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COMPARATIVE ANALYSIS OF SURGICAL INTERVENTIONS FOR POSTOPERATIVE VENTRAL HERNIA IN OBESE PATIENTS

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Ключевые слова: *лапароскопическая герниопластика, послеоперационная вентральная грыжа, открытая герниопластика, индекс массы тела*

Abstract. Comparative analysis of surgical interventions for postoperative ventral hernia in obese patients. Kravchenko B.S., Klimenko A.V., Klimenko V.N., Sergeeva L.N. *The problem of surgical treatment of post-operative ventral hernias remains relevant today. Currently, a large number of methods of surgical interventions for hernias of the anterior abdominal wall have been proposed, the variety of which requires systematization and analysis of the immediate and distant results of treatment. Goal: to analyze the effectiveness of laparoscopic hernia repair in patients with postoperative ventral hernia with a body mass index of >30 kg/m^2. The results of treatment of 29 patients with postoperative ventral hernia were analyzed. Men – 8 (27.5%), women – 21 (72.5%). In 16 (55.2%) patients (main group) laparoscopic intraperitoneal onlay mesh – IPOM was performed, in 13 (44.8%) patients (comparison group) open hernia repair with fixation of the mesh graft in the Sublay position was performed. The analysis of the duration of the surgical intervention indicates that with open hernia repair, there is a significant increase in the duration of the surgical intervention, p<0.0001. Comparison of the duration of operations in both groups depending on the body mass index also indicates the dependence of the duration of surgery on this indicator. Thus, in the comparison group, there was a tendency to an increase in the duration of the operation with an increase in the body weight of patients with a significant difference in the duration of the operation between the main group and the comparison. The duration of a patient's stay in the hospital and the occurrence of respiratory complications correlates with the level of postoperative pain and the duration of surgery. Postoperative complications in the form of fluid accumulations in the wound area of the*

abdominal wall depend on the method of surgery and the location of the mesh graft. The use of laparoscopic – IPOM in obese patients significantly improves the results of surgery by reducing the level of postoperative pain, shortening the duration of surgery, and the absence of complications in the early and late postoperative period. When choosing the method of surgical intervention in patients with postoperative ventral hernia, laparoscopic IPOM should be preferred.

Реферат. Сравнительный анализ оперативных вмешательств по поводу послеоперационной вентральной грыжи у пациентов с ожирением. Кравченко Б.С., Клименко А.В., Клименко В.Н., Сергеева Л.Н. *Проблема хирургического лечения послеоперационных вентральных грыж на сегодняшний день остается актуальной. В настоящее время предложено большое количество методов оперативных вмешательств при грыжах передней брюшной стенки, разнообразие которых требует систематизации и анализа ближайших и отдаленных результатов лечения. Цель исследования: проанализировать эффективность выполнения лапароскопической герниопластики у больных с послеоперационной вентральной грыжей с индексом массы тела >30 кг/м^2. Проанализированы результаты лечения 29 больных с послеоперационной вентральной грыжей. Мужчин – 8 (27,5%), женщин – 21 (72,5%). У 16 (55,2%) пациентов (основная группа) выполнена лапароскопическая герниопластика – IPOM, у 13 (44,8%) пациентов (группа сравнения) выполнена открытая герниопластика с фиксацией сетчатого трансплантата в позиции Sublay. Анализ продолжительности оперативного вмешательства указывает, что при открытой герниопластике наблюдается достоверное увеличение длительности оперативного вмешательства p<0.0001. Сопоставление продолжительности операций в обеих группах в зависимости от индекса массы тела также указывает на зависимость срока оперативного вмешательства от этого показателя. Таким образом, в группе сравнения наблюдалась тенденция к увеличению продолжительности времени операции с увеличением массы тела больных с достоверной разницей продолжительности операции между основной группой и сравнения. Продолжительность нахождения пациента в стационаