғылыми хирургия орталығының эндокриндік хирургия бөлімінің ғылыми қызметкері, Баку қ., Әзірбайжан Республикасы. E-mail: fetta.sadixov@gmail.com*

Мүдделер қақтығысы
Авторлар мүдделер қақтығысының жоқтығын мәлімдейді

Аңдатпа

Жұмыстың мақсаты *- аутоиммунды тиреоидиттің диффузды түрімен ауыратын науқастарда лазерлік фотодинамикалық терапия кезінде гуморальды және жергілікті иммунитеттің, қалқанша безінің параметрлерінің өзгеру сипаты мен динамикасын зерттеу болып табылады.*

Материал және әдістер. *Жұмыс ұзақ мерзімді аутоиммунды тиреоидитпен ауыратын әртүрлі жас топтарындағы 160 пациенттің гуморальды және жергілікті иммунитет көрсеткіштерін анықтау деректеріне негізделген. Қан плазмасына зертханалық зерттеу жүргізілді, оның үлгілерінде иммуноглобулиндер A, G, M (IgA, IgG, IgM), интерлейкин-1 β (IL-1 β), ісік некроз факторы-α (TNF-) анықталды. а) иммундық талдау ферментімен анықталды. Осы зертханалық көрсеткіштердің динамикасы емдеудің 7 және 15-ші күндерінде барлық үш топтағы науқастарда зерттелді. Бұл көрсеткіштер «Вектор-Бест» (Ресей) компаниясының реагенттері арқылы анықталды. Материал емдеуге дейін, емдеу басталғаннан кейін 7 және 15 күннен кейін алынды.*

Нәтижелер. *Ұзақ мерзімді аутоиммунды тиреоидитпен (АИТ) TNF индекстерінің төмендеуіне тенденция байқалады, бұл патологиялық процестің ауырлығын көрсетеді. Аутоиммунды тиреоидит пен диффузды токсикалық зоб (ДТГ) кезінде а2-MG мөлшері неғұрлым жоғары болса және емдеу кезінде олардың қалыпқа келуі неғұрлым баяу болса, процестің қайталану ықтималдығы соғұрлым жоғары болады деп болжанады.*

Қорытынды. *АИТ бар науқастарды емдеуде лазерлік технологияларды қолдану консервативті терапияның мүмкіндіктерін кеңейтеді және осы ауруды емдеудің тиімді әдістерінің арсеналын толықтырады. Әдістердің қарапайымдылығы, олардың қолжетімділігі, сенімділігі, қалқанша безінің термиялық зақымдануын болдырмау біздің терең сеніміміз бойынша бұл әдістерді клиникалық тәжірибеге енгізуге негіз береді.*

Түйін сөздер
аутоиммунды тиреоидит, иммуноглобулин, ісік некрозының факторы-α, интерлейкин-1 β, лактоферрин

Оценка иммунологических изменений при проведении лазерной фотодинамической терапии у больных диффузной формой аутоиммунного тиреоидита

Агаев Р. М., Садыхов Ф. Г., Алиев Ф.Х.
Научный центр хирургии им. Академика М.А. Топчубашова, г. Баку, Республика Азербайджан

Аннотация

Целью работы *является изучить характер и динамику изменений показателей гуморального и местного иммунитета, щитовидной железы при проведении лазерной фотодинамической терапии у больных диффузной формой аутоиммунного тиреоидита.*

Материал и методы. *Работа основана на данных определения показателей гуморального и местного иммунитета 160 больных разных возрастных групп с длительно текущим аутоиммунным тиреоидитом. Выполнено лабораторное исследование плазмы крови, в образцах которых иммуноферментным методом определяли содержание иммуноглобулинов A, G, M (IgA, IgG, IgM), интерлейкина-1 β (ИЛ-1 β), фактора некроза опухоли-α (ФНО-а). У пациентов всех трех групп изучена динамика данных лабораторных показателей на 7-й и 15-й день лечения. Данные показатели определяли с использованием реактивов компании ООО «Вектор-Бест» (Россия). Забор материала осуществляли до лечения, через 7 и 15 суток от начала лечения.*

Результаты. *При длительно текущем аутоиммунном тиреоидите (АИТ) отмечается тенденция снижения показателей ФНО, что указывает на выраженность патологического процесса. Предполагается, что чем выше содержание а2-МГ при аутоиммунном тиреоидите и диффузно-токсическом зобе (ДТЗ), и чем медленнее их нормализация при лечении, тем выше вероятность возникновения рецидива процесса.*

Заключение. *Применение лазерных технологий в лечении больных АИТ расширяет возможности консервативной терапии и дополняет арсенал эффективных методов лечения этого заболевания. Простота способов, их доступность, надежность, исключение термического повреждения щитовидной железы дают, по нашему глубокому убеждению, основание к внедрению этих методов в клиническую практику.*

Автор для корреспонденции:
Садыхов Ф.Г. *- научный сотрудник отделения эндокринной хирургии Научного центра хирургии им. Академика М.А.Топчубашова, г. Баку, Республика Азербайджан.*
E-mail: fetta.sadixov@gmail.com

Конфликт интересов
Авторы заявляют об отсутствии конфликта интересов

Ключевые слова
аутоиммунный тиреоидит, иммуноглобулин, фактора некроза опухоли-α, интерлейкина-1 β, лактоферрин

Introduction

Autoimmune thyroiditis is a typical autoimmune disease characterized by chronic inflammation of the thyroid gland. A characteristic morphological sign of autoimmune thyroiditis (AIT) is lymphoplasmacytic infiltration of the thyroid tissue of the gland, with obligatory autoimmune inflammation. The composition of cells in AIT is always constant; it combines cells of the lymphoid series, plasmacytic infiltration, and macrophages. An increased level of antibodies to the thyroid gland in the blood leads to an increase in the functional activity of mononuclear cells, which destroy thyrocytes and follicles with the release of cytokines and lactoferrin (Lf). Cytokines play an important role in modulating immune responses and initiating the immune process. Their role is often difficult to predict without taking into account other mediators - immune and hormonal. Regulatory cytokines can induce self-tolerance to thyroid antigens or, on the contrary, activate autoimmune processes in it. An excess of Lf in the blood does not improve the situation; on the contrary, it supports inflammatory and autoimmune changes, increases the production of TNF-a and lactoferrin (Lf) cytokines in the blood serum of AIT patients [1,4,12].

Meanwhile, in practical medical institutions, clinical diagnosis is often formulated as a nodular (or multinodular) goiter. However, from a practical point of view, identifying the main forms of thyroiditis is extremely important, since applying an accurate classification will vividly establish the nature (with/without complications) of the clinical course of the disease, while also enabling us to objectively assess the prognosis of the disease, and, consequently, choose the optimal treatment method. Recall that AIT patients have a higher risk of developing “thyroid cancer” than those who do not suffer from this disease [2,7,8,11]. Such development of the pathological process is based on genetic mechanisms. During histological and immunohistochemical examinations, it was noted that an increase in the expression of Ki-67, p53 and an increase in the expression of thyroglobulin in autoimmune thyroiditis are reflections of proliferation processes of thyrocytes. As you know, proliferation is a direct path to cellular dedifferentiation and dysplasia of thyrocytes. It is important to emphasize that with different forms of AIT there are changes of varying intensity [3,5,10,12].

The general principle of the treatment of autoimmune diseases is to suppress the activity of the immune system, to reduce the lymphoplasmacytic infiltration of the thyroid tissue. Functionally active mononuclear cells infiltrating the thyroid tissue also actively accumulate photosensitizers, just like tumor cells and microflora [4,7,13]. Consequently, it is possible to induce their apoptosis with the formation of apoptotic bodies, which macrophages recognize and phagocytose without damaging

neighboring healthy cells. The release of regulatory cytokines, together with the anti-inflammatory effect, makes it possible to test photodynamic therapy in the treatment of autoimmune thyroiditis [8,12,14].

In recent years, based on the revealed polyvalent effect of photodynamic therapy (PDT), laser PDT has been successfully applied in the treatment of benign and malignant skin neoplasms of various localizations, psoriasis, and inflammatory diseases [6,8,9,11]. The mechanism of action of photodynamic therapy is the selective accumulation of a light-sensitive substance in inflammatory tissue and pathogenic microorganisms and its activation by laser irradiation to produce active oxygen species that cause bactericidal effects without damaging healthy tissues. Photodynamic therapy has anti-inflammatory, antihistamine, desensitizing, and immunomodulatory effects [10,11,13]. The accumulated experience gives grounds to apply this method in the treatment of AIT. The photodynamic effect is local in nature, and the bactericidal effect is limited to the zone of laser irradiation, which avoids several side effects observed during antibiotic therapy [7,13,14]. From our point of view, at the present, it is quite justified to study the possibility of using the method of laser PDT in the treatment of patients with the diffuse form of autoimmune thyroiditis.

The purpose of the study

To study the nature and dynamics of changes in humoral and local immunity during laser photodynamic therapy in patients with diffuse forms of autoimmune thyroiditis.

Material and methods

The work is based on the results of laboratory examinations for the indices of humoral and local immunity of 160 patients hospitalized at the clinical base of the Scientific Center of Surgery named after Academician M.A.Topchubashov. Patients aged 16 to 74 years were admitted to the hospital in a planned manner at various times from the onset of the disease. Patients were divided into three age groups (I group-low age group (ages 16-35), II group-middle age group (ages 35-59), and III group-old patients (ages 60-74)).

To study the features of humoral and local immunity in 160 patients of different age groups with long-term autoimmune thyroiditis, a laboratory study of blood plasma was performed. In the samples information about immunoglobulins A, G, M (IgA, IgG, IgM), interleukin-1 β (IL-1β), tumor necrosis factor-α (TNF-α) was determined. The dynamics of these laboratory parameters on the 7th and 15th days of treatment were studied in patients of all three groups. These indicators were determined using reagents of the company "Vector-Best" (Russia). These reagents were obtained from the Scientific Research Immunology Laboratory. The material was taken before treatment, after 7 and 15 days from the start of treatment.

The functional activity of mononuclear cells of whole blood in an in vitro reaction was studied according to the daily spontaneous and mitogen-stimulated production of cytokines TNF-α and lactoferrin in the blood serum of AIT patients before the prescribed treatment. The possibility of using this approach to optimize the diagnosis and predict the state of cellular immunity with autoimmune thyroiditis was assessed. The concentration of α2-MG was determined by quantitatively low-voltage immunoelectrophoresis in agarose gel plates using monospecific polyclonal antibodies to proteins. The level of Lactoferrin (Lf) and also TNF-α, IL-6, IFN, and hormones TSH and free T4 were investigated by the method of enzyme-linked immunosorbent assay (ELISA) using the "Vector Best" test systems.

We have studied the parameters of inflammatory cytokines, inflammatory mediators, immunoglobulins, and endothelial growth factors in the blood of patients with various forms of autoimmune thyroiditis. Statistical processing of the obtained data was carried out with the help of MS Excel-2016 software by the method of variational statistics. Statistical evaluation was performed using the Mann-Whitney U criterion with Bonferroni corrections.

Results and discussion

The level of TNF-α in blood plasma in all forms of thyroiditis was detected slightly higher in diffuse toxic goiter (DTG) and AIT in the decompensation stage, though it did not go beyond the reference values (5 ɵg/l). IL-6 concentrations were significantly increased in DTG and AIT (18 or more times). Low levels of TNF-α in all groups of patients indicate long-term chronic inflammation.

Cytokines play an important role in modulating immune responses and initiating the immune process. Their role has been insufficiently studied and is often difficult to predict without taking into account other mediators - immune and hormonal. Regulatory cytokines can induce self-tolerance to thyroid antigens or, on the contrary, activate autoimmune processes in it. The study of the role of each specific cytokine in the context of a specific immune response in different functional states of the thyroid gland is of fundamental importance for the development of appropriate strategies for their modulation.

When examining patients with AIT, clinical signs of hormonal disorders were reflected by changes in the level of TSH and FT4. The con-

Table 1.
Concentrations of immunoregulatory proteins and anti-inflammatory cytokines in the blood of patients with DTG and AIT

Tireoiditin forması	TTH mIU/ml	Sər. T_4 pmol/L	TNF-α (pq/ml)	$α_2$-MG	IL-6	LF
control n = 40	1,37±0,16	16,38±0,71	0,9±0,2	1,89±0,6	0,5±0,1	1,06±0,07
I G. hypertrophic (n = 32)	15,7±2,15	8,4±1,50	2,5±0,3	2,81±0,19	11±1,1	1,49±0,10
II G. Atrophic (n = 28)	21,6±2,73	17,82±0,76	2,2±0,3	2,57±0,10	8,9±1,5	1,44±0,17
III G. Recurrence (n = 30)	14,14	11,2±2,7	1,1±0,1	2,37±0,10	9,4±0,9	1,88±0,15
IV G. DTG (n = 30)	0,03±0,01	59,08±6,18	1,9±0,2	2,85±0,10	7,7±0,9	1,71±0,12

** - the values of the quantitative feature in the mentioned group are statistically significant (p <0.05) and differ from the values in the age group 35-59;*
 # - the values of the quantitative feature in the mentioned group are statistically significant (p <0.05) and differ from the values in the age group 60-74;
Statistical evaluation was performed using the Mann-Whitney U criterion with Bonferroni corrections.

centration of α2-MG – 1,7±0,12 in the blood was increased in DTG and AIT by an average of 1,5 times. During treatment, its levels statistically significantly decreased in DTG and were somewhat lower than before treatment with AIT, although they remained significantly higher than in the control group (table 1).

The average TSH level in patients with AIT was 15±4,71 mIU/ml, the concentration of free thyroxine was T3-10,26±0,66 and T4-15,3±1,08 pmol/L, respectively.

In DTG and AIT, α2-MG concentration in the blood serum before treatment was increased in the decompensation stage. During treatment, its levels statistically significantly decreased in DTG and were slightly lower than before treatment with AIT, although they remained significantly higher than in the control group. The LF content was significantly increased in AIT (1,3 times) and DTG (1,6 times).

The treatment did not significantly affect its concentration. The level of the proinflammatory cytokine TNF-α was slightly higher than normal in DTG and AIT in the decompensation stage, though it did not go beyond the reference values.

The cytotoxic effect in the thyroid gland is largely mediated by Th-1 lymphocytes, which actively produce TNF and especially IFN-γ. An excess of IFN-gamma induces the expression of MHC-P, the synthesis of chemokines and the expression of adhesion molecules, promotes the expansion of T- and B lymphocytes and macrophages into the thymus, supports the development of an inflammatory response, causes the progression of autoimmune processes and stimulates apoptosis of thymocytes. It is predicted that the hypersynthesis of proinflammatory cytokines in response to infectious agents is one of the trigger mechanisms of autoimmune pathological changes in the thyroid gland. Inducers of inflammation and autoimmune processes such as TNF-α and IL-6 make a somewhat smaller contribution to the pathogenesis of the disease. In this regard, the following fact is an indicator: we did not observe a complete normalization of the concentration of TNF-α and IL-6 in the blood of patients with DTG and AIT, despite the clinical effect. In our opinion, conservative treatment carried out for 4-6 months did not have a pronounced effect on the causes of the pathological process and only stopped their consequences.

One of the reasons for this situation may be dysregulation of the synthesis and functioning of polyfunctional immunoregulatory proteins. In particular, α2-MG is an inhibitor of protein-

Table 2.
Titers of serum Anti TPO in patients with different forms of autoimmune thyroiditis

Form of thyroiditis	Indicators		
	TTH mIU/ml	**T_4 pmol/L**	**Anti TPO IU/mL**
Hypertrophic (n = 32)	7,9 ± [3,33±5,29]	5,5 ± [3,2±4,5]	640 ± [27,7±30,38]
Atrophic (n = 28)	12,5 ± [3,35±6,2]	7,9 ± [3,0±4,1]	650 ± [28,13±33,43]
Recurrence (n = 30)	15,2 ± [3,73±7,8]	8,0 ± [2,1±3,18] *	690 ± [35,6±38,88] *

** - the values of the quantitative feature in the mentioned group are statistically significant (p <0.05) and differ from the values in the age group 35-59;*
 # - the values of the quantitative feature in the mentioned group are statistically significant (p <0.05) and differ from the values in the age group 60-74;
Statistical evaluation was performed using the Mann-Whitney U criterion with Bonferroni corrections.

Table 3.
Indicators of immunoglobulins in the blood of patients in different age groups

Age groups	Immunoglobulin	indicators	
	IgA, g/l	**IgM, g/l**	**IgG, g/l**
I G. (n = 32) (ages 16-35)	4,31 [3,33-5,29]	3,85 [3,2-4,5]	29,04 [27,7-30,38]
II G. (n = 28) (ages 35-59)	4,78 [3,35-6,2]	3,55 [3,0-4,1]	30,78 [28,13-33,43]
III G. (n = 30) (ages 60-74)	6,27 [4,73-7,8]	2,64 [2,1-3,18]*	37,24 [35,6-38,88]*
DTG n=30	1,9±0,9	0,9±0,6	12,9±4,8

** - the values of the quantitative feature in the mentioned group are statistically significant (p<0.05) and differ from the values in the age group 35-59;*
 # - the values of the quantitative feature in the mentioned group are statistically significant (p<0.05) and differ from the values in the age group 60-74;
Statistical evaluation was performed using the Mann-Whitney U criterion with Bonferroni corrections.

ases released during inflammation, is involved in the recognition and presentation of infectious agents, regulation of proliferation and apoptosis, and tissue remodeling. Lf also has antibacterial and antiviral properties, regulates the synthesis of cytokines, and is a highly sensitive marker of inflammation. An excess of cytokines (especially IL-6 for α2-MG and chemokine IL-8 for Lf) activates the synthesis of these proteins. At the same time, pronounced inflammation leads to the oxidation of α2-MG molecules and their accumulation in blood circulation, which is confirmed by the results of our research.

The accumulation of α2-MG in autoimmune diseases of the thyroid gland was as follows. As the patient's ages were increasing, we observed a tendency to an increase in the level of immunoglobulins. The IgA index in blood plasma was 4,31 [3,33-5,29] g/l in patients of the first age group (ages 16-35), 4,78 [3,35-6,2] g/l in patients of the middle age group (ages 35-59), and 6,27 [4,73-7,8] g/l in the elderly (ages 60-74), which is statistically significantly higher than in middle-aged patients (p <0,05).

In the study of IgM, we did not note statistically significant differences among the studied groups, although there was a slight increase in the median values. IgM indices were 3,85 [3,2-4,5] g/l in the first age group, 3,55 [3,0-4,1] g/l in the second age group, and 2,64 [2,1-3,18] g/l in the group of elderly patients. When analyzing IgG indicators, there were statistically significantly high values (p <0,05, for each of the comparison pairs with both groups) of these immunoglobulins in the elderly than in younger groups. IgG was equal to 29,04 [27,7-30,38] in patients of the first group, 30,78 [28,13-33,43] in the second group, and 37,24 [35,6-38,88] in the third group.

Thus, in elderly patients with long-term AIT, there is a tendency for TNF indices to decrease, which indicates the severity of the pathological process. Increased immunoglobulin (IgA and IgG) levels are observed in elderly patients with a long-term inflammatory process in the thyroid gland. In this category of patients, changes in the immune system (α2-MG -negative reactant of inflammation) negatively affect all physiological processes due to defective forms. This causes pathological changes controlled by a negative reactant of inflammation, including stimulation of cytokine synthesis. It is predicted that the higher the content of α2-MG in AIT and DTG and the slower their normalization during treatment, the higher the probability of a relapse of the process. The situation is similar with Lf: the direction of its effect on the synthesis of cytokines is regulated by the balance of free and iron-bound forms of Lf. When T3 and T4 deficiency are observed during autoimmune changes in the thyroid gland, high levels of LF in the blood do not improve the situation, but rather support the inflammatory process and autoimmune changes. Accordingly, a decrease in LF concentration in the blood serum during treatment, especially a high number of cytokines, indicates a negative prognosis and a high risk of recurrence in the near future. In general, α2-MG in DTG and AIT behaves like a positive late reactant of inflammation, which is slowly removed from the blood circulation; therefore the absence of normalization of this indicator in the blood after treatment is not informative.

Conclusion

The combined use of modern laser technology in the treatment of patients with autoimmune thyroiditis expands the possibilities of conservative therapy and completes the arsenal of effective methods of treatment of this disease. The simplicity of the methods, ease of application, reliability, the absence of thermal effects on the thyroid gland create ample opportunities for the application of this method in clinical practice.

References

1. Saprina T.V. General patterns and features of dysregulation of the immune system in endocrine diseases of autoimmune genesis: Thesis of MD, - 2014, - 388 p.
2. Kim K.W., Park Y.J., Kim E.H., et al. Elevated risk of papillari thyroid cancer in Korean patients with Hashimoto's thyroiditis // Head Neck. -2011.- Vol. 33(5), -P. 691-695
3. Saprina T.V., Prokhorenko T.S., Ryazantseva N.V. Immunological and morphological predictors of clinical heterogeneity in patients with Graves' disease (based on the results of a study of the operative material of the thyroid gland) // Bulletin of Siberian Medicine. - 2015. - T. 14, -№ 1, - P. 81-91. (in Russian)
4. Dzhikaev G. D. Morphological criteria for the diagnosis of chronic autoimmune thyroiditis. Thesis of MD. 117 p. Volgograd 2016.
5. Poloz T.L., Shevchenko S.P. Problems of cytological diagnosis of thyroid follicular tumors // Siberian Journal of Oncology. - 2011. - № 6 (48) - P.62-65. (in Russian)
6. Polyakov A.V., Kirillov Y.B., Aristarkhov V.G., Biryukov S.V. Indications and volume of surgical treatment for chronic autoimmune thyroiditis // Actual problems of surgery and healthcare organization // Ryazan -1977 -p. 174-177 (in Russian)
7. Fomin D.K., Tararukhin O.B. Possibilities of two-indicator scintigraphy in the differential diagnosis of malignant and benign thyroid diseases // Medical Radiology and Radiation Safety. - 2010. - T.55, № 2. - P.39-42. (in Russian)
8. Fridman M.V., Demidchik Y.E., Meleshko O.I. Problems of interaction between doctors of different specialties at the stages of diagnosis of tumors and tumor-like conditions of the thyroid gland // Medical panorama. - 2004. - № 5. - P.19-21. (in Russian)
9. 9. Fadeev V.V. Diseases of the thyroid gland in the regions of mild iodine deficiency // - M: Vidar, 2005. - 240 p.
10. Kharnas S.S., Mamaeva S.K. Long-term results and quality of life after surgical treatment of diffuse toxic goiter // Endocrine Surgery. - 2008. - № 1 (2). - P.10-14. (in Russian)
11. Charles R.P., Iezza G., Amendola E. et al. Mutationally activated BRAF (V600E) elicits papillary thyroid cancer in the adult mouse // Cancer Res. – 2011. – Vol.71. (11). – P.3863-3871.
12. Chen R.H., Chen W.C., Wang T.Y. Lack of association between pro-inflammatory cytokine (IL-6, IL-8 and TNF-alpha) gene polymorphysms and Graves'disease //Int.J. Immunogenet. 2005. 32(6).343-347
13. Stranadko E.Ph. Photodynamic therapy in ENT cancer. Moscow, 2016, p. 86 (in Russian)
14. DeMicco C, Ruf J., Chrestian M.A. et al. Immunohistochemical study of thyroid peroxidase in normal, hyperplastic, and neoplastic human thyroid tissues // Cancer. 1991. -Vol. 67, № 12. - P.3036-3041.

https://doi.org/10.35805/BSK2021IV038

GASTRIN IN SERUM AND MORPHOLOGICAL STATE OF GASTRIN-SECRETING CELLS IN PATIENTS WITH GASTRIC POLYPOSIS

Tazhimuradov R.
orcid.org/0000-0002-1391-0893

Saranova M.
orcid.org/0000-0003-4313-794X

Madalihodjayev R.
orcid.org/0000-0002-6375-880X

Corresponding author:
Saranova M. *- General Surgeon, Meir Private Clinic, Shymkent, Kazakhstan.*
E-mail: dr.saranova@gmail.com

Conflict of interest
The authors declare that they have no conflicts of interest

Tazhimuradov R.[1], Saranova M.[3], Madalihodjayev R.[1,2]
[1]Shymkent Medical Institute of the Akhmet Yassawi International Kazakh-Turkish University, Shymkent, Kazakhstan
[2]Surgical Division, South Kazakhstan Regional Oncology Dispensary, Shymkent, Kazakhstan
[3]Meir Private Clinic, Shymkent, Kazakhstan

Abstract

Numerous studies regarding gastric hormones and their regulation have been performed until now. However, the effect of the hormones on the formation and malignisation of gastric polyps still remains not clear. ***Our aim*** *was to identify the relation between the level of gastrin in the blood, gastric mucosa, polyp tissue, gastric juice and pathogenesis of gastric polyposis.*

Materials and methods. *A thorough investigation of gastrointestinal hormones in serum and gastric juice, in polyp's tissue and mucosa, gastrin-secreting cells and proteolytic activity of gastric juice was carried out in 40 patients with gastric polyps. These patients were divided into groups, depending on the location, number, and malignancy of the polyps. As a control group, 10 healthy individuals were used to determine the normal values of the studied indicators.*

Results: *A significant increase (more than two times) in the gastrinemia level before the surgery was noted in patients with polyp recurrence, and gastrin level increased to more significant digits of 227.0+37.4 pg/ml ($p<0.05$) in one year after polypectomy.*

Conclusion. *Gastrin is apparently involved in the process of polyp formation since polyp's growth is accompanied by elevation of serum gastrin. This is confirmed by a response of gastrin in the blood to a test meal in individuals with different duration of the disease: a marked increase in gastrinemia appears in patients suffering from gastric polyposis for more than three years. Therefore, evaluation of gastrin level in the patients' blood can be used to predict a recurrence potential of polyps. This is evidenced by more pronounced hypergastrinemia before polypectomy in patients who had a further recurrence of the disease within one year after the surgery.*

Keywords
serum gastrin, gastric secretion, gastric polyps, polypectomy, polyp recurrence

Асқазан полипозы бар науқастардың қан сарысуындағы гастрин құрамы және гастрин шығаратын жасушалардың морфологиялық жағдайы

Хат алысатын автор:
Саранова М. *– хирург, «Меир» жеке клиникасы, Шымкент қ., Қазақстан.*
E-mail: dr.saranova@gmail.com

Мүдделер қақтығысы
Авторлар мүдделер қақтығысының жоқтығын мәлімдейді

Тәжімұрадов Р.[1], Саранова М.[3], Мадалиходжаев Р.[1,2]
[1]Қожа Ахмет Яссауи атындағы Халықаралық қазақ-түрік университетінің Шымкент медициналық институты, Шымкент қ., Қазақстан
[2]Оңтүстік Қазақстан облыстық онкологиялық диспансерінің хирургиялық бөлімі, Шымкент қ., Қазақстан
[3]«Меир» жеке клиникасы, Шымкент қ., Қазақстан

Аңдатпа

Бүгінгі күні асқазан гормондары мен олардың реттелуіне қатысты көптеген зерттеулер жүргізілді. Алайда, гормондардың асқазан полиптерінің пайда болуына және қатерлі ісікке әсері әлі түсініксіз. ***Біздің мақсатымыз*** *қандағы, асқазанның шырышты қабатындағы, полип тіндегі, асқазан сөліндегі гастрин деңгейі мен асқазан полипозының патогенезі арасындағы байланысты анықтау болды.*

Материал мен әдістер. *Асқазан полиптері бар 40 науқаста қан сарысуы мен асқазан сөліндегі, полип тіндеріндегі және шырышты қабаттардағы, гастрин шығаратын жасушалардағы асқазан-ішек жолдары гормондарын және асқазан сөлінің протеолитикалық белсенділігін мұқият зерттеу жүргізілді. Бұл науқастар полиптердің орналасуына, санына және қатерлі ісіктеріне байланысты топтарға бөлінді. Бақылау тобы ретінде зерттелген параметрлердің қалыпты мәндерін анықтау үшін дені сау 10 адам зерттелінді.*

Нәтижелер. *Қайталанатын полипі бар науқастарда операцияға дейін гастринемия деңгейінің едәуір жоғарылауы (екі реттен артық) болды, ал полипэктомиядан кейін бір жыл өткен соң гастрин деңгейі 227,0 + 37,4 пг/мл-ге дейін жоғарылады ($p < 0,05$).*

Қорытынды. *Гастрин полиптің пайда болуына қатысады, өйткені полиптің өсуі сарысудағы гастрин деңгейінің жоғарылауы арқылы жүреді. Бұл аурудың әр түрлі ұзақтығы бар адамдарда қандағы гастриннің сынақ тамағына реакциясы арқылы расталады: асқазан полипозы үш жылдан асқан науқастарда гастринемияның айқын жоғарылауы пайда болады. Сондықтан пациенттердің қанындағы гастрин деңгейін бағалау арқылы полиптердің қайталану мүмкіндігін болжауға болады. Операциядан кейін бір жыл ішінде аурудың қайталануы болған науқастарда полипэктомияға дейінгі айқын гипергастринемия осының дәлелі.*

Түйін сөздер
асқазан полиптері, полип, полипэктомия, полиптің қайталануы, қан сарысуындағы гастрин, асқазан секрециясы

Содержание гастрина в сыворотке крови и морфологическое состояние гастринпродуцирующих клеток у пациентов с полипозом желудка

Тажимурадов Р.[1], Саранова М.[3], Мадалиходжаев Р.[1,2]

[1]Шымкентский медицинский институт Международного казахско-турецкого университета имени Ходжа Ахмета Яссауи, г. Шымкент, Казахстан

[2]Хирургическое отделение, Южно-Казахстанский областной онкологический диспансер, г. Шымкент, Казахстан

[3]Частная клиника «Меир», г. Шымкент, Казахстан

Автор для корреспонденции:
Саранова М. *- хирург, частная клиника «Меир», г. Шымкент, Казахстан.*
E-mail: dr.saranova@gmail.com

Конфликт интересов
Авторы заявляют об отсутствии конфликта интересов

Аннотация

До настоящего времени проведено множество исследований, касающихся гормонов желудка и их регуляции. Однако влияние гормонов на образование и малигнизацию желудочных полипов до сих пор остается неясным. ***Нашей целью*** *было выявить взаимосвязь между уровнем гастрина в крови, слизистой оболочке желудка, ткани полипа, желудочном соке и патогенезом полипоза желудка.*

Материал и методы. *У 40 пациентов с полипами желудка проведено тщательное исследование гастроинтестинальных гормонов в сыворотке крови и желудочном соке, в ткани полипа и слизистой, гастринпродуцирующих клеток и протеолитической активности желудочного сока. Эти пациенты были разделены на группы в зависимости от расположения, количества и злокачественности полипов. В качестве контрольной группы использовали 10 здоровых лиц для определения нормальных значений исследуемых показателей.*

Результаты. *У пациентов с рецидивом полипа отмечено значительное повышение (более чем в два раза) уровня гастринемии до операции, а через год после полипэктомии уровень гастрина повысился до более значимых цифр 227,0+37,4 пг/мл ($p<0,05$).*

Выводы. *Гастрин, очевидно, вовлечен в процесс образования полипов, поскольку рост полипов сопровождается повышением уровня гастрина в сыворотке крови. Это подтверждается реакцией гастрина в крови на пробный прием пищи у лиц с различной длительностью заболевания: выраженное повышение гастринемии появляется у пациентов, страдающих полипозом желудка более трех лет. Поэтому оценка уровня гастрина в крови пациентов может быть использована для прогнозирования возможности рецидива полипов. Об этом свидетельствует более выраженная гипергастринемия перед полипэктомией у пациентов, у которых в течение года после операции наблюдался дальнейший рецидив заболевания.*

Ключевые слова
полипы желудка, полип, полипэктомия, рецидив полипа, гастрин сыворотки крови, желудочная секреция

Introduction

Gastrin is one of the main regulators of acid-forming function of the stomach. Currently, there are two known ways to implement the gastrin action on hydrochloric acid secretion in gastric mucosa [1-3].

The first way is based on the notion of histamine as the final stimulator of acid secretion. It increases the activity of histidine decarboxylase, which catalyzes the conversion of histidine to histamine. The last one, interacting with the H2-receptors, activates adenylate cyclase and increases intracellular level of AMP in the parietal cells [4,5].

The second way is based on the elevation of tubular permeability of the parietal cells and increase in the flow of exogenous calcium to them [2-7].

In any case, the effect of gastrin on the secretion of hydrochloric acid is caused by the interaction of the hormone with a specific gastrin receptor of the parietal cell membranes.

These processes are carried out in close contact with other biologically active substances with very narrow relationship between them [8].

Besides the influence on the secretion of hydrochloric acid, gastrin is able to stimulate smooth muscle contraction of the lower esophageal sphincter, stomach, small intestine, gall bladder [2,6,9], to increase blood flow to the stomach, small intestine, pancreas [4,8].

Trophic effects of gastrin on the various parts of digestive tract and pancreas were noted in clinical and experimental studies. Thus, mucosal thickening of stomach fundus and duodenum was revealed in patients with Zollinger-Ellison syndrome. The stimulatory effect of gastrin on the cells' growth was noted in a tissue culture of duodenal mucosa during the investigation [10,11].

Experimental data on the trophic action of gastrin is contradictory. Trophic effects of exogenous gastrin on the gastrointestinal tract mucosa, including esophagus and antrum, were marked in a number of papers, while other evidence suggests that injection of gastrin leads to the increase of mitosis number and DNA synthesis in the fundic mucosa, but not in the antral mucosa [12].

Experiments in which found that gastrin increases DNA synthesis and mitotic activity in the fundic gland cells and histamine does not cause such effect, became the basis for hypothesis on the trophic activity of gastrin [13,14]. Consequently, endogenous hypergastrinemia has trophic effect on the fundic mucosa, which is not observed after gastrectomy with antrum elimination. In humans, injection of pentagastrin contributed to the inclusion

of urinating leucine to the protein components of the gastric mucosa, but not of the duodenal mucosa [15-18]. Trophic effect of gastrin observed in the works of many authors [16,19-21]. At the same time, there is doubt about the physiological nature of trophic effect of exogenous gastrin [22-24].

Material and methods

A total of 40 patients (17 men, 23 women) with gastric polyps admitted to the Regional Oncologic Dispensary were included in the study. Age of the patients ranged from 25 to 79 years.

26 (65%) patients were examined in the hospital, 14 (35%) patients underwent examination and treatment in outpatient conditions. 10 healthy volunteers took part in the clinical trial as a control group.

Outpatient and clinical records of patients were the source of statistical data. These records included all the information on the results of endoscopy, radioimmunoassay, histological examination and surgical management, along with a long-term endoscopic follow-up of patients.

Most patients were aged 41 to 60 years when gastric polyps are frequently found. These findings should be considered in the examination of patients because the blastic transformation of polyps especially increased in individuals aged 41 to 60 years.

Upper gastrointestinal endoscopy and target biopsy of gastric tissue and surrounding mucosa was performed in all patients. Polyps were divided into two main groups depending on the histological structure of biopsy sample: 1) benign polyps – in 31 (77.5%) patients; 2) malignant polyps – in 9 (22.5%) patients. Based on the World Health Organization (WHO) classification of gastric polyps, we ranged adenomatous and hyperplastic polyps with various dysplasia rates, chronic gastritis related polypoid focal hyperplasia of mucosa and fibrous inflammatory polyps in a group of clinically benign growths. Solitary polyps were observed in 21 (52.5%) patients, multiple – in 19 (57.5%).

Biopsy was obtained from the polyp, in its area and away from it (2-3, 5-6, 8-10 cm) under the control of the camera. 8-10 tissue specimens were sampled from 40 patients during each procedure. Specimens were put in 10% formalin solution for several hours in form of immersion fixation. Furthermore, they were embedded into liquid paraffin, and 5-өm-thick sections were prepared. Hematoxylin-eosin (PAS-reaction) was used as a general stain.

To obtain serum gastrin levels, 5 ml of venous blood was collected in the morning while the patient was fasting for 12 hours. Samples were centrifuged instantly at 4 ˚C and stored at -75 ˚C until required. Serum gastrin response to a test meal (100g of cooked meat) was recorded in 10 healthy individuals and in 40 patients with gastric polyps. Changes in serum gastrin were registered in 15, 30, 45, and 60 min after the test meal. Serum gastrin levels were identified using GASK-PR-US radioimmunoassay kit (CIS Bio International, France).

We also assessed the basal serum gastrin levels in patients with polyps before the polypectomy procedure and one year after it, taking into account the presence or absence of the disease recurrence. Gastrin levels were also measured in stomach mucosa, polyp tissue, and in gastric juice in patients with antral and fundic polyps.

Total acidity and free hydrochloric acid were identified in order to determine the cause of hypergastrinemia in patients and to get normal values in control group.

Statistical data processing was performed on a computer using “Statistica 10” software package for analysis of digital data. We applied Student’s t-test to compare means equality in two samples at the value of $p<0.05$.

Results

The results of the study of basal serum gastrin and gastric acidity in patients with polyposis, depending on the nature of the polyps and changes of the gastric mucosa, are presented in Table 1, from which it appears that significant (in 2.6 times) increase in the basal level of gastrin with marked reduction in gastric acidity was observed in patients with atrophic gastritis. In patients with atrophic hyperplastic gastritis, content of serum gastrin does not differ from that in healthy individuals, although they had clearly reduced acidity of gastric juice.

Thus, the level of basal gastrin was different at the same severity of achylia in patients with gastric polyposis, depending on the nature of changes in the gastric mucosa.

Gastrin in serum was 1.8 times higher in patients with solitary gastric polyps than in healthy individuals, and it was two times as great as in patients with multiple polyps. The significant difference between this indicator in patients with solitary and multiple polyps was not found. At the same time, there is a pronounced reduction in the acidity of gastric juice in both groups of patients, and no difference in severity of achylia.

Basal serum gastrin was two times higher in patients with benign gastric polyps than that in the control group. The indicator was not much different in patients with malignant polyps, compared with healthy individuals. A marked reduction of gastric acidity was noted in both groups.

So, level of basal gastrin was different at the same severity of achylia in patients with gastric polyposis, depending on the nature of changes in the gastric mucosa, the amount and nature of pol-

Table 1.
Basal level of serum gastrin (pg/ml) and gastric acidity in patients with gastric polyposis, with changes in the gastric mucosa

No.	Survey sample	Number of surveyed patients	Basal level of gastrin (M ± m)	Gastric acidity	
				Total acidity (M±m)	Free hydrochloric acid (M±m)
1	Control group	10	87,42±2,8	53,21±1,9	26,4±0,88
2	Atrophic gastritis	24	230,2±34,3	14,5±1,3 p <0,05	0,9±0,3
3	Atrophic hyperplastic gastritis	16	97,8±15,4	15,2±1,5 p< 0,05	3,9±0,8
4	Solitary gastric polyps	21	155,0±26,7 p > 0,05	14,8±1,9 p<0,05	2,5±0,7
5	Multiple gastric polyps	19	176,3±28,3 p<0,02	I7,1±1,5 p<0,05	2,8±0,6
6	Benign gastric polyps	31	174,4±17,9 p<0,05	15,6±0,9 p <0,05	2,9±0,5
7	Malignant gastric polyps	9	87,99±9,4	13,8±1,6 p<0,05	2,7±1,2

yps. Consequently, determining the level of basal gastrin allows in some cases to identify a violation of hormonal regulation of gastric acid secretion in patients with gastric polyposis.

A more detailed analysis can be obtained in the study of gastrin after standard test meal. The results of these studies are shown in Table 2, from which it appears that significant increase of 80% in serum gastrin was noted within 30 minutes after the test meal in patients with atrophic gastritis, compared to basal level.

After 45 and 60 min, the indicator was higher by 89% and 86% than the basal level, respectively. At all stages of the study, gastrin level significantly exceeds in patients with atrophic gastritis than that of healthy individuals. Increase in gastrin level in this group of patients after the test meal is more pronounced and prolonged than in the control group (100g of cooked meat as a standard test meal).

Discussion

In patients suffering from polyposis combined with atrophic hyperplastic gastritis, standard test meal leads to a significant increase in gastrin level by 79% in 30 minutes, compared with the basal level. A further increase by 125% and 175% was recorded in 45 and 60 min, respectively, while this indicator in 15, 30 and 45 min in said group of patients is not very different from that of the control group. After 60 min, serum gastrin level was 2.6 times higher than in healthy individuals, test meal in this cohort of patients leads to a more pronounced and prolonged increase in gastrin levels compared with those in the control group.

Comparison of changes in the serum gastrin levels in patients with atrophic and atrophic hyperplastic gastritis after the test meal demonstrates that this indicator is higher in atrophic gastritis at all stages of the study. At the same time, an increase in the gastrin level was noted in 45 and 60 min after the test meal in patients with atrophic hyperplastic gastritis, compared to the basal level, which is less pronounced in patients with atrophic gastritis.

Thus, the standard test meal in patients with gastric polyposis reveals significant differences in the nature and severity of the changes in the serum gastrin compared with the control group, which is characterized by a more pronounced and prolonged hypergastrinemia. Test meal reveals inappropriate secretion of gastrin in patients with gastric polyposis, combined with atrophic hyperplastic gastritis and normal level of basal gastrin.

Table 2.
Change in the concentration of gastrin (pg/ml) in the blood of patients with atrophic and atrophic hyperplastic gastritis after the standard test meal

No.	Survey sample	Number of surveyed patients	Basal level of gastrin (M±m)	Level of gastrin after the test meal			
				In 15 min	In 30 min	In 45 min	In 60 min
1	Control group	10	87,4±2,8	87,0±9,2	127,5±17,1	122,4±16,5	108,8±16,9
2	Atrophic gastritis	24	230,2±34,3 p_2<0,05	2,82±41,9 p_2<0,05	414,2±71,2 $p_{1<}$0,05 p_2<0,05	434,1±74,0 $p_{1<}$0,05 p_2<0,05	427,2±76,2 p_1<0,05 p_2<0,05
3	Atrophic hyperplastic gastritis	16	97,8±26,7 p_2<0,05	133,6±28,9 p_2<0,05	175,0±30,9 p_1<:0,05	219,7±41,8 p_1<0,05	268,6±66,3 p_1<:0,05 p_2<0,05

Note: p_1 – statistical significance, compared to baseline; p_2 – statistical significance, compared to control group.

Table 3.
Change in the concentration of serum gastrin in patients with single and multiple gastric polyps after the standard test meal (pg/ml)

No.	Survey sample	Number of surveyed patients	Basal level of gastrin (M±m)	Level of gastrin after the test meal			
				In 15 min	In 30 min	In 45 min	In 60 min
1	Control group	10	87,4±2,8	87,0±9,2	127,5±17,1	122,4±16,5	108,8±16,9
2	Solitary gastric polyps	21	155,0±26,7 p_2<0,05	208,0±34,1 p_2<0,05	202,0±34,0 p_2<0,05	230,0±40,1 p_2<0,05	236,0±37,8 p_2<0,05
3	Multiple gastric polyps	19	176,3±28,3 p_2<0,02	204,4±29,1 p_2<0,05	378,7±77,8 p_1<:0,05 p_2<0,02	420,6±82,0 p_1<:0,05 p_2<0,01	457,6±89,7 p_1<:0,05 p_2<0,0

Note: p_1 – statistical significance, compared to baseline; p_2 – statistical significance, compared to control group.

Study results of serum gastrin levels in patients with single and multiple polyps after the test meal are presented in Table 3.

The results demonstrate that gastrin level in patients with solitary gastric polyps significantly exceeds the indicator in the control group in response to the test meal during the entire study. At the same time, the level of this hormone undergoes further slight fluctuation, reaching 208.0 + 34.1 pg/ml at 15 min after the test meal.

When multiple gastric polyps, a significant increase by 115% in serum gastrin level is registered after 30 min as a response to the test meal compared to the basal level. Its level increased by 139% and 160% after 45 and 60 min, respectively. Gastrin level in these patients was significantly higher than that in healthy individuals at the appropriate time at all stages of the study. It was noted a more pronounced and prolonged increase in the gastrin level in patients with multiple polyps in response to the standard test meal, compared to healthy individuals.

Comparing changes in the content of serum gastrin in patients with solitary and multiple gastric polyps after the test meal, we have found its significant increase after 30, 45 and 60 min in patients with multiple polyps.

Consequently, the standard test meal leads to distinct changes in the dynamics of gastrin level in patients with solitary and multiple gastric polyps, compared with control group. If the basal gastrin level in one or another group of patients is almost identical, then it changes differently in response to test meal. Thus, the response to test meal is negligible in patients with solitary polyps, while there is a pronounced and long lasting hypergastrinemia in patients with multiple polyps. It may indicate a different nature of the regulatory function changes in the gastrin producing cells in patients with solitary and multiple gastric polyps.

We determined the basal level of gastrin in patients with polyposis before polypectomy and one year after it, depending from the presence or absence of the disease recurrence (Table 4).

It was revealed that basal serum gastrin before surgery was higher than control level by 88% in patients without recurrence of polyp formation in one year after polypectomy. So, one year after surgery it was decreased to 101.0 + 18.9 pg/ml, which is only slightly higher than gastrin level in healthy individuals. In these patients, the acidity of gastric juice was reduced as before the surgery, so after it.

Significant increase (more than two times) in the gastrinemia level before the surgery was noted in patients with disease recurrence, and one year after polypectomy gastrin level increased to more significant digits of 227.0+37.4 pg/ml (p<0.05).

That is, performing the polypectomy is not accompanied by normalization of the basal gastrin level in the blood of patients with gastric polyposis,

Table 4.
Basal level of serum gastrin (pg/ml) in patients with gastric polyposis before and after polypectomy, with the disease recurrence and without it, within one year after surgery

No.	Survey sample	Number of surveyed patients	Basal level of gastrin
1	Control group	10	87,4±2,8
2	Patients with polyposis before the surgery without following recurrence	24	154,6±34,6 p> 0,05
3	Patients with polyposis within one year after the surgery without recurrence	10	101,0±18,9 p > 0,05
4	Patients with polyposis before the surgery with recurrence	16	182,3±37,0 p<0,05
5	Patients with polyposis within one year after the surgery with recurrence	13	227,0±37,4 p<0,05

Table 5.
Change in gastrin concentration (pg/ml) in the blood of patients with gastric polyposis before polypectomy and within one year after it without recurrence in response to the standard test meal

No.	Survey sample	Number of surveyed patients	Basal level of gastrin	Level of gastrin after test meal			
				In 15 min	In 30 min	In 45 min	In 60 min
1	Control group	10	87,4±2,8	87,0±9,2	127,5±17,1 p_1<:0,05	122,4±16,5 p_1<:0,05	108,8±16,9
2	Patients with polyposis before the surgery	24	154,6±34,6 p>0,05	188,0±40,1 p_2<0,05	246,1±41,6 p_2<0,05	275,0±49,1 p1<:0,05 p_2<0,05	404±90,5 p1<:0,05 p_2<0,05
3	Patients with polyposis within one year after the surgery	10	101,0±18,9 p>0,05	128,9±32,2 p >0,05	145,0±24,7 p > 0,05	185,0±43,7 p> 0,05	184,4±45,8 p> 0,05

Note: p_1 – statistical significance, compared to baseline; p_2 – statistical significance, compared to control group.

despite the presence or absence of polyp recurrence. However, if there is a reducing trend of this indicator while no recurrence, then a trend of its increase is revealed during recurrence. The level of achylia was expressed almost equally in all patients during all periods of determination.

Table 5 shows the results of determination of the serum gastrin concentration in patients with gastric polyposis before and one year after surgery without recurrence of the disease under the influence of the test meal. It was noted that test meal before polypectomy leads to the increased gastrinemia already in 15 minutes after it, reaching significant level in 45 minutes.

We observed no significant changes of gastrin level in the blood in response to test meal in patients within one year after polypectomy in the absence of disease recurrence.

Thus, significant hypergastrinemia develops in response to test meal in patients with gastric polyposis without the disease recurrence, and one year after surgery gastrin level reaches close to that of healthy individuals.

Gastrin level in the blood increased within 15 minutes after test meal in patients with gastric polyposis and the disease recurrence before the polypectomy performance, reaching a valid value of 281.6+37.0 pg/ml after 30 minutes, which is much higher than gastrin concentration in the control group at the same moment (Table 5).

Test meal within one year after surgery in patients with recurrent disease caused a distinct increase in gastrin level not only compared to its initial level, but also to its control concentration. The changes were noted at all stages of its determination. If gastrinemia level was decreasing already after 45 min in healthy individuals, then in this group of patients it was continuing to grow even after one hour after the test meal.

Therefore, the tendency to recurrence of polyp formation is evident in the increasing the level of gastrin in the blood of patients (before and after the operation) under the influence of the standard test meal.

In the context of the investigation data of gastrin level in patients within one year after polypectomy, it was interesting to estimate the level of gastrinemia after test meal in patients within one year after gastrectomy for polyposis (Table 6).

Thus, gastrectomy in patients with polyposis reduces the basal level of gastrin by 1.8 times as compared to control level. And, standard test meal causes a slight increase in gastrin level in the blood within one year after the gastric resection. Even the

Table 6.
Changes in gastrin concentration (pg/ml) in the blood of patients with gastric polyposis with recurrent disease before surgery and within one year after it, in response to the test meal

No.	Survey sample	Number of surveyed patients	Basal level of gastrin	Level of gastrin after test meal			
				In 15 min	In 30 min	In 45 min	In 60 min
1	Control group	10	87,4±2,8	87,0±9,2	127,5±17,1 p_1<:0,05	122,4±16,5 p_1<:0,05	108,8±16,9
2	Patients with polyps before the surgery	16	182,3±37,0 p_2<0,5	227,0±54,9 p_2<0,5	281,6±37,0 p_1<:0,05 p_2<0,05	284,0±37,0 p_1<:0,05 p_2<0,05	258,0±32,0 p_1<:0,05 p_2<0,02
3	Patients with polyps within one year after the surgery	13	207,0±37,4 P2<0,05	326,8±40,0 p_2<0,05	337,0±28,5 p_1<:0,05 p_2<0,05	385,0±26,6 p_1<:0,05 p_2<0,05	423,0±41,0 p_1<:0,05 p_2<0,05

Note: p_1 – statistical significance, compared to baseline; p_2 – statistical significance, compared to control group.

Table 7.
Changes in gastrin concentration (pg/ml) in the blood of patients after gastric resection in response to the test meal

No.	Survey sample	Number of surveyed patients	Basal level of gastrin	Level of gastrin after test meal			
				In 15 min	In 30 min	In 45 min	In 60 min
1	Control group	10	87,4±2,8	37,0±9,2	127,5±17,1	122,4±16,5	108,3±16,9
2	Patients after gastric resection	3	47,0±9,2 p<0,05 1	47,7±2,5 p<0,05	45,3±4,3 p<0,05	48,7ұ5,1 p<0,05	60,0±9,9 p< 0,05

Table 8.
Mucosal gastrin in different parts of the stomach in patients with polyposis, in the polyp tissue (μg/g) and in the gastric juice of the patients (pg/ml)

Mucosal gastrin concentration (μg/g)		Concentration of gastrin in the tissue of gastric polyp ((μg/g)	Concentration of gastrin in the gastric juice (pg/ml)
in antrum	in fundus		
81.2±8.1	42.6±7.5	3.6±0.6	69.5±7.8

highest level of gastrin did not reach the basal level in healthy individuals at this moment (Table 7).

Thus, gastrectomy in patients with polyposis causes a sharp decline in the serum gastrin and no reaction to the test meal.

Our studies have shown that functional state of gastrin producing cells of the stomach, which determines the gastrinemia level in patients with polyposis, plays an important role in the pathogenesis of gastric polyposis. However, it could not base only on an assessment of the gastrin level in the blood of patients. It was necessary to determine the concentration of the hormone in the mucosa of different parts of the stomach, in the polyp tissue and in the gastric juice of the patients with polyps. Such a study could let to assess more adequately the role of gastrin in the pathogenesis of polyp formation. Therefore, we analyzed the content of gastrin in the mucosa, polyp tissue and gastric juice in 7 patients with antral (5) and fundic (2) polyps of the stomach. The results obtained are shown in the Table 8.

As it can be seen from the above data, the highest level of gastrin was observed in the antral mucosa, which amounted to 81.2+ 8.1 μg/g. At the same time, if to focus on the results obtained in determining the level of gastrin in the mucosa of healthy individuals, then the estimated indicator in these patients was almost twice higher than in healthy individuals.

Gastrin level was two times lower in the mucosa of fundic polyps than in the antral polyps. Due to lack of own information and literature data on the gastrin level in the fundic mucosa in healthy people, it was difficult to assess the significance of gastrin concentration in patients with fundic gland polyps.

Gastrin content in the polyp tissue appeared negligible compared with its content in the gastric mucosa and amounted to 3.6±0.6 μg/g.

Our results showed that the content of gastrin in gastric juice in patients with polyposis was slightly lower (69.5±7.8 pg/ml) than in healthy individuals which is amounted to185±28 pg/ml

Thus, an increase in the gastrin level in the gastric mucosa was noted in patients with gastric polyposis. It obviously provides a higher basal gastrin level in the blood of these patients without significant impact on the gastrin content in the gastric juice. Gastrin level in the polyp tissue was low and independent of the polyp localization.

There are various endocrine cells in the gastric epithelium that produce nearly all known peptide hormones. It is important to determine the amount of gastrin producing G-cells in the gastric mucosa, which can be done by immunohistochemistry methods [25-27]. Change in their number and staining intensity may indirectly indicate the gastrin level in the blood, which has a paracrine effect on nearby cells.

At the same time, there were large enough difficulties in interpreting the results of immunochemical studies. Thus, increasing the number of cells may be the result not only of their actual increase, but also can be caused by increased synthesis of the corresponding peptide or delay of its secretion.

But an immunohistochemical study of various types of endocrine cells and the relation between them can be used to determine the role of their peptide products in the origin and development of various diseases of the digestive system. The most interesting is the change of G-cells in patients with precancerous diseases of the stomach. Unfortunately, information about the G-cells and the concentration of immunoreactive gastrin in biopsy specimens of gastric mucosa in chronic gastritis and gastric polyposis is not enough.

The effect of neuro-humoral factors in the regulation of motor and secretory function of the stomach must be evaluated to provide each method of surgical treatment of gastric polyposis. It was, therefore, necessary to examine the quantitative and functional status of gastrin producing cells of the antral mucosa, as well as their relationship with the level of gastrin in the blood and the connection with gastric secretion in polyposis.

Table 9.
Basal level of gastrin in the blood and G-cells quantity in stomach mucosa of patients with gastric polyposis

No.	Survey sample	Number of surveyed patients	Basal level of gastrin in the blood (pg/ml)	G-cells quantity in stomach mucosa		
				Antrum	Stomach body	Polyp
1	Control group	10	87,4±2,8	293,0±27,0	0±0	-
2	Patients with gastric polyps	17	317,1±25,3	338,9±22,7 p>0,05	5,8±1,8 p<0,05	2,9±0,9

Gastrin level in the blood and tissues depends not only on the change of functional state of G-cells, but also on their mass in the gastric mucosa. The last one is very important to find in patients with gastric polyposis.

We counted G-cells in the mucosa of antrum and stomach body, as well as in the polyps' mucosa in 17 patients with polyposis (Table 9).

In the presence of severe basal hypergastrinemia in patients with gastric polyposis, the number of G-cells in 1 mm^2 of antral mucosa reached 338.9±22.7. This value is slightly higher than the indicator in apparently healthy individuals, which is equal to 293.0±27.0.

G-cell number was determined in the mucosa of stomach body in 7 patients. The number of G-cells in these patients was significantly lower than in the antrum. G-cells were not defined in this part of the stomach in the control group.

G-cells were found in the polyps' mucosa in only 12 of 17 patients, their number was equal to only 2.9±09.

Since the level of gastrin in the blood and tissues of the gastric mucosa, as it was shown by our study, depended on the location of polyps, therefore, the number of G-cells in the gastric mucosa was determined in patients with polyposis of antrum and stomach body (Table 10).

As it turned out, the high basal gastrin level was combined with a marked increase of G-cells in the gastric antral mucosa and reached 406.6±35.9 in patients with antral polyposis. The amount of G-cells in polyps' mucosa in these patients appeared 83 times lower than in other mucous sections of this part. Number of cells in the mucosa of stomach body amounted to 59±29 in patients with antral polyps.

In less pronounced hypergastrinemia, the number of G-cells in the stomach body in patients with gastric polyposis did not differ from that of healthy individuals and it was 1.85 times lower than in patients with antral polyposis. Level of G-cells in the polyps of stomach body mucosa in patients of this category did not differ from the indicator in the patients with antral polyposis. The number of these cells in polyps' mucosa was lower than in the rest part of the stomach body mucosa and the mucosa of antral polyps.

Thus, when antral polyposis, hypergastrinemia caused not only by increased functional activity of gastrin producing cells, but also by increasing their numbers in the antral mucosa. The number of G-cells was dramatically reduced in the mucosa of gastric polyps, especially in polyps of the gastric body. We can assume that hypergastrinemia, revealed in patients with polyposis of stomach body, is caused only by increased functional activity of gastrin producing cells.

Finally it should be noted that gastrin, having marked trophic effect in physiological conditions as well as in neoplastic processes [28,30], may participate in the formation of atrophic hyperplastic changes with focal hyperplasia in the mucosa, as it was evidenced by our findings. This pathology of mucosa appears due to the formation of the gastric polyps, and polyps are most often detected in the pyloric antrum of the stomach (63% of cases). This is confirmed by a higher concentration of gastrin in the serum of patients with multiple gastric polyps compared with those who has solitary polyps, and even more in comparison with healthy people.

According to some reports [23,31-35], a higher level of gastrin in the blood of patients with gastric carcinoma, compared to healthy individuals,

Table 10.
Basal level of gastrin in the blood and G-cells quantity in stomach mucosa of patients with gastric polyps of different localization

No.	Survey sample	Number of surveyed patients	Basal level of gastrin in the blood (pg/ml)	G-cells quantity in stomach mucosa		
				Antrum	Stomach body	Polyp
1	Control group	10	87,4±2,8	293,0±27,0	0±0	-
2	Patients with polyps of antrum	10	405,0±31,5 p_1<:0,05	406,6±35,9 p_1<:0,05	5,9±2,9 $p_{1<:}$0,05	4,9±1,5
3	Patients with polyps of stomach body	7	228,5±25,7 p_1<:0,05 p_2<0,05	220,5±27,3 p_1>0,05 p_2<0,05	5,5±1,6 p_1<:0,05 p_2 >0,05	1,0±0,4 p_2<0,05

Note: p_1 – statistical significance, compared to control group; p_2 – statistical significance, compared to patients with polyposis of antral part of the stomach.

indicates the role of gastrin in the pathogenesis of tumor development. Although in our studies, gastrinemia was less pronounced in patients with malignant polyps than in those with benign polyps. However, participation of gastrin in the process of polyp formation has no doubt because an increase in the size of the polyp accompanied by an increase in gastrinemia. This was confirmed by the assessment of gastrin concentration in the blood after test meal in patients with different duration of the disease in question: the highest gastrinemia appears in individuals suffering from gastric polyposis over three years.

Another proof of participation of gastrin in the gastric polyp formation is detectable maximum hypergastrinemia in polyps of pyloric antrum, i.e. in the areas subjected to the most frequent polyp formation.

Assessing the level of gastrin in the blood of patients can be used to predict the possible recurrence of polyp formation. This is confirmed by a more pronounced hypergastrinemia before the polypectomy in patients, who were diagnosed with a recurrence within one year after the surgery. This indicator can serve as an additional sign of polyp recurrence since gastrinemiya in recurrence is more than twice higher than that seen in patients without identified polyposis recurrence within one year after polypectomy.

Conclusion

Despite the fact, that polypectomy decreases the gastrin concentration in the blood (which indicates a decrease in the risk of the disease recurrence), yet gastric resection should be considered the most radical surgery for multiple polyps. After this surgery, even the test meal does not increase the level of gastrin and it stays equal to its basal level in healthy individuals.

Once again it should be noted that polyps are most frequently formed in the pyloric antrum that can be confirmed by a higher content of gastrin in the mucosa of this part compared to other areas of the stomach.

In conclusion, our findings suggest that polyp formation accompanied by an increased gastrin level in the blood of patients, has significant impact on the concentration of gastrin in gastric juice and influences the function of gastric acid formation in patients with polyps.

References

1. Konturek SJ, Bielanski W, Konturek PC, Brzozowski T. Endogenous gastric mediators: patho-physiological role and measurements. Curr Protoc Toxicol. 2010 Aug;Chapter 21:Unit 21.6.
2. Waldum HL, Hauso O, Fossmark R. The regulation of gastric acid secretion - clinical perspectives. Acta Physiol (Oxf). 2013 Nov 26.
3. Carmack SW, Genta RM, Graham DY, Lauwers GY. Management of gastric polyps: a pathology-based guide for gastroenterologists. Nat Rev Gastroenterol Hepatol. 2009 Jun;6(6):331-41.
4. Kopic S, Geibel JP. Update on the mechanisms of gastric acid secretion. Curr Gastroenterol Rep. 2010 Dec;12(6):458-64.
5. Borch K, Skarsgerd J, Franzйn L, Merdh S, Rehfeld JF. Benign gastric polyps: morphological and functional origin. Dig Dis Sci. 2003 Jul;48(7):1292-7.
6. Schubert ML. Gastric secretion. Curr Opin Gastroenterol. 2011 Oct;27(6):536-42.
7. Chu S, Schubert ML. Gastric secretion. Curr Opin Gastroenterol. 2013 Nov;29(6):636-41.
8. Sachs G, Shin JM, Hunt R. Novel approaches to inhibition of gastric acid secretion. Curr Gastroenterol Rep. 2010 Dec;12(6):437-47.
9. Fossmark R, Jianu CS, Martinsen TC, Qvigstad G, Syversen U, Waldum HL. Serum gastrin and chromogranin A levels in patients with fundic gland polyps caused by long-term proton-pump inhibition. Scand J Gastroenterol. 2008 Jan;43(1):20-4.
10. Yakut M, Ormeci N, Erdal H, Keskin O, Karayel Z, Tutkak H, Soykan I. The association between precancerous gastric lesions and serum pepsinogens, serum gastrin, vascular endothelial growth factor, serum interleukin-1 Beta, serum toll-like receptor-4 levels and Helicobacter pylori Cag A status. Clin Res Hepatol Gastroenterol. 2013 Jun;37(3):302-11. Epub 2012 Nov 6.
11. Niv Y, Delpre G, Sperber AD, Sandbank J, Zirkin H. Hyperplastic gastric polyposis, hypergastrinaemia and colorectal neoplasia: a description of four cases. Eur J Gastroenterol Hepatol. 2003 Dec;15(12):1361-6.
12. Genta RM. The gastritis connection: prevention and early detection of gastric neoplasms. J Clin Gastroenterol. 2003 May-Jun;36(5 Suppl):S44-9.
13. Bonilla Palacios JJ, Miyazaki Y, Kanayuma S, Yasunaga Y, Matsuzawa Y. Serum gastrin, pepsinogens, parietal cell and Helicobacter pylori antibodies in patients with gastric polyps. Acta Gastroenterol Latinoam. 1994;24(2):77-82.
14. Haruma K, Yoshihara M, Sumii K, Tari A, Watanabe C, Kodoi A, Kajiyama G. Gastric acid secretion, serum pepsinogen I, and serum gastrin in Japanese with gastric hyperplastic polyps or polypoid-type early gastric carcinoma. Scand J Gastroenterol. 1993 Jul;28(7):633-7.
15. Haruma K, Sumii K, Morikawa A, Uemura N, Inbe A, Kimura M, Tokumo K, Yoshihara M, Teshima H, Inoue K, et al. Gastric mucosa in patients with fundic hyperplastic polyps. Nihon Shokakibyo Gakkai Zasshi. 1989 Apr;86(4):851-7. Japanese.
16. Tatsuta M, Okuda S, Tamura H, Taniguchi H. Polyps in the acid-secreting area of the stomach. Gastrointest Endosc. 1981 Aug;27(3):145-9.

17. Farah Klibi F, Ferchichi L, Borgi C, Jemaa Y, Najjar T, Ben Jilani S, Zermani R. Histopathological study of gastric polyps. A report of 65 cases. Tunis Med. 2006 Oct;84(10):611-6. French.
18. Szalyki T, Tyth V, Nйmeth I, Tiszlavicz L, Lonovics J, Czaky L. Endoscopic mucosal resection: not only therapeutic, but a diagnostic procedure for sessile gastric polyps. J Gastroenterol Hepatol. 2008 Apr; 23(4):551-5. Epub 2007 Dec 5.
19. Morais DJ, Yamanaka A, Zeitune JM, Andreollo NA. Gastric polyps: a retrospective analysis of 26,000 digestive endoscopies. Arq Gastroenterol. 2007 Jan-Mar; 44(1):14-7.
20. Bulianov VM, Vinnitskii LI, Tazhimuradov RT, Zhidkov IL. Diagnostic and prognostic value of determining serum gastrin level in the treatment of patients with gastric polyps. Klin Khir. 1986;(5):10-2. Russian.
21. Szalyki T, Tyth V, Tiszlavicz L, Czaky L. Flat gastric polyps: results of forceps biopsy, endoscopic mucosal resection, and long-term follow-up. Scand J Gastroenterol. 2006 Sep;41(9):1105-9.
22. Oberhuber G, Stolte M. Gastric polyps: an update of their pathology and biological significance. Virchows Arch. 2000 Dec;437(6):581-90. Review.
23. Minocha A. The handbook of digestive diseases. Thorofare, NJ: SLACK Inc., 2004.
24. Montgomery EA, Voltaggio L. Biopsy interpretation of the gastrointestinal tract mucosa. Volume 2, Neoplastic. Philadelphia, PA : Wolters Kluwer Health/Lippincott Williams & Wilkins, 2013.
25. Riddell RH, Jain D, Lewin KJ. Gastrointestinal pathology and its clinical implications. Philadelphia : Wolters Kluwer/Lippincott Williams & Wilkins Health, 2011.
26. Tadataka Yamada, William H, John M, Michelle A, Robert S. Brown Jr. Handbook of gastroenterology. Philadelphia: Lippincott Williams & Wilkins, 2005.
27. Niv Y, Delpre G, Sperber AD, Sandbank J, Zirkin H. Hyperplastic gastric polyposis, hypergastrinaemia and colorectal neoplasia: a description of four cases. Eur J Gastroenterol Hepatol. 2003 Dec;15(12):1361-6.
28. Gencosmanoglu R, Sen-Oran E, Kurtkaya-Yapicier O, Avsar E, Sav A, Tozun N. Gastric polypoid lesions: analysis of 150 endoscopic polypectomy specimens from 91 patients. World J Gastroenterol. 2003 Oct;9(10):2236-9.
29. Vallot T. Gastric polyps. Presse Med. 2007 Oct;36(10 Pt 2):1412-7. Epub 2007 May 7. Review. French.
30. Imagawa A, Okada H, Kawahara Y, Takenaka R, Kato J, Kawamoto H, Fujiki S, Takata R, Yoshino T, Shiratori Y. Endoscopic submucosal dissection for early gastric cancer: results and degrees of technical difficulty as well as success. Endoscopy. 2006 Oct;38(10):987-90.
31. Testino G, De Iaco F, Cornaggia M. Role of chronic atrophic gastritis of the body-fundus and achlorhydria in the development of epithelial dysplasia and gastric carcinoma. Acta Gastroenterol Belg. 2004 Oct-Dec;67(4):327-30.
32. Galimov OV, Rylova TV, Khanov VO. Endoscopy in the diagnosis and treatment of gastric polyps. Vestn Khir Im I I Grek. 2008;167(5):65-7. Russian.
33. Kovalenko VL. Patomorphology and morphogenesis of acquired morphoepithelial polypoid formation of the stomach. Chelyabinsk: Chelyabinskaya gos. med. akademiya, 2001. Russian.
34. Pavlov KA, Vorob'eva NK, Kolodin VI, Murzin BA, Smirnov NM. Complex diagnosis of stomach polyps. Vopr Onkol. 1983;29(6):17-23. Russian.
35. Sunil Dacha, Mohammed Razvi, Julia Massaad, Qiang Cai, Mohammad Wehbi; Hypergastrinemia, Gastroenterology Report, Volume 3, Issue 3, 1 August 2015, Pages 201–208, https://doi.org/10.1093/gastro/gov004

https://doi.org/10.35805/BSK2021IV048

PREVALENCE OF CONGENITAL HEART DISEASES IN CHILDREN OF SCHOOL AGE ACCORDING TO ECHOCARDIOGRAPHY DATA

Abdramanov K.A.
orcid.org/0000-0002-6706-9104

Kokoev E.B.
orcid.org/0000-0002-9558-8729

Arzibaeva P.M.
orcid.org/0000-0001-8023-2845

Abdramanova A.K.
orcid.org/0000-0003-2340-5943

Corresponding author:
Kokoev E.B. *- Junior Researcher, Head of the Department of Adult Cardiac Surgery and Arrhythmology, Southern Regional Scientific Center for Cardiovascular Surgery, Jalal-Abad, Kyrgyz Republic.*
E-mail:emilbek.kokoev@gmail.com

Conflict of interest
The authors declare that they have no conflicts of interest

Abdramanov K.A., Kokoev E.B., Arzibaeva P.M., Abdramanova A.K.
Southern Regional Scientific Center for Cardiovascular Surgery, Jalal - Abad, Kyrgyz Republic

Abstract

Purpose of the study. *Study of the prevalence of congenital heart defects among schoolchildren in the Kyrgyz Republic.*

Materials and methods. *The material for the study were 38598 schoolchildren aged 6 to 16 surveyed in Jalal-Abad, Osh, Batken and Naryn regions. Using the instrumental technique, 2919 children out of all schoolchildren underwent an echocardiographic (EchoCG) study. The indication for echocardiography of the study was presence of a heart murmur, revealed by auscultation.*

Results. *Based on the study, the authors identified 171 (5.8%) cases of congenital heart defects.*

Conclusion. *The presented results indicate changes in the size of the heart cavities, valve apparatus and pressure in the pulmonary artery with an enriched pulmonary circulation. With tetralogy of Fallot and pulmonary atresia, there is an increased size of the pancreas and a smaller size of the left ventricle. More complex defects are detected at a younger age. All of the above indicates the need to optimize early diagnosis and management tactics for children with congenital heart defects.*

Keywords
schoolchildren, valvular regurgitations, prevalence

Эхокардиография мәліметтері бойынша мектеп оқушылары арасында туа біткен жүрек ақауларының таралуы

Хат алысатын автор:
Кокоев Э.Б. *- оңтүстік аймақтық жүрек-қан тамырлары хирургиясы ғылыми орталығының кіші ғылыми қызметкері, ересектер кардиохирургиясы және аритмология бөлімінің меңгерушісі, Жалал-Абад қ., Қырғыз Республикасы.*
E-mail: emilbek.kokoev@gmail.com

Мүдделер қақтығысы
Авторлар мүдделер қақтығысының жоқтығын мәлімдейді

Абдраманов К.А., Арзибаева П.М., Кокоев Э.Б., Абдраманова А.К.
Оңтүстік аймақтық жүрек-қан тамырлары хирургиясы ғылыми орталығы,
Жалал-Абад қ., Қырғыз Республикасы

Аңдатпа

Зерттеу мақсаты *- Қырғыз Республикасының мектеп оқушылары арасында туа біткен жүрек ақауларының таралуын зерттеу.*

Материалдар мен әдістер. *Зерттеу материалы Жалал-Абад, Ош, Баткен және Нарын облыстарында сауалнамаға қатысқан 6 мен 16 жас аралығындағы 38598 оқушыны қамтиды. Аспаптық техниканы қолдану арқылы барлық мектеп оқушыларынан 2919 бала ЭхоКГ (ЭхоКГ) зерттеуден өтті. EchoCG зерттеуіне көрсеткіш жүректе аускультация арқылы анықталған шудың болуы болды.*

Нәтижелер. *Қырғыз Республикасындағы мектеп оқушыларының арасында туа біткен жүрек ақауларының таралуын зерттеу.*

Қорытынды. *Ұсынылған нәтижелер байытылған өкпе айналымы бар өкпе артериясындағы жүрек қуыстарының, клапан аппаратының және қысымының өзгеруін көрсетеді. Фалло тетрадасы мен өкпе артериясының атрезиясы кезінде ұйқы безінің ұлғаюы және сол жақ қарыншаның кішіреғюі байқалады. Неғұрлым күрделі ақаулар жас кезде анықталады. Жоғарыда айтылғандардың барлығы туа біткен жүрек ақаулары бар балаларды ерте диагностикалау және басқару тактикасын оңтайландыру қажеттілігін көрсетеді.*

Түйін сөздер
мектеп оқушылары, жүректің туа біткен ақаулары, қақпақшалық ақаулар, таралуы

Распространенность врожденных пороков сердца у детей школьного возраста по данным эхокардиографии

Абдраманов К.А., Кокоев Э.Б., Арзибаева П.М., Абдраманова А.К.
Южный региональный научный центр сердечно-сосудистой хирургии,
г. Жалал – Абад, Кыргызская Республика

Автор для корреспонденции:
Кокоев Э.Б. *- младший научный сотрудник, заведующий отделением взрослой кардиохирургии и аритмологии, Южный Региональный Научный Центр Сердечно-Сосудистой Хирургии, г. Жалал-Абад, Кыргызская Республика.*
E-mail: emilbek.kokoev@gmail.com

Конфликт интересов
Авторы заявляют об отсутствии конфликта интересов

Аннотация

Цель исследования *- изучение распространенности врожденных пороков сердца среди школьников Кыргызской Республики.*

Материалы и методы. *Материалом исследование стали 38598 школьников в возрасте от 6 до 16 лет обследованных в Жалал – Абадской, Ошской, Баткенской и Нарынской областях. С использованием инструментальной методики из всех школьников 2919 детям проведено эхокардиографическое (ЭхоКГ) исследоваине. Показанием к проведению ЭхоКГ исследования послужило наличие шума в сердце, выявленного аускультативно.*

Результаты. *Изучение распространенности врожденных пороков сердцасреди школьников в Кыргызской Республике.*

Выводы. *Представленные результаты свидетельствуют об изменениях размеров полостей сердца, клапанного аппарата и давления в легочной артерии с обогащенным малым кругом кровообращения. При тетраде Фалло и атрезии легочной артерии отмечаются увеличенные размеры ПЖ и меньшие размеры левого желудочка. Более сложные пороки выявляются в более младшем возрасте. Все вышеперечисленное свидетельствует о необходимости оптимизации ранней диагностики и тактики ведения детей с врожденными пороками сердца.*

Ключевые слова
школьники, врожденные пороки сердца, клапанные регургитации, распространенность

Congenital heart defects are abnormalities in the structure and (or) function of the cardiovascular system resulting from a violation of its embryonic development [1]. According to the clinical guidelines of the European Society of Cardiology 2020, the frequency of congenital heart defects is 9 per 1000 live births [2].

Patent ductus arteriosus (PDA) usually occurs in premature babies and is extremely rare in babies born at term. With these criteria, the frequency of isolated pathology is about 0.14-0.3 / 1000 live births, 7% among all congenital heart defects (CHD) and 3% among critical CHD. The average life expectancy for patients with PDA is approximately 40 years. 20% of patients die before age 30, before age 45 - 42%, before age 60 - 60% [12].

Coarctation of the aorta occurs in about 2 - 5 per 104 newborns, which is 6 - 7% of all diagnosed CHD [13].

The incidence of atrial septal defect (ASD) in childhood is 1 case per 1500 live births, or 7% among all CHD [14].

Partial abnormal drainage of pulmonary veins (PADPV) is usually combined with the presence of an interatrial communication (ASD), an open foramen ovale. Less commonly, the atrial septum is intact. For each type of PADPV there are preferential localizations of ASD, however, combinations of PADPV variants with ASD cannot be considered absolute. The frequency of partial abnormal drainage of pulmonary veins ranges from 0.3% of all CHD according to clinical data to 0.6% according to autopsy data [15].

Isolated stenosis of the pulmonary artery valve, according to Nadas` Pediatric Cardiology (USA) is 6.8%, which can be only 8.8 cases of CHD of the type of “pulmonary artery / pulmonary valve stenosis (PA/PVS)” of all severity degrees per year per 1 million population [16]. Russian data on the frequency of such stenosis is much less - only 1.2% [17], which is 3 cases per 1 million population.

Ventricular septal defect is the most common congenital heart disease, found in 32% of patients, either alone or in combination with other abnormal heart defects.

Tetralogy of Fallot is diagnosed in 8-13% of all patients with congenital heart disease. Among the defects requiring surgical treatment in early childhood, the tetralogy of Fallot accounts for 15%. The incidence of malformation in newborns ranges from 4 to 7%. The average life expectancy of patients with tetralogy of Fallot is 12-13 years and depends on the degree of PA stenosis. Mortality during the first year of life - 25%, by age 3 - 40%, by age 10 - 70%, by age 40 - 95%. With the “pale” forms of the defect, life expectancy is somewhat longer than with the cyanotic form. Usually, severe non-operated patients die from thromboembolism of cerebral vessels with the formation of abscesses, the development of heart failure, infective endocarditis [3–4].

The frequency of the defect according to clinical data is 0.72% [5]. The prognosis of the course of the defect largely depends on the hemodynamic variant. Life expectancy is higher in patients with right ventricular outlet obstruction [6].

Pulmonary atresia occurs in 3-5% of all CHD cases. The prognosis of a patient's life depends on the nature of the pulmonary blood flow. The mortality rate of children with ductus-dependent hemodynamics up to 12 months is 90%. In 6 patients with several sources of pulmonary blood flow and moderate cyanosis, by 3-5 years of age, the mortality rate is 50%. With increased pulmonary blood flow and the presence of large aorto-pulmonary collateral arteries, patients die as pulmonary hypertension develops, mainly in the third decade of life. In general, the median survival rate for patients with pulmonary atresia (PA) and VSD is within six months to two years old [7].

The frequency of a single ventricle (SV) is about 0.13 / 1000 of newborns, among all CHD - 2.5%, among "critical" CHD - 5.5%, during the first year of life without treatment, mortality is 75% [8.9]. The most common variant is a double inflow left ventricle (LV) with transposition of the great arteries (TGA) [1].

The forecast of the natural course of SV is unfavorable: 55–67% of children die in the first year of life without surgery, and up to 90% of children by age 10 [10].

According to the International Register of Pediatric Pulmonary Hypertension, among all reported cases of pulmonary hypertension (PH) in children, 88% of patients were diagnosed with pulmonary arterial hypertension (PAH). The overwhelming majority (over 85%) were associated with PAH, which complicated the course of congenital heart defects [18, 19].

Until now, no studies have been conducted in the Kyrgyz Republic to study the prevalence of congenital heart defects, which determines the relevance of this study.

Purpose of the study

Study of the prevalence of congenital heart defects among schoolchildren in the Kyrgyz Republic.

Material and methods

Between 2015 and 2019, 38,598 schoolchildren aged 6 to 16 (average aging 11) living in Jalal-Abad, Osh, Batken and Naryn regions were surveyed. All examined underwent a questionnaire survey, a general clinical examination with auscultation of the heart. Out of these, 2919 children (7.56%) with heart murmur underwent Echocardiography. Echocardiography was performed according to the standard technique on a portable device "SonoscapeS9" from "SonoScapeMedicalCorp".

Results and discussion

2919 students with heart murmur were examined, who were often monitored in polyclinics at their place of residence. All the examined underwent echocardiography with Doppler analysis. 171 students were diagnosed with congenital heart defects, which accounted for 5.9% of the total number of patients examined.

By sex, the surveyed children were distributed as follows: 80 (46.8%) boys and 91 (53.2%) girls. By age, children were divided into the following groups: primary school age (6–11 years old) - 109 children (63.7%), senior school age (12–16 years old) - 73 students (36.3%).

Survey results. As a result of the study, patent ductus arteriosus (PDA) was diagnosed in 15 (8.8%) children, coarctation of the aorta (CoA) in 5 (2.9%), ASD in 20 (11.7%), PADPV in 5 (2.9%), isolated pulmonary valve stenosis (IPVS) - 3 (1.7%), VSD - in 88 (51.4%), incomplete form of atrioventricular communication (AVC) - 4 (2, 3%), tetralogy of Fallot (TF) - 22 (12.9%), double vascular discharge from the right ventricle with pulmonary artery stenosis (PAS) - in 7 (4%), type I pulmonary atresia with VSD (PA) - in 1 (0.58%), the single ventricle with pulmonary artery stenosis (SV) - in 1 (0.58%) (Fig. 1).

- The number of students in the lower grades is higher than in the senior ones.
- Complex heart defects such as SV, PA, PAS from the right ventricle (RV) rarely survive to an older age [11].

When examining the valves, mitral regurgitation was detected in 102 cases, which amounted to 59.6% of the examined. Of these, I degree - in 86 (50.3%) schoolchildren, II degree - in 16 children, which, respectively, amounted to 9.3%.

Tricuspid regurgitation was observed in 93 (54.4%) students; Grade I was detected in 82 (47.9%), grade II tricuspid valve insufficiency - in 11 (6.4%).

Regurgitation on the pulmonary valve was diagnosed in 36 cases, which amounted to 21%. Aortic valve regurgitation was 7 (4%).

The gradient on the pulmonary valve was detected in 33 (19.2%) cases. In 4 cases, aortic regurgitation is associated with prolapse of the right coronary valve in VSD.

Combined regurgitation on the mitral, tricuspid, aortic and pulmonary valves was observed in 24 cases, which accounted for 14% of the subjects. Mitral-aortic regurgitation - in 74 (0.43%) cases. Mitral-tricuspid regurgitation - in 159 (92.9%) schoolchildren. Regurgitation on the tricuspid and pulmonary valve - in 106 (61.9%) students; regurgitation on the mitral valve and gradient on the pulmonary valve - in 12 (7%) patients. Regurgitation on the tricuspid valve and a gradient on the pulmonary valve - in 50 (29.2%) children.

The dimensions of the heart cavities were calculated considering the body surface area (BSA) (m^2) [20,21]. End-diastolic and end-systolic dimensions of the left ventricle (EDV and ESR) were increased in subjects with PDA, VSD, coarctation of the aorta, PAS from the pancreas, incomplete form of AVC by more than 25-28 percent. An increase in the size of the pancreas was diagnosed in schoolchildren with TF, IPVS and PA by more than 30-35%. Patients with tetralogy of Fallot and pulmonary atresia had low values of EDV and ESR were below normal.

When determining pulmonary hypertension, clinical guidelines for pulmonary hypertension in children were followed [22]. The criteria for the reliability of pulmonary hypertension were the blood flow velocity of tricuspid regurgitation (Vtc)> 3.4 m / s, systolic pressure in the pulmonary artery (PPA)> 50 mm Hg.

Out of 137 patients with hypervolemia of the pulmonary circulation, pulmonary hypertension was detected in 66 patients, which amounted to -38.5%. The data are presented in table 3.

Conclusion

The presented results indicate changes in the size of the heart cavities, valve apparatus and pressure in the pulmonary artery with an enriched pulmonary circulation. With tetralogy of Fallot and pulmonary atresia, there is an increased size of the pancreas and a smaller size of the left ventricle. More complex defects are detected at a younger age. All of the above indicates the need to optimize early diagnosis and management tactics for children with congenital heart defects.

References

1. Clinical protocol for diagnostics and treatment of congenital heart defects in adults. Ministry of Health and Social Development of the Republic of Kazakhstan dated October 27, 2016 Protocol No. 14. P. 26.
2. Baumgartner H., De Backer J., Babu Narayan S.V., Budts W., Chessa M., Diller G.P., Lung B., Kluin J., Lang I.M., Meijboom F., Moons P., Mulder B.J.M., Oechslin E., Roos Hesselink J.W., Schwerzmann M., Sondergaard L., Zeppenfeld K.; ESC Scientific Document Group: 2020 ESC Guidelines for the management of adult congenital heart disease. EuropeanHeartJournal, 2020; doi: 10.1093 / eurheartj / ehaa554
3. Gatzoulis M.A., Balaji S., Webber S.A. et al. Risk factors for arrhythmia and sudden cardiac death late after repair of tetralogy of Fallot: a multicentre study. Lancet. 2000; 356: 975–81.
4. Clinical guidelines Tetralogy of Fallot ICD 10: Q 21.3 Age category: Children Year of approval (frequency of revision): 2018 (at least once in every 3 years)
5. Gasul B.M., Arcilla R.A., Lev M. Heart disease of children. J.B. Lippincott Co., Philadelphia, 1966.
6. Clinical Practice Guidelines Double Vascular Diversion from the Right Ventricle ICD 10: Q20.1 Year of Approval (revision rate): 2016 (revision every 3 years)
7. Clinical guidelines of the Russian Federation. Pulmonary atresia with ventricular septal defect (PA with VSD) ICD 10: Q 22.0 Age: Children Year of approval (revision rate): 2021 (revision every 3 years)
8. Burakovsky V.I., Bukharin V.A., Podzolkov V.P., Falkovsky G.E., Aleksi-Meskhishvili V.V. Single heart ventricle. In the book: Burakovsky V.I., Bockeria L.A. (ed.). Cardiovascular Surgery: A Guide. M .: Medicine; 1996: 240 - 251.
9. Jacobs M.L., Mayer J.E. Congenital heart surgery nomenclature and database project: single ventricle. Ann. Thorac. Surg. 2000; 69: S197 - 204.
10. Bockeria L.A., Zelenikin M.M., Svobodov A.A. Defects with single ventricular hemodynamics. Right heart bypass surgery. In the book: Bokeria L.A., Shatalov K.V. (ed.) Pediatric cardiac surgery. A guide for doctors. A.N.Bakulev Scientific Center for Agricultural Research, Ministry of Health of the Russian Federation, 2016, p. 663.
11. Hoffman J.I.E. The natural and unnatural history of congenital heart disease Chichester: Wiley-Blackwell; 2009.
12. Clinical guidelines Patent ductus arteriosus (PDA) ICD 10: Q 25.0 Year of approval (frequency of revision): 2016 (revision every 3 years). 14 p
13. Coarctation of the aorta. Clinical guidelines. Age category of patients: neonatal period, children. 2019 (revised every 3 years)
14. Kalashnikova E.A., Nikitina N.A. Early neonatal and postnatal diagnosis. Manifestation, treatment, and prognosis for atrial septal defect. Odessa National Medical University. № 6(74) • c. 63-67. 2016 УДК 616.124.6-053.2-07-08-036 DOI: 10.22141/2224-0551.6.74.2016.82134
15. Kupryashov A.A. Atrial septal defect. Partial abnormal drainage of the pulmonary veins. In the book: Bokeria L.A., Shatalov K.V. (ed.). Pediatric cardiac surgery. A guide for doctors. Federal State Budgetary Institution “N. Bakulev NMITSSSH” of the Ministry of Health of the Russian Federation 2016, c. 294 - 312.
16. Fyler DC, Nadas AS. Nadas` pediatric cardiology. Philadelphia: Hanley&Belfus, 1992.
17. Healthcare in Russia 2017. Statistical collection. Rosstat. M. 2017:170.
18. Bockeria L.A., Gorbachevsky S.V., Shkolnikova M.A. Pulmonary hypertension in children.-Moscow, 2013-416 c.
19. Hilgendorff A, Apitz C, Bonnet D, Hansmann G. Pulmonary hypertension associated with acute or chronic lung diseases in the preterm and term neonate and infant. The European Paediatric Pulmonary Vascular Disease Network, endorsed by ISHLT and DGPK. // Heart. 2016 May; 102 Suppl 2:ii49-56.
20. Vorobiev A. S., Zimina V. Yu. B75 Echocardiography in children and adults: a guide for doctors / A. S. Vorobiev, V. Yu. Zimin. - St. Petersburg: SpetsLit, 2015. – 590 c.: ил.УДК 611.1/616.12-073.97-71.
21. Martsinkevich G.I., Sokolov A.A. Echocardiography in children: anthropometric and age norms. Russian pediatric journal 2′ 2012. C. 17-21.
22. Ministry of Health of the Russian Federation Pulmonary hypertension in children ICD 10: I 27.0 / I 27.8 / I 27.9 Year of approval (frequency of revision): 2017 (revision every 5 years).

https://doi.org/10.35805/BSK2021IV052

DE NOVO AUTOIMMUNE HEPATITIS AFTER LIVER TRANSPLANTATION IN CHILDREN. REVIEW

Yerimova.N.Zh., Akhbetova.A.G.
JSC "National Scientific Center of surgery named after A.N.Syzganov", Almaty, Kazakhstan

Yerimova N.Zh.
orcid.org/0000-0002-0565-5327

Akhbetova A.G.
orcid.org/0000-0003-0122-3487

Corresponding author:
Yerimova N.Zh. *- MD, pediatrician, JSC "National Scientific Center of Surgery name after A. N. Syzganov". E-mail: nazier1611@gmail.com*

Conflict of interest
The authors declare that they have no conflicts of interest

Abstract

De novo autoimmune hepatitis (AIH) is a clinical disease similar to AIH that develops in liver transplant recipients with diseases other than AIH. Timely recognition of this disease makes it possible to avoid graft rejection and liver re-transplantation (LT), liver fibrosis, and can ensure a long life expectancy, given the effectiveness of more active immunosuppression with the use of corticosteroids and azathioprine, as in the treatment of idiopathic AIH. The de novo prefix was added to distinguish this condition from primary autoimmune hepatitis prior to transplant, but the diagnostic algorithm adopted generally accepted diagnostic criteria for autoimmune hepatitis. In fact, de novo autoimmune hepatitis is characterized by typical necroinflammation of the liver, rich in plasma cells, increased serum gammaglobulin levels, and the appearance of inorganic specific autoantibodies. However, the general signs of autoimmune hepatitis de novo, apparently, cannot be associated with an unambiguous pathophysiological pathway, since they can develop in patients undergoing liver transplantation due to different etiologies.

The literature review presents such aspects as the prevalence of this case, the influence of the HLA phenotype on the manifestation and outcome of the disease, diagnosis and treatment.

Objective. *To conduct a literary review of scientific publications on the development of De novo Autoimmune hepatitis after liver transplantation in children.*

Materials and methods. *The authors selected scientific bases for the search such as: Web of science, Cyberleninka, UpToDate, Pubmed and Cochrane, Google Scholar.*

Results. *A meta-analysis of scientific articles in English and Russian was carried out for the selected keywords. The causes of development were not infectious or surgical complications. Liver biopsy revealed histological changes typical of acute or chronic ovulation. High levels of transaminases, hypergammaglobulinemia, positivity to autoantibodies – ANA, AMA, SMA, anti-LKM-1. De novo AIH patients did not respond to conventional anti-rejection therapy, but responded only to classical AIH therapy.*

Keywords
schoolchildren, valvular regurgitations, prevalence

Балалардағы бауыр трансплантациясынан кейінгі de nova аутоиммунды гепатиті. Әдебиет шолуы

Еримова Н.Ж., Ахбетова А.Г.
«А.Н. Сызғанов атындағы Ұлттық ғылыми хирургия орталығы» АҚ, Алматы қ., Қазақстан

Хат алысатын автор:
Еримова Н.Ж. *– дәрігер-педиатр, «А.Н. Сызғанов атындағы Ұлттық ғылыми хирургия орталығы» АҚ. E-mail: nazier1611@gmail.com*

Мүдделер қақтығысы
Авторлар мүдделер қақтығысының жоқтығын мәлімдейді

Аңдатпа

De novo аутоиммунды гепатит (АИГ) – АИГ-ға ұқсас клиникалық ауру, басқа аурулардың нәтижесінде өткерілген бауыр трансплантациясынан кейін дамиды. Бұл ауруды дер кезінде анықтау арқылы трансплантатты қабылдамау, қайта трансплантация, бауыр фиброзы сияқты салдарлардың алдын алуға болады, сонымен қоса, кортикостероидтар мен азатиопринмен активті иммуносупрессияны қолданып, өмір сүру уақытының ұзақтығын қамтамасыз етеді.

De novo қосымшасы бұл жағдайды трансплантацияға дейінгі біріншілік аутоиммунды гепатиттен ажырату үшін қосылған, алайда диагностикалық алгоритмде аутоиммунды гепатитті анықтаудың жалпы өлшемдері қолданылады. Негізінде De novo аутоиммунды гепатит бауырдың плазмалық жасушаларына бай типтік некроқабынуымен, қан сарысуында гаммаглобулин деңгейінің жоғарылауымен, органикалық емес спецификалық аутоантиденелердің пайда болуымен сипатталады. Бірақ De novo аутоиммунды гепатиттің жалпы белгілері бір патофизилогиялық жолмен байланыспайды, себебі бауыр трансплантациясы әртүрлі этиологияға байланысты жасалынады.

Әдебиеттік шолуда осы жағдайдың таралуы, HLA фенотипінің аурудың дамуы мен асқынуына әсері, диагностикасы және емі баяндалады.

Жұмыстың мақсаты *- балалардағы бауыр трансплантациясынан кейінгі De novo аутоиммунды гепатиттің дамуы жайлы ғылыми басылымдарға әдебиеттік шолу жасау.*

Материал және әдістер. *Іздеу үшін мына ғылыми базалар таңдалынды: Web of science, Cyberleninka, UpToDate, Pubmed и Cochrane, Google Scholar.*

Нәтижелер. *Таңдалған түйін сөздер бойынша орыс және ағылшын тілдерінде ғылыми басылымдардың мета-анализі жүргізілді. Аурудың дамуы инфекция немесе хирургиялық асқынудан болмаған. Бауырдың биопсиясы кезінде трансаминазалардың жоғары деңгейі, гипергаммаглобулинемия, аутоантиденелерге позитивтілік – ANA, AMA, SMA, anti-LKM-1 анықталды. De novo АИГ-мен ауыратын науқастар тек АИГ-ның классикалық еміне жауап қайтарды.*

Түйін сөздер
аутоиммунды гепатит, бауыр трансплантациясы, педиатриялық трансплантация, de novo гепатит, бауыр циррозы

Denova аутоиммунный гепатит после трансплантации печени у детей. Обзор литературы

Еримова Н.Ж., Ахбетова А.Г.
АО "Национальный научный центр хирургии им. А.Н. Сызганова", г. Алматы, Казахстан

Автор для корреспонденции:
Еримова Н.Ж. *– врач-педиатр, АО «Национальный научный центр хирургии им. А.Н. Сызганова». E-mail: nazier1611@gmail.com*

Конфликт интересов
Авторы заявляют об отсутствии конфликта интересов

Аннотация

De novo аутоиммунный гепатит (АИГ) - это клиническое заболевание, напоминающее АИГ, которое развивается у реципиентов после трансплантации печени при других заболеваниях, кроме АИГ. Своевременное распознавание данного заболевания позволяет избежать отторжения трансплантата и повторной трансплантации печени (ТП),фиброза печени, и может обеспечить высокую продолжительность жизни, учитывая эффективность более активной иммуносупрессии с применением кортикостероидов и азатиоприна, как и при лечении идиопатического АИГ. Приставка denovобыла добавлена для того, чтобы отличить это состояние от первичного аутоиммунного гепатита до трансплантации, но в диагностическом алгоритме были приняты общепринятые критерии диагностики аутоиммунного гепатита. На самом деле, аутоиммунный гепатит de novo характеризуется типичным некровоспалением печени, богатыми плазматическими клетками, повышением уровня гаммаглобулина в сыворотке крови и появлением неорганических специфических аутоантител. Тем не менее, общие признаки аутоиммунного гепатита denovo,не могут быть связаны с однозначным патофизиологическим путем, поскольку они могут развиваться у пациентов, перенесших трансплантацию печени, из-за различной этиологии.

В обзоре литературы представлены такие аспекты, как распространенность данного случая, влияние HLA фенотипа на проявление и исход заболевания, диагностика и лечение.

Цель работы - *провести литературный обзор научных публикаций по развитии De novo аутоиммунного гепатита после трансплантации печени у детей.*

Материалы и методы. *Авторами выбраны научные базы для поиска такие как: Web of science, Cyberleninka, UpToDate, Pubmed и Cochrane, Google Scholar.*

Результаты. *По выбранным ключевым словам был проведен мета-анализ научных статей на английском и русском языках. Причинами развития не были ифекционные или хирургические осложнения. При биопсии печени были выявлены гистологические изменеия типичные для острого или хронического отторжения. Были выявлены высокие уровни трансаминаз, гипергаммаглобулинемия, позитивность к аутоантителам – ANA, AMA, SMA, anti-LKM-1. Пациенты с de novo АИГ не отвечали на обычную терапию против отторжения, а отвечали только на классическое лечение АИГ.*

Ключевые слова
аутоиммунный гепатит, трансплантация печени, педиатрическая трансплантация, de novo гепатит, цирроз печени

Introduction

Liver transplantation (LT) is considered the main therapeutic approach for end-stage acute and chronic liver disease. Approximately 90% of liver transplant patients are alive and well at 1 year and 75% at 5 years, with most living full and near-normal lives. Early post-transplant mortality rates have dropped sharply over the past two decades, while late graft loss and patient death rates have remained unchanged. Therefore, the reasons for graft and patient failure are important to improve future outcomes. In the early days after LT, ischemia and reperfusion injuries predominate, while acute cellular rejection is relatively common in the first 3 months. And after the cause of graft dysfunction may vary, and recurrence of the disease is the main cause of graft loss [1].

Initially, de novo AIH was described predominantly in children with biliary atresia and was later found to be more prevalent in PBC recipients. The first de novo description of AIH was in children in 1998, with 7 of 180 children followed up for at least 5 years after LT. These patients had histological signs of AIH, hypergammaglobulinemia and high titers of ANA, SMA, anti-LKM1. Of these 7 patients, 6 responded to therapy with corticosteroids and azathioprine. Since then, subsequent studies have confirmed the occurrence of de novo AIH in 1-7% of patients aged 0 to 9 years after LT [2].

The age of the recipient may be an important determinant of de novo AIH. Most often occurs and is more severe in children 3]. Miyagawa-Hayashino et al. [4] reported that age 11 to 15 years was an independent prognostic factor for de novo AIH in a large group of LT recipients from living donors.

The incidence of de novo AIH is unknown because there are no systematic diagnostic criteria for this disease. Moreover, the de novo outcome of AIH is unclear, as there are few studies evaluating its effect on graft or patient survival. Female transplant recipients or older donors have a higher prevalence of de novo AIH, indicating that the risk associated with de novo AIH may be dictated by the allograft itself [5].

The 5-year survival rate after LT in AIH is 80-90% [6]. The results of AT with AIH are good, but the disease can recur in the allograft despite immunosuppression. The average time from TP to relapse is 5 years, but relapse can occur as early as 35 days after surgery [7]. The recurrence rate of AIH varies between 30-83% and depends on the diagnosis, treatment, duration of follow-up and the results of

histological examination of liver tissue. The diagnosis of recurrent AIH is based on the appearance of clinical symptoms of hepatitis, increased levels of transaminases and IgG, autoantibodies, response to treatment with corticosteroids and azathioprine. Reasons associated with the recurrence of AIH after LT: histocompatibility antigens HLA-DR3 or HLA-DR4; discontinuation of corticosteroids after LT, severity of necroinflammatory activity in the native liver during LT. Recurrent AIH develops less frequently in patients transplanted for the fulminant course of AIH with ALF compared with patients with a chronic form of the disease [8].

The formation of nonspecific autoantibodies is detected over time after liver transplantation, affecting more than 70% of recipients [9,10], the incidence of de novo AIH in children ranges from 2-6% [11,12]. These pathological changes, which occur in 4% of children transplanted for various liver diseases, were first described at King's College Hospital (London, UK) [13]. The patients developed a form of graft dysfunction characteristic of classical AIH: high transaminase levels, hypergammaglobulinemia, positive autoantibody titers ANA, ASMA, typical and atypical anti-LKM-1, and histological features characteristic of chronic hepatitis with portal or periportal inflammation and centrolobular necrosis.

The pathogenesis of de novo AIH is poorly understood; it is a form of graft intolerance or a special mode of graft rejection that is not directed against HLA molecules. In the case of de novo AIH associated with antibodies against GSTT1, patients with a GSTT1 genotype null who received a transplant from a positive donor can be described as satisfying the basic condition for the development of de novo AIH [14, 15]. However, not every patient with this genetic mismatch will develop clinical signs de novo AIH. The history of immunological and clinical features of patients with GSTT1 mismatch and anti-GSTT1 antibodies after LT has not been described.

De novo AIH has been associated with atypical serum autoantibodies, which are antibodies against glutathione S-transferase T1 (anti-GSTT1). In fact, the discrepancy between the donor and recipient in the GSTT1 genotype is a necessary factor for the emergence of anti-GSTT1 and the de novo development of AIH.

De novo AIH should be distinguished from acute rejection, chronic rejection, viral infection, and drug side effects. Histological features and the time interval between disease onset and liver transplantation are important in guiding diagnostic efforts [16–22]. Acute rejection occurs within 30 days after LT and is characterized by portal and central endothelitis, damage to the bile ducts and eosinophils, and chronic rejection develops 3-12 months after LT and is characterized by cholestatic laboratory findings: bile duct loss. lesion of more than 50% of the portal tracts, loss of a small artery, perivenular fibrosis, and obliterating foam cell arteriopathy [16].

Other causes of graft dysfunction after liver transplantation, such as rejection, infection, and hepatic artery thrombosis, were ruled out. Study patients with De novo AIH did not respond to standard antiretroviral therapy, but responded to classical AIH therapy. None of the children had undergone transplants for autoimmune liver disease, and all had therapeutic antireactive serum calcineurin inhibitor concentrations at the time of de novo AIH diagnosis. De novo AIH is sometimes a complication in liver transplant donors [23]. The largest pediatric trial published to date describes 41 out of 788 patients with single-center TP who developed de novo AIH. Graft rejection and steroid dependence have been identified as risk factors for this complication [24]. In adults, the development of this condition can be predicted using a histological picture characterizing centrilobular inflammation with necroinflammatory activity and plasma cell infiltration. In children, the histological feature of de novo AIH is lobular hepatitis without necroinflammatory activity or plasma cell infiltrates [25].

Several reports investigated the relationship between the de novo development of AIH after liver transplantation with the possession of a specific major histocompatibility complex (MHC) antigen between recipient and donor. In the report, five out of seven patients received livers from donors with HLA alleles known to confer sensitivity to AIH, two being DR4, one DR3 and two being DR3 / DR4, while no association was found to possess DR3 or DR4 recipient [13]. Henegan et al. [26] found HLA DRB * 0301 or DRB * 0401 in donors or recipients in all cases, and Salcedo et al. [27] found an overrepresentation of DR3 in recipients. It is necessary to investigate a larger number of patients to establish the immunogenetic effect on the de novo development of AIH after liver transplantation.

If the five-year survival rate after liver transplantation is 92%, the autoantibodies disappear within two years. Recurrence of autoimmune hepatitis after liver transplantation has been reported in patients who received overdose of immunosuppressive drugs and in HLA DRS-positive patients who received HLA DR3-negative transplants.

Role of liver biopsy for diagnosis and decision making in De Novo autoimmune hepatitis?

According to the Banff Working Group, the histological criteria used to diagnose De novo AIH in a liver allograft are similar to those used to recognize AIH in a nontransplant setting [28]. Many studies have identified a typical plasma cell rich infiltrate showing a significant necroinflammatory interface and perivenular activity [29]. De novo AIH should be differ-

entiated from other causes of hepatitis, such as idiopathic chronic hepatitis after LT and viral hepatitis. In a large cohort of 51 pediatric patients diagnosed with De novo AIH, the predominant histological pattern of damage was necroinflammatory activity, presented as lobular hepatitis, followed by interface and perivenular activity [30]. The rest of the injury patterns were similar to those observed in acute rejection, chronic rejection, and bile duct obstruction. 80% of liver biopsies showed no or moderate fibrosis. An infiltrate rich in plasma cells was observed in only 31% of patients; they affected the portal areas. A decrease in the severity of hepatitis and plasma cell rich infiltrates was indicated in biopsies taken from these patients after treatment with corticosteroids. Sebagh et al. [31] developed a mathematical model to assess the predictability of the histological diagnosis of DAIH. This model had the best level of predictability (99.6%) when both severe centrilobular necroinflammatory activity and a centrilobular plasma cell ratio of 30-50% were present. This model can be useful for separating DAIH from other nosologies [32]. Diagnosing autoimmune hepatitis de novo (AIH) after orthotopic liver transplantation (OLT) is difficult when hypergammaglobulinemia is absent. Circulating autoantibodies are not sensitive or specific for de novo AIH, but a positive result increases the diagnostic likelihood. There is evidence of the discovery of new autoantibodies to liver microsomes against CYP-2C19 in a 9-year-old boy with de novo AIH who developed 7 years after OLT. Graft dysfunction is manifested by hypertransaminasemia, and gammaglobulins were normal. Liver histology and response to high dose corticosteroids supplemented with azathioprine further confirmed the de novo AIH diagnosis. The study of autoantibodies by indirect immunofluorescence in rodent tissues showed a new staining pattern affecting the pericentral zone of the liver and preserving the renal tissue. Immunoblotting of human liver proteins allowed them to characterize new antibodies to liver microsomes and identify CYP-2C19 as a human antigen [33]. De novo AIH can be aggressive in children. In one pediatric group, 80% of recipients had an outcome as pronounced fibrosis, and graft loss occurred in 33%, despite the combined treatment of corticosteroids with azathioprine. Adult patients who develop de novo AIH after treatment for recurrent HCV infection with interferon may also be aggressive. In the first group, 2 out of 9 patients were fatal, and 1 patient had graft rejection and 1 patient required a second transplant, despite the rapid initiation of corticosteroid treatment.

De novo AIH should be distinguished from acute rejection, chronic rejection, viral infection, and drug side effect. The difficulty in making a diagnosis is due to the lack of a specific marker. Recurrent AIH develops in about 20–25% of cases [34,35]. The awareness that treatment with prednisolone and azathioprine is effective for de novo AIH after LT has resulted in excellent graft and patient survival. This is documented in an article describing the experience of a single center for de novo AIH treatment after liver transplantation. The retrospective drug-naive group was compared with the prospective group of patients receiving steroids and azathioprine. While all patients who did not receive drug treatment developed liver cirrhosis and were fatal or required a second transplant, none of the treated patients had progression of the disease within four years. At the stage of drug treatment, an increased dose of corticosteroids or their resumption of administration with or without azathioprine or MMF are used [36]. When we do not see the desired response, azathioprine / MMF can be substituted for sirolimus [37]. The prophylactic use of azathioprine in patients with liver transplants associated with AIH has not been systematically evaluated, although such a tactic seems to be justified. AIH de novo has been described in 2–7% of patients after LT for various diseases not associated with autoimmune processes, especially in children. The treatment strategy is the same as for recurrent AIH. Finally, patients with recurrent or de novo AIH should be considered for re-transplantation if AIH progresses to graft loss (rarely with early treatment) [38].

De novo AIH has been described as a manifestation of immune restoration in HIV-infected patients receiving highly active antiretroviral therapy. Liver biopsy data play an important role in establishing the diagnosis of AIH and differentiating numerous other causes of changes in liver function parameters in these patients [39]. Standard AIH immunosuppressive therapy can be effective, but sometimes it is complicated by the development of life-threatening infections. Treatment of AIH in HIV-infected patients should be individualized and take into account the possible risks and benefits [40].

Conclusion

The de novo position of AIH in the spectrum of allograft dysfunction is still undetermined, and further research is needed to standardize its diagnosis and distinguish it from plasma cell-rich rejection. This requires looking for disease-specific serologic markers and determining the value of anti-GSTT1 testing. In pediatric patients with unexplained graft dysfunction after LT, it is important to quickly recognize de novo AIH and develop an adequate diagnostic strategy, including assessment of serum autoantibodies, immunoglobulin G, and liver biopsy.

Early diagnosis and prompt initiation of therapy with prednisolone or prednisolone in combination with azathioprine are the main principles of treatment of recurrent and de novo autoimmune hepatitis.

References

1. Desai M, Neuberger J. Chronic liver allograft dysfunction. Transplant Proc. 2009 Mar;41(2):773-6.
2. Czaja A. Diagnosis Pathogenesis and treatment of autoimmune hepatitis after liver transplantation. Dig Dis Sci. 2012 Sep;57(9):2248-66
3. Magdalena Salcedo, Margarita Rodrнguez-Mahou, Carmen Rodrнguez-Sainz, Diego Rincyn, Emilio Alvarez, Jose Luis Vicario, Maria-Vega Catalina, Ana Matilla. Risk factors for developing de novo autoimmune hepatitis associated with anti–glutathione S-transferase T1 antibodies after liver transplantation. 27 April 2009. DOI:10.1002/lt.21721
4. Miyagawa-Hayashino A, Haga H, Egawa H, Hayashimo Y, Sakurai T, Minamiguchi S, et al. Outcome and risk factors of de novo autoimmune hepatitis in living-donor liver transplantation. Transplantation 2004; 78: 128–135.
5. Kerkar N, Dugan C, Rumbo C., Morotti RA, Gondolesi G, Shneider BL, Emre S. Rapamycin successfully treats post-transplant autoimmune hepatitis. Am. J. Transplant. 2005;5(5):1085–1089
6. Vergani D., Mieli-Vergani G. Autoimmunity after liver transplantation. Hepatology. 2002 Aug;36(2):271–6. DOI: 10.1053/jhep.2002.35339
7. Ayata G., Gordon F.D., Lewis W.D., Pomfret E., Pomposelli J.J., Jenkins R.L., Khettry U. Liver transplantation for autoimmune hepatitis: a long-term pathologic study. Hepatology. 2000;32(2):185–92. DOI: 10.1053/ jhep.2000.9077
8. Reich D.J., Fiel I., Guarrera J.V., Emre S., Guy S.R., Schwartz M.E., Miller C.M., Sheiner P.A. Liver transplantation for autoimmune hepatitis. Hepatology. 2000;32(4 Pt 1):693–700. DOI: 10.1053/ jhep.2000.16666
9. Liberal R., Zen Y., Mieli-Vergani G., Vergani D. Liver transplantation and autoimmune liver diseases. Liver Transpl. 2013 Oct;19(10):1065–77. DOI: 10.1002/ lt.23704
10. Chen C.Y., Ho M.C., Wu J.F., Jeng Y.M., Chen H.L., Chang M.H., Lee P.H., Hu R.H., Ni Y.H. Development of autoantibodies after pediatric liver transplantation. Pediatr Transplant. 2013;17:144–8. (SCI 1.294, Rank: 74/121 PEDIATRICS).
11. Edmunds C.I., Ekong U.D. Autoimmune Liver Disease Post-Liver Transplantation: A Summary and Proposed Areas for FutureResearch. Transplantation. 2016 Mar;100(3):515–24. DOI: 10.1097/ TP.0000000000000922
12. Kerkar N., Yanni G. 'De novo' and 'recurrent' autoimmune hepatitis after liver transplantation: A comprehensive review. J Autoimmun. 2016 Jan;66:17–24. DOI: 10.1016/j.jaut.2015.08.017
13. Kerkar N.I., Hadzić N., Davies E.T., Portmann B., Donaldson P.T., Rela M., Heaton N.D., Vergani D., Mieli-Vergani G. De-novo autoimmune hepatitis after liver transplantation. Lancet. 1998;351(9100):409– DOI: 10.1016/S0140-6736(97)06478-7
14. Aguilera J, Sousa JM, Gavilaэn F, Bernardos A, Wichmannl, Nunχez-Roldaэ n A. Glutathione-S-transferase T1 mismatch constitutes a risk factor for de novo autoimmune hepatitis after liver transplantation. Liver Transpl 2004; 10:1166-1172.
15. Rodriguez-Mahou M, Salcedo M, Fernandez-Cruz E, Ruiz-Tiscar JL, Banχares R, Clemente G, et al. Antibodies against glutathione S-transferase T1 (GSTT1) in patients with GSTT1 null genotype as prognostic marker: longterm follow-up after liver transplantation. Transplantation 2007;83:1126-1129.
16. Czaja A. Diagnosis Pathogenesis and treatment of autoimmune hepatitis after liver transplantation. Dig Dis Sci. 2012 Sep;57(9):2248-66
17. Zhang Y, Wang B, Wang T. De novo autoimmune hepatitis with centrilobular necrosis following liver transplantation for primary biliary cirrhosis: a case report. Transplant Proc. 2010 Nov;42(9):3854-7
18. Richter A, Grabhorn E, Helmke K, et al. Clinical relevance of autoantibodies after pediatric liver transplantation. Clin Transplant. 2007 May-Jun;21(3):427-32
19. Cho JM, Kim KM, Oh SH, et al. De novo autoimmune hepatitis in Korean children after liver transplantation: a single institution's experience. Transplant Proc. 2011 JulAug;43(6):2394-6
20. Damoiseaux, J.G., van Breda Vriesman, P.J. Cyclosporin Ainduced autoimmunity: the result of defective de novo T-cell development. Folia Biol (Praha). 1998;(44):19
21. Salcedo M, Rofriguez-Mahou M, Rodriguez-Sainz C, et al. Risk factors for developing de novo autoimmune hepatitis associated with anti-glutathione S-transferase T1 antibodies after liver transplantation. Liver Transpl. 2009 May;15(5):530- 9
22. Demetris AJ, Adeyi O, Bellamy CO, et al. Liver biopsy interpretation for causes of late liver allograft dysfunction. Hepatology. 2006 Aug;44(2):489-501
23. Miyagawa-Hayashino A., Haga H., Egawa H., Hayashino Y., Sakurai T., Minamiguchi S., Tanaka K., Manabe T. Outcome and risk factors of de novo autoimmune hepatitis in living-donor liver transplantation. Transplantation. 2004;78(1):128–35. PMID: 15257051
24. Venick R.S., McDiarmid S.V., Farmer D.G., Gornbein J., Martin M.G., Vargas J.H., Ament M.E., Busuttil R.W. Rejection and steroid dependence: unique risk factors in the development of pediatric posttransplant de novo autoimmune hepatitis. Am J Transplant. 2007;7(4):955– 63. DOI: 10.1111/j.1600-6143.2006.01717.x
25. Pongpaibul A., Venick R.S., McDiarmid S.V., Lassman C.R. Histopathology of de novo autoimmune hepatitis. Liver Transpl. 2012;18(7):811–8. DOI: 10.1002/lt.23422
26. Heneghan MA, Portmann BC, Norris SM, Williams R, Muiesan P, Rela M, et al. Graft dysfunction mimicking autoimmune hepatitis following liver transplantation in adults. Hepatology 2001;34:464–470.
27. Salcedo M, Vaquero J, Banares R, Rodriguez-Mahou M, Alvarez E, Vicario JL, et al. Response to steroids in de novo autoimmune hepatitis after liver transplantation. Hepatology 2002;35:349–356.
28. Demetris AJ, Bellamy C, Hьbscher SG, O'Leary J, Randhawa PS, Feng S, et al. 2016 comprehensive update of the Banff Working Group on Liver Allograft Pathology: Introduction of antibody-mediated rejection. Am J Transplant 2016;16:2816–2835.
29. Adeyi O, Fischer SE, Guindi M. Liver allograft pathology: approach to interpretation of needle biopsies with clinicopathological correlation. J Clin Pathol 2010;63:47–74.

30. Pongpaibul A, Venick RS, McDiarmid SV, Lassman CR. Histopathology of de novo autoimmune hepatitis. Liver Transpl 2012;18:811–818.
31. Sebagh M, Castillo-Rama M, Azoulay D, Coilly A, Delvart V, Allard MA, et al. Histologic findings predictive of a diagnosis of de novo autoimmune hepatitis after liver transplantation in adults. Transplantation 2013;96:670–678.
32. Luis Ibanez-Samaniego,Magdalena Salcedo,Javier Vaquero,Rafael Bacares. De novo autoimmune hepatitis after liver transplantation: A focus on glutathione S-transferase theta 1, 06 October 2016, doi. 10.1002/lt.24652.
33. Maria Grazia Clemente, Roberto Antonucci, , Lucia Cicotto, Antonella Meloni, Bruno Gridelli, Stefano De Virgiliis, 1 Michael P. Manns, and Pietro Vajro. Autoantibodies against CYP-2C19: A Novel Serum Marker in Pediatric De Novo Autoimmune Hepatitis. 2017 doi: 10.1155/2017/3563278.
34. Gautam M, Cheruvattath R, Balan V. Recurrence of autoimmune liver disease after liver transplantation: a systematic review. Liver Transpl 2006;12:1813–1824.
35. Carbone M, Neuberger JM. Autoimmune liver disease, autoimmunity and liver transplantation. J Hepatol 2014;60:210–223.
36. Gonzalez-Koch A, Czaja AJ, Carpenter HA, Roberts SK, Charlton MR, Porayko MK, et al. Recurrent autoimmune hepatitis after orthotopic liver transplantation. Liver Transpl 2001;7:302–310
37. Kerkar N, Dugan C, Rumbo C, Morotti RA, Gondolesi G, Shneider BL, et al. Rapamycin successfully treats post-transplant autoimmune hepatitis. Am J Transplant 2005;5:1085–1089.
38. Montano-Loza AJ, Vargas-Vorackova F, Ma M, Bain VG, Burak K, Kumar T, et al. Incidence and risk factors associated with de novo autoimmune hepatitis after liver transplantation. Liver Int 2012;32:1426–1433.
39. Puius YA, Dove LM, Brust DG, Shah DP, Lefkowitch JH. Three cases of autoimmune hepatitis in HIV-infected patients. J Clin Gastroenterol 2008;42:425–429.
40. Wan DW, Marks K, Yantiss RK, Talal AH. Autoimmune hepatitis in the HIV-infected patient: a therapeutic dilemma. AIDS Patient Care STDS 2009;23:407–413.

VII КОНГРЕСС ХИРУРГОВ КАЗАХСТАНА С МЕЖДУНАРОДНЫМ УЧАСТИЕМ «ХИРУРГИЯ: ВЧЕРА, СЕГОДНЯ, ЗАВТРА», ПОСВЯЩЕННЫЙ 75-ЛЕТИЮ СО ДНЯ ОСНОВАНИЯ ННЦХ ИМ. А.Н. СЫЗГАНОВА

30 сентября - 1 октября 2021 года с огромным успехом прошел VII Конгресс хирургов Казахстана с международным участием «Хирургия: вчера, сегодня, завтра», посвященный 75-летию со дня основания Национального научного центра хирургии им. А.Н. Сызганова, флагмана отечественной хирургической службы. Впервые Конгресс был организован в гибридном режиме, в том числе с более 15 тысячами подключений слушателей из разных континентов и стран в онлайн режиме, что по факту в значительной степени позволило расширить аудиторию участников.

На пленарном заседании с докладами выступили профессор Чжао А.В. (г. Москва, РФ), к.м.н. Рзаев Ф.Г. (г. Москва, РФ), профессор Баймаханов Б.Б. (г. Алматы, Казахстан). Секционные заседания были посвящены актуальным темам гепатопанкреатобилиарной хирургии и трансплантации печени, хирургии желудочно-кишечного тракта и эндокринных органов, кардиохирургии, интервенционной аритмологии, рентгеноэндоваскулярной хирургии и интервенционной кардиологии, торакальной и детской хирургии, сосудистой хирургии, микрохирургии, урологии и трансплантации почки, а также анестезиологии и интенсивной терапии.

