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BOĞULMUŞ QASIQ YIRTIĞININ CƏRRAHİ MÜALİCƏSİNİN UZAQ NƏTİCƏLƏRİNİN QIYMƏTLƏNDİRİLMƏSİ: AÇIQ VƏ LAPARASKOPİK METODLARIN TƏHLİLİ

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Məqalədə boğulmuş qasıq yırtığının açıq və laparoskopik üsullarla cərrahi müalicəsi zamanı immun sistemin fərdi korreksiyasının müalicənin nəticələrinə təsirini öyrənmək məqsədilə aparılmış tədqiqat işi haqqında məlumat verilmişdir. Tədqiqata cəlb edilmiş 85 pasiyent 2 qrupa bölünmüşdür: 45 nəfərdən ibarət olan 1-ci qrupda laparoskopik hernioplastika (tordan istifadə edilməklə), 40 pasiyentdən ibarət olan müqayisə qrupunda isə boğulmuş qasıq yırtığının bərpası Lichtensteyn üsulu ilə aparılmışdır. Tədqiqat operativ müdaxilədən 6-8 ay sonra aparılmışdır. Xəstələrə immun korreksiya məqsədilə fərdi tövsiyələr verilmişdir. Qanda T- və B-limfositlərin ümumi sayı, T-limfositlərin CD3, CD19, CD4, CD8 və CD16 subpopulyasiyaları, qan serumunda IgA, IgM, IgG təyin edilmişdir. Bundan əlavə, xəstələrin həyat keyfiyyətini öyrənmək üçün "SF-36" sorğu metodundan istifadə edilmişdir.

Müqayisə qrupunun pasiyentlərində CD3+ göstəricisi kontrollu müqayisədə azalmışdır ($41,16 \pm 1,9\%$). Tx/Ts indeksi müqayisə qrupunda nisbətən az olmuşdur – $1,28 \pm 0,07$. Sağlamlığın fiziki komponenti göstəricisi müqayisə qrupunda $46,68 \pm 4,25$ bala bərabər olmaqla, əsas qrupun pasiyentlərindəkinə nisbətən $5,50\%$ ($p < 0,05$) az olmuşdur (əsas qrupda $52,18 \pm 5,96$ bal: hər iki tədqiqat qrupunda operativ müalicədən sonrakı 12 ay ərzində təkrar hospitalizasiya halları qeyd edilməmişdir.) Bu, postoperasion dövrdə xəstələrə kompleks fərdi yanaşmanın effektivliyini göstərir.

Açar sözlər: boğulmuş qasıq yırtığı, hernioplastika, immun sistem, həyat keyfiyyəti

Ключевые слова: ущемленная паховая грыжа, герниопластика, иммунная система, качество жизни, отдаленные результаты

Keywords: strangulated inguinal hernia, hernioplasty, immune system, quality of life, long-term results

LONG-TERM RESULTS EVALUATION OF SURGICAL TREATMENT OF STRANGULATED INGUINAL HERNIA. ANALYSIS OF OPEN AND LAPAROSCOPIC METHODS

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The aim of the study was to evaluate the effect of individual correction of the immune system on the long-term results of surgical treatment of strangulated inguinal hernia using open and laparoscopic methods. The study included 85 patients with strangulated inguinal hernia, who were divided into two groups: the main group of 45 people who underwent laparoscopic hernioplasty - TAPP (MG) and comparison of 40 people who underwent surgery using the Lichtenstein method (CG). The studies were conducted 6-8 months after the surgery. After the surgery, patients were given recommendations for individual correction of their immune status. The total number of T- and B-lymphocytes, T-lymphocyte subpopulations: CD3, CD19, CD4, CD8, CD16, and changes in the content of immunoglobulin classes: IgA, IgM, IgG in the blood serum were studied. An integral determination of the quality of life was also performed using the SF-36 method. In the CG patients, the CD3+ indices were reduced compared to the control indices ($41.16 \pm 1.9\%$), and were also significantly lower than in the group of patients operated on using the TAPP method (51.07 ± 1.8). The Tx/Ts index was significantly reduced in the CG (1.28 ± 0.07). The values of the complex index of the physical component of health in the CG were 46.68 ± 4.25 points and were lower by 5.50% ($p < 0.05$) compared to the

MG patients = 52.18±5.96 points. The pain intensity values in the CG were lower by 13.88% ($p<0.005$) compared to the MG patients. Patients in both groups had no re-hospitalizations within 12 months after surgery, which indicates a significant positive impact of a comprehensive individual approach to patient care in the postoperative period.

Introduction. Strangulated inguinal hernia is one of the most common types of strangulated hernias of the anterior abdominal wall, accounting for 50–80% of all strangulated hernias [1, 2]. The main complication in the late period after the initial hernioplasty is hernia recurrence, which, according to the literature, is 7-8% [3, 4, 5]. The use of a mesh prosthesis has significantly reduced the risk of hernia recurrence [6,7] and the main clinical problem has shifted to postoperative chronic pain, with 5% of patients who have undergone hernia repair suffering from severe chronic pain in the postoperative period [8]. Relapses and chronic pain in the late postoperative period lead to rehospitalization. After discharge from the hospital, up to 5-6% of patients may be rehospitalized due to various complications [5]. Evaluation of the impact of changes in surgical and anesthetic [6,7] techniques has not yielded significant results. A number of researchers have questioned whether rehospitalization can be prevented at all [8,9]. Given this problem, there has been recent interest in the role of postoperative strategies to prevent complications in the postoperative period [10,11,12], which includes increasing the adaptive capacity of the human body. It has been suggested that continuing active patient management in the late postoperative period may reduce the risk of rehospitalization [13,14,15]. A very important factor that ensures high adaptive capacity is the state of the human immune system, since membrane-destructive processes are associated with the maximum level of psycho-emotional and physical stress, which lead to the accumulation of toxic products in tissues that destabilize the structure of DNA cells, including immunocompetent ones, as a result of which their function is disrupted and a threat to the state of organs and systems arises [16,17]. Therefore, we devoted our work to studying the effectiveness of individual correction of the immune system against the background of laboratory diagnostics of its

state in the late postoperative period.

The aim of study: to evaluate the effect of individual correction of the immune system on the long-term results of surgical treatment of strangulated inguinal hernia using open and laparoscopic methods.

Materials and methods: The study included 85 patients diagnosed with strangulated inguinal hernia, including 73 (85.8%) men and 12 (14.1%) women, the average age was 49.2 (23-75) years. They were operated on between January 2021 and June 2024 in the general surgery clinic and divided into two groups. The first group is the main group of 45 people (MG), who underwent laparoscopic hernioplasty - TAPP and the second group is a comparison group of 40 people (CG), who underwent surgery using the Lichtenstein method. The studies were conducted 6-8 months after the surgery. After the surgery, patients were given recommendations taking into account the individual immunodiagnostics of the patient's condition. First, there were instructions for physical exercises to strengthen muscles, maintain the cardiovascular system, stimulate metabolism, and strengthen the immune system. Second, there was a recommended diet that included fresh fruits, vegetables, whole grains, legumes, and proteins. Patients with a tendency toward decreased T-cell immunity were recommended immunomodulatory foods rich in vitamin C (citrus fruits, kiwi, broccoli, and bell peppers), vitamin E (nuts, seeds, and green leafy vegetables), and vitamin D (fish, eggs, and mushrooms).

Various components of the immune system were studied, in particular its cellular immunity (the total number of T- and B-lymphocytes, T-lymphocyte subpopulations: CD3, CD19, CD4, CD8, CD16 – by flow cytometry, the humoral link of immunity – changes in the content of immunoglobulins of the classes: IgA, IgM, IgG in the blood serum were determined by the radial immunodiffusion method according to the Mancini method.

An integral determination of the patients' quality of life was also carried out using the SF-36 questionnaire "Health Status Survey" (USA). For the survey, an online medical calculator SF-36 <https://abdugaliyev.ru/proj/medcalc/sf36> was used, a link to which the patient received on his personal mobile device, completed the survey,

sent a screenshot of the result to the attending physician, the result was entered into the worksheet for further statistical processing.

Statistical processing of the obtained data was performed using generally accepted methods of analysis using nonparametric and parametric criteria. Determination of the reliability of differences in comparison groups with a normal distribution by the Student's criterion (t); with an abnormal distribution for unrelated samples, by the Pearson χ^2 (Xi square) compliance criterion, for related samples by the Whitney-Wilcoxon criterion (W). The minimum statistical probability was determined at $P < 0.05$. Primary processing of the research data was carried out in the shells of the original programs Microsoft Office 2016, version 18.2008.12711.0., STATISTICA 6.1 Stat Soft Inc No. AGAR909E41588.

Results and discussion. We analyzed the implementation of the provided recommendations on physical exercises to strengthen muscles and diet to improve immunity. The survey results showed that in the comparison group (CG), 32 (80.2%) patients followed the recommendations on physical exercises during the first 2 months after surgery. At the time of the survey, 6-8

months after surgery, 18 (47.4%) patients followed the recommendations. According to the dietary regimen for improving immunity in this group, at the time of the survey, 22 (51.3%) patients adhered to it, 8 (14.5%) did not comply with our recommendations and gained excess weight. These patients had reduced T-cell immunity indicators (CD3+, CD4+, B-cell activation (CD19+), CIC and NST). In the main group (MG) of patients who underwent surgery using the TAPP method, 43 (97.6%) patients followed the recommendations for physical exercise in the first 2 months after surgery. This is due to the less traumatic surgical technique, so they quickly restored their physical activity. Six to eight months after the surgery, 36 (81.2%) patients followed our recommendations for exercise and diet. The survey data obtained are consistent with the best immune status indicators in the group of patients who underwent surgery using the TAPP technique. All indicators of T-cell immunity, B-cells and the immunoregulatory index CD4+/CD8+ were within normal limits (Table 1).

Table 1

Results of studies of the immune status of patients with strangulated inguinal hernia in the late postoperative period

Indicators	Methodology Lichtenstein (n=40)	Methodology TAPP (n=45)	Control values (n=30)
Leukocytes $\times 10^9 / L$	5,83 $\pm$ 0,42	5,48 $\pm$ 0,31	5,35 $\pm$ 0,21
Lymphocytes % a.n.	30,35 $\pm$ 1,9 1,54 $\pm$ 0,18	25,71 $\pm$ 1,76 1,5 $\pm$ 0,08	28,71 $\pm$ 0,81 1,61 $\pm$ 0,07
T- lymphocytes % CD3+ a.n. $\times 10^9 / L$	41,16 $\pm$ 1,9* 0,53 $\pm$ 0,07	51,07 $\pm$ 1,8** 0,79 $\pm$ 0,04	50,88 $\pm$ 0,68 0,76 $\pm$ 0,04
T-helpers % CD4+ a.n. $\times 10^9 / L$	30,38 $\pm$ 1,48* 0,39 $\pm$ 0,04	37,45 $\pm$ 1,03** 0,48 $\pm$ 0,03	38,71 $\pm$ 0,52 0,53 $\pm$ 0,03
T-suppressors % CD8+ a.n. $\times 10^9 / L$	24,56 $\pm$ 1,13 0,31 $\pm$ 0,02	18,45 $\pm$ 1,4 0,29 $\pm$ 0,03	18,39 $\pm$ 0,57 0,30 $\pm$ 0,02
B-lymphocytes % CD19+a.n. $\times 10^9 / L$	18,73 $\pm$ 2,14 0,39 $\pm$ 0,04*	15,11 $\pm$ 1,26* 0,26 $\pm$ 0,03**	14,78 $\pm$ 0,48 0,25 $\pm$ 0,01
NST %	20,9 $\pm$ 1,68*	14,16 $\pm$ 1,67**	12,03 $\pm$ 0,74
Th/Ts CD4+/ CD8+	1,28 $\pm$ 0,07*	1,98 $\pm$ 0,08**	1,97 $\pm$ 0,07
CIC unit.opt.sh.	8,04 $\pm$ 1,59*	4,24 $\pm$ 0,05 **	3,42 $\pm$ 0,23

Notes:

1. * $p < 0,05$ compared to the control.
2. ** $p < 0,05$ in comparison with the indicators of groups I and II.

As the results showed, 6-8 months after the operation, there was a tendency to restore the immune status indicators, namely T-cell immunity CD3+, CD4+ and CD8+ in patients of the main group. In patients of the comparison group, the CD3+ indicators were reduced compared to the norm ($41.16 \pm 1.9\%$ versus $50.88 \pm 0.68\%$ in the control), and were also significantly lower than in the group of patients operated on using the TAPP technique (51.07 ± 1.8). The ratio of the helper subpopulation to the suppressor Th/Ts was significantly reduced in the CG in relation to the control group and MG (1.28 ± 0.07 versus 1.97 ± 0.07 and 1.98 ± 0.08 , respectively). In the GS, the NST test, indicating the state of immune resistance, was significantly ($p < 0.05$) elevated, and the CIC, indicating the presence of inflammatory processes, including the accumulation of toxic products in tissues and a high probability of allergic reactions, was also significantly elevated ($p < 0.05$).

The analysis of the results of quality of life studies was carried out using the SF-36 Health Status Survey questionnaire 6-8 months after the operation. The values of the complex indicator of the physical component of health in

the group of patients operated on using the Lichtenstein method were 46.68 ± 4.25 points and were significantly ($p < 0.05$) lower by 5.50% compared to the patients operated on using the TAPP method (52.18 ± 5.96 points). The values of the complex indicator of the psychological component of health include indicators of social functioning, role functioning caused by the emotional state, mental health and life activity. This indicator reflects the value of the indicator of the psychological component of health in the group of patients operated on using the Lichtenstein method, which was 42.05 ± 4.32 points, significantly (at $p < 0.005$) lower by 6.81% compared to patients operated on using the TAPP method (48.46 ± 7).

The value of the pain intensity index reflects its impact on the ability to perform daily activities, including work at home and outside the home. Low values on this scale indicate that pain significantly limits activity in all areas of the patient's activity. The values of this parameter in the group of patients operated on using the Lichtenstein method were significantly (at $p < 0.005$) lower by 13.88% compared to the data of patients operated on using the TAPP method (Table 2).

Table 2

**Results of quality of life indicators according to the questionnaire
"SF-36 Health Status Survey" (in points)**

Parameters	Methodology Lichtenstein (n=40)		Methodology TAPP (n=45)	
	Average	SD	Average	SD
Physical component of health	46,68*	4,25	52,18*	5,96
Psychological component of health	42,05**	4,32	48,86**	7,24
Physical functioning	80,78**	13,74	91,20**	11,86
Role functioning determined by physical condition	66,64	19,60	75,23	29,12
Intensity of pain	65,20**	15,83	79,08**	20,79
General health	59,63***	6,18	71,38***	9,12
Life activity	54,61*	8,54	66,72*	12,19
Social functioning	64,26*	12,64	76,35*	14,42
Role functioning determined by emotional state	52,24	24,46	62,85	32,12
Mental health	64,36***	9,90	74,45***	12,10

SD – standard deviation; * statistically significant difference in $p < 0,05$; ** statistically significant difference in $p < 0,005$; *** statistically significant difference in $p < 0,001$

In many respects (clinical picture, structural and anatomical changes in the area of the postoperative scar, integral quality of life, characteristics of the immune status), the TAPP technique has undoubted advantages over other hernioplasty techniques against the background of the program of following recommendations for physical exercises to strengthen muscles and following a diet to improve immunity. Patients in both groups did not have repeated hospitalizations, which indicates the positive impact of a comprehensive individual approach to patient management in the postoperative period.

Discussion.

Human life is associated with psycho-emotional and physical loads of large volume and intensity, often at the limit of the functional capabilities of the body. An extremely important problem is development of methods that allow for the optimal use of functional reserves and the real unique abilities of a human body to obtain positive results of surgical treatment [16]. In this case, special attention should be paid to the correction of the T-cell link, since the depletion of the adaptive and reserve capabilities of the immune system is associated to greater extent with a decrease in the bioenergetic capabilities of the body at the cellular level. This can be achieved by

increasing a person's physical endurance, direct corrective effects on his immune system aimed at optimizing immune reactions, effectively and quickly eliminating the consequences of membrane-destructive processes under stress factors, high psycho-emotional stress and moderate physical activity [17]. Our studies have allowed us to conclude that after using the TAPP method, the clinical and functional results are more encouraging compared to the Lichtenstein method. The individual recommendations we offered for physical exercises to strengthen muscles and correct the diet to improve immunity contributed to the restoration of immune status indicators and so faster clinical and social adaptation of patients in the remote period after surgery.

Conclusions

1. In 81.2% of patients operated on using the TAPP method and adhering to recommendations for physical exercise and diet, complete restoration of the immune status was observed.

2. In patients of both groups there were no re-hospitalizations within 12 months after surgery, which indicates significant positive impact of a comprehensive individual approach to the management in postoperative period.

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ОЦЕНКА ОТДАЛЕННЫХ РЕЗУЛЬТАТОВ ХИРУРГИЧЕСКОГО ЛЕЧЕНИЯ УЩЕМЛЕННОЙ ПАХОВОЙ ГРЫЖИ. АНАЛИЗ ОТКРЫТОГО И ЛАПАРОСКОПИЧЕСКОГО МЕТОДОВ

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Резюме. Цель исследования - оценить влияние индивидуальной коррекции иммунной системы на отдаленные результаты хирургического лечения ущемленной паховой грыжи открытым и лапароскопическим методами. В исследование включены 85 пациентов с ущемленной паховой грыжей, которые были разделены на две группы: основная 45 человек, которым была проведена лапароскопическая герниопластика – TAPP(ОГ) и сравнения 40 человек, которым была проведена операция по методике Lichtenstein (ГС). Исследования проводились через 6-8 месяцев после операции. Больным после оперативного вмешательства были предоставлены рекомендации, для индивидуальной коррекции иммунного статуса. Изучали общее количество Т- и В-лимфоцитов, субпопуляции Т-лимфоцитов: CD3, CD19, CD4, CD8, CD16, изменение содержания иммуноглобулинов классов: IgA, IgM, IgG в сыворотке крови. Также проводили интегральное определение качества жизни методом «SF-36». У пациентов ГС были снижены показатели СДЗ+ по сравнению с контрольными показателями (41,16±1,9%), а также были достоверно ниже, чем в группе пациентов, прооперированных по методике TAPP 51,07±1,8. Показатель Тх/Тс был достоверно снижен в ГС 1,28±0,07. Значения комплексного показателя физического компонента здоровья в ГС составляли 46,68±4,25 балла и были ниже на 5,50%(p<0,05) по сравнению с пациентами ОГ=52,18±5,96 бал. Значения интенсивности боли в ГС были ниже на 13,88% (p<0,005) по сравнению с данными пациентов ОГ. У больных обеих групп отсутствовали повторные госпитализации в течении 12 месяцев после хирургического вмешательства, что свидетельствует о существенном позитивном влиянии комплексного индивидуального подхода к ведению больного в послеоперационном периоде.

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