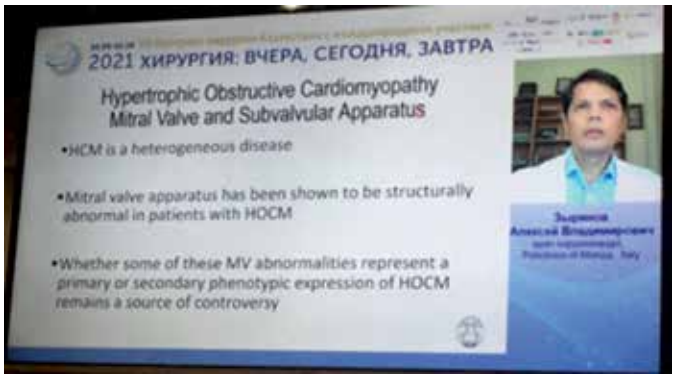
Материалы Конгресса, а это более 260 поступивших тезисов и абстрактов на актуальные темы различных областей современной хирургии, вошли в специальный выпуск рецензируемого журнала «Вестник хирургии Казахстана». Более того, в честь 75-летнего Юбилея при активном участии сотрудников центра выпущена книга под названием «Хирургия: прошлое, настоящее и будущее», прочитав которую можно ознакомиться с богатой историей центра, этапами его становления, научными достижениями, выдающимися руководителями, талантливыми хирургами, знаменитыми учёными, ведущими научными сотрудниками, известными специалистами, врачами смежных специальностей, врачами параклинической службы, административного персонала, среднего медицинского персонала, внесшими неоценимый и значительный вклад в развитие ННЦХ им. А.Н. Сызганова.

На секции «Гепатопанкреатобилиарная хирургия и трансплантация печени» было представлено 11 зарубежных докладов от спикеров из Узбекистана, Украины, Российской Федерации, Беларуси и Японии, и 5 докладов от сотрудников Центра. Один из интересных выступлений был представлен профессором Нагасакского университета Susumu Eguchi на тему: «Злокачественные образования гепатобилиарной зоны: новые взгляды». Помимо всего прочего, на секции обсуждались актуальные вопросы хирургического лечения гепатоцеллюлярной карциномы, эхинококкоза печени, заболеваний поджелудочной железы и желчных протоков.

На секции «Хирургия желудочно-кишечного тракта и эндокринных органов» было представлено 17 докладов, из них 9 были сделаны спикерами из зарубежных стран, таких как Узбекистан, Азербайджан, Россия, Китай, Япония, Германия. Модераторами были профессор Жураев Ш.Ш. и Шокебаев А.А.

На секции «Кардиохирургия» были сделаны 19 докладов ведущими специалистами из Италии, Грузии, Таджикистана, Российской Федерации. Онлайн подключений было более 1700.

На секции «Интервенционная аритмология и рентгеноэндоваскулярная хирургия» с интересными докладами выступили ведущие ученые и специалисты, такие как Али Ото из Турции, Маринскис Германас из Латвии, Евгений Михайлов из Санкт-



Петербурга и др. Модератором секции был к.м.н. Рзаев Ф.Г., один из ведущих врачей-аритмологов из г. Москвы (РФ).

На секции «Сосудистая хирургия» всего было сделано 19 докладов, из них 10 докладов от спикеров из ближнего и дальнего зарубежья. Модераторами секции были профессора Султаналиев Т.А. и Егембердиев Т.Ж., к.м.н. Коспанов Н.А.

На секции «Торакальная и детская хирургия» всего было сделано 15 научных докладов от спикеров из Турции, Российской Федерации, Узбекистана, а также из Казахстана.

На секции «Урология и трансплантация почки» было представлено 20 докладов от 16 спикеров из ближнего и дальнего зарубежья (Великобритания, Россия, Узбекистан, Республика Беларусь). Обсуждались актуальные вопросы трансплантации почек, ведение пациентов в раннем и позднем послеоперационном периодах, современные подходы к лечению острого криза отторжения, трансплантация почек у детей со стероидрезистентным нефротическим синдромом,

онкологические осложнения после трансплантации почек. Секция была насыщена интересными фактами в области трансплантации почек, урологии и нефрологии. Онлайн подключений было более 3000.

На секции «Микрохирургия» было представлено 4 доклада от сотрудников отделения восстановительно-пластической микрохирургии ННЦХ им. А.Н. Сызганова, и 2 доклада ученых из Российской Федерации.

Секция «Анестезиология и интенсивная терапия» включила в себя 13 интереснейших докладов, представленных учеными и специалистами из Японии, Литвы, Российской Федерации, а также из Казахстана. На данной секции было зарегистрировано более 4000 онлайн подключений.

ТРАНСПЛАНТАЦИЯ ПЕЧЕНИ В ННЦХ ИМ. А.Н. СЫЗГАНОВА

К настоящему моменту в АО «ННЦХ им. А.Н. Сызганова» проведена 207-я по счету трансплантация печени.

Программа трансплантации печени в АО «ННЦХ им. А.Н. Сызганова» была запущена ровно 10 лет назад в 2011 году. За этот период 145 взрослым пациентам проведена трансплантация печени от живого родственного донора, 38 детям выполнена трансплантация печени от живого родственного донора и 24 пациентам выполнена трансплантация печени от посмертного донора.

За последние 5 лет из общего числа трансплантаций печени выполнены 134 (67%) операций, что говорит о сравнительном динамическом росте. В текущем году выполнены 19 трансплантаций печени от живого донора, 2 - от посмертного донора и 9 трансплантаций фрагмента печени детям. На сегодняшний день АО «ННЦХ им. А.Н. Сызганова» является ведущим центром по трансплантации печени в Республике Казахстан. Специалистами Центра разработаны клинические протоколы по лечению реципиентов, систематически проводится обучение коллег из других клиник Республики, издаются учебно-методические пособия. Сотрудники клиники постоянно участвуют в отечественных и международных конференциях, посвященных достижениям и актуальным проблемам клинической трансплантологии. Выживаемость после трансплантации печени составляет: 5-ти летняя - 74,3% и 10-ти летняя - 71,7%.

Во внедрении и развитии трансплантации печени в условиях ННЦХ им. А.Н. Сызганова принимали участие зарубежные партнеры и ведущие специалисты из Белоруссии (Руммо О.О.) – трансплантация печени от живого родственного донора, из Индии (Субаш Гупта) - трансплантация печени от живого родственного донора взрослым и детям, из Японии (Сусуми Эгучи) - трансплантация печени от живого родственного донора, а также из Южной Кореи (Lee S.G.) - трансплантация печени от двух живых родственных доноров (Dual Graft).

МАСТЕР-КЛАСС «ADVANCED ENDOSCOPY»

В ННЦХ им. А.Н. Сызганова 5-6 ноября 2021 года проведен мастер-класс «Advanced Endoscopy» с участием приглашенных лучших эндоскопистов из Турецкой Республики: профессора Эрдем Акбалем из Liv Hospital Ulus (г. Стамбул) и профессора Мехмет Ибиш.

В рамках мастер-класса выполнено 3 операций (ПОЭМ, диссекция в прямой кишке и в желудке), прочитаны доклады по увеличительной эндоскопии, хромоскопии и по основам эндоскопической подслизистой диссекции. Также проведен симуляционный тренинг на биомоделях по эндоскопической подслизистой диссекции.

Всего 160 врачей из Казахстана, Кыргызстана, Таджикистана, Украины, Узбекистана, Сербии, Турции и Украины приняло участие в работе мастер-класса (в оффлайн и онлайн режимах).

ВЫЕЗДНЫЕ КОНСУЛЬТАЦИИ В УЙГУРСКУЮ ЦЕНТРАЛЬНУЮ РАЙОННУЮ БОЛЬНИЦУ Г. ЧУНДЖА, АЛМАТИНСКОЙ ОБЛАСТИ В РАМКАХ 30-ЛЕТИЯ НЕЗАВИСИМОСТИ РЕСПУБЛИКИ КАЗАХСТАН

Специалисты ННЦХ им. А.Н. Сызганова 6 ноября 2021 года в рамках 30-летия Независимости Республики Казахстан выезжали с консультациями в Уйгурскую центральную районную больницу г. Чунджа, Алматинской области. Целью поездки явилось предоставить населению данной местности, которое нуждается в подобных консультациях и по разным причинам не имеющее возможности приехать в город Алматы, получить бесплатную консультацию узких специалистов, таких как гепатобилиарный хирург, гастроэнтеролог и врач ультразвуковой диагностики.

Обратившихся жителей проконсультировали заведующий отделением гепатопанкреатобилиарной хирургии и трансплантации печени Досханов М.О., врачи отделения Скакбаев А.С., Исматов А.У., врач гепатолог-гастроэнтеролог Абжапарова Б.С. и врач отделения ультразвуковой диагностики Садыков Ч.Т.

Специалистами центра осмотрен 81 пациент, из них 53 пациента получили консультацию гепатобилиарного хирурга, 28 пациентов - консультацию гастроэнтеролога. Пациенты были с различными патологиями печени, поджелудочной железы и желчных протоков, при этом 43 пациентам на месте было выполнено исследование органов брюшной полости с помощью УЗ.

В ходе первичного осмотра и обследования у 8 пациентов выявлены различные объемные образования печени, у 23 пациентов - желчекаменная болезнь и у 4-х пациентов впервые выявлен цирроз печени. На оперативное лечение в условиях ННЦХ им А.Н. Сызганова через портал госпитализации направлено 15 пациентов.

В ближайшем будущем планируется организовать консультативные дни ведущих специалистов Центра в других отдаленных районах Алматинской области.

К 80-летию со дня рождения Байжаркиновой Аяш Болдыбаевны

7 ноября 2021 года свой 80- летний юбилей отмечает ветеран труда, врач-хирург, ученый и преподаватель Байжаркинова Аяш Болдыбаевна.

Аяш Болдыбаевна закончила Актюбинский государственый медицинский институт в 1964 гг. Трудовую деятельность начала в узловой больнице ст. Кандагач, в системе министерства путей сообщения в линейной больницы Шубар-Кудук, где открывала хирургическое отделение с операционной и кабинетом переливания крови во вновь построенной больнице. В период 1973-1977 гг. заведовала хирургическим отделением, присвоены первая и высшая квалификационные категории. В 1977 году переведена в Дорожную клиническую больницу Западно-Казахстанской железной дороги в г. Актюбинск (Актобе), где заведовала хирургическим отделением в течение 26 лет. Работу практического хирурга, организатора совмещала с преподованием на кафедре «Общей хирургии». В 1995 году в ННЦХ им. А.Н. Сызганова защитила кандидатскую диссертацию на тему: «Диагностическая лапароскопия в комплексном лечении острого холецистита».

Аяш Болдыбаевна - одна из немногих женщин-хирургов Республики, достигших высокого мастерства в профессии и возглавивших хирургическое отделение крупной клиники. В 1978 г. Аяш Болдыбаевна внедрила диагностическую лапароскопию «Красногвардеец», в 1993-94 гг. совместно с сотрудниками кафедры хирургии одними из первых в Республике внедрили лапароскопические операции и лично выполнила свыше 500 экстренных холецистэктомии аппаратом Олимпус. Наряду с практической и преподавательской деятельностью продолжала и научную работу. В период с 1995 по1998 гг. - член коллегии журнала «Хирургия Казахстана».

Байжаркинова А.Б. имеет ряд изобретений и патентов по ЛХЭ. Уже в те годы ею было внедрено грыжесечение в амбулатории. Участница многих международных конгрессов. Автор более 200 статей, соавтор книги «Жалпы хирургия», автор учебника «Емханалық хирургия», является профессором РАЕ и почетным доктором и членом «Хирургического общества» по лапароскопии и РАЕ г. Москвы. Награждена: Орден Александра Великого «За научные победы и свершения», Орден Екатерины Великой «За служение науке и просвещению», медали к «100-150-Летию со дня рождения В.И. Ленина», к 150-летию города Актобе, 75-летию Победы в ВОВ, имени «А. Нобеля», «Ветеран труда», «Н.И. Пирогова». Ассоциация врачей и провизоров Актюбинской области наградила «Ардақты ардагер» и «Алтын дәрігер», знаки «Почетный железнодорожник» и «Отличник здравоохранения» и др. Она профессор РАЕ, «Почетный доктор», «Заслуженный работник науки и образования», «Заслуженный деятель науки и техники», ее имя вошло в энциклопедию «Ученые России», «Известный железнодорожник РК».

Редакционная коллегия журнала «Вестник хирургии Казахстана» присоединяется к поздравлениям и желает крепкого здоровья и активного долголетия!

Адильгереева Люция Халиловна

Адильгереева Люция Халиловна, кандидат медицинских наук, родилась в 1935 году. В 1959 году окончила Алма-Атинский государственный медицинский институт, факультет «Лечебное дело». В том же году поступила в аспирантуру по специальности «Патологическая анатомия» на базе кафедры хирургических болезней в Казахском научно-исследовательском институте клинической и экспериментальной хирургии им. А.Н. Сызганова. В 1965 г. защитила кандидатскую диссертацию на тему: «Патологическая анатомия предраковых заболеваний и рака пищевода».

Адильгиреева Л.Х. до последних дней своей жизни работала в патоморфологическом отделе ННЦХ им. А.Н. Сызганова патоморфологом. Адильгиреева Л.Х. в период 1987 – 1988 гг. занимала должность Ученого секретаря ННЦХ им. А.Н. Сызганова. Автор более 50 научных трудов, среди которых 1 авторское свидетельство СССР, 8 патентов и предпатентов на изобретение РК.

Коллектив ННЦХ им. А.Н. Сызганова глубоко скорбит по поводу кончины врача-патологоанатома Адильгиреевой Люции Халиловны. Сотрудники Центра приносят глубокие соболезнования родным и близким Люции Халиловны. Она всегда будет для нас примером ответственности перед профессией, мудрости и фундаментальных знаний. Мы навсегда запомним ее неуемную жизненную энергию, жизнерадостность, высокие этические и душевные качества. Она была прекрасным врачом, достойным ученым, добрым, отзывчивым другом и коллегой. Светлая память о ней сохраниться в наших сердцах навсегда.

Лифанова Галина Александровна

12 октября 2021 года на 58 году жизни скоропостижно скончалась Лифанова Галина Александровна, заведующая приемным отделением ННЦХ им. А.Н. Сызганова.

Лифанова Галина Александровна родилась в 1963 году в г. Алматы. Окончила Алма-Атинский Государственный медицинский институт в 1986 году по специальности «Лечебное дело». С 1986 по 1987 г. проходила интернатуру по анестезиологии и реаниматологии в Талды-Курганской областной больнице. С 1987 по 1988 г. работала врачом анестезиологом-реаниматологом в Областной офтальмологической больнице г. Талды-Курган. В 1988 году была принята в отделение анестезиологии и реаниматологии на должность врача анестезиолога-реаниматолога, затем младшеого научног сотрудника в НИИ клинической и экспериментальной хирургии им. А.Н. Сызганова. С 2003 по 2009 г. занимала должность заведующей отделением реанимации, а с 2009 года работала врачом-консультантом реаниматологом в ГККП «Городской ревматологический центр» г. Алматы. В 2010 году работала врачом приемного покоя и заведующей дневным стационаром, а с 2011 года - заведующей физиотерапевтическим отделением ННЦХ им. А.Н. Сызганова.

Коллектив Национального научного центра хирургии им. А.Н. Сызганова глубоко скорбит и выражает искренние соболезнования родным и близким Лифановой Галины Александровны.

Симоньянц Карине Эдуардовна

15 декабря 2021 года на 55-м году жизни после тяжелой болезни скончалась Симоньянц Карине Эдуардовна, анестезиолог-реаниматолог с 31-летним трудовым стажем, врач высшей квалификационной категории, “отличник здравоохранения”, член Казахстанской, Российской и Европейской Ассоциаций анестезиологов-реаниматологов.

Симоньянц Карине Эдуардовна родилась 27 октября 1966 года в г. Алма-Ата. В 1989 году окончила Алма-Атинский государственный медицинский институт по специальности «Лечебное дело». С 1989 по 1991 год проходила подготовку в клинической ординатуре при институте усовершенствования врачей и закончила полный курс по специальности «Анестезиология и реаниматология». С 1991 года работала в АО «ННЦХ им. А.Н. Сызганова» сначала врачом-анестезиологом-реаниматологом, а в 1998 году была назначена на должность заведующей кабинетом переливания крови. За 26 лет работы в Центре проявила себя как высококвалифицированный и грамотный специалист, пользовалась заслуженным уважением среди коллег и пациентов, постоянно совершенствовала собственный уровень профессиональных знаний и навыков, проявляла профессионализм, компетентность и преданность профессии.

Редакционная коллегия журнала «Вестник хирургии Казахстана» и коллектив ННЦХ им. А.Н. Сызганова искренне скорбят по поводу кончины Симоньянц Карины Эдуардовны и приносят свои глубокие соболезнования родным, близким и друзьям.

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 аудитории 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 должная 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 б 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. Metodyiotsenki]. 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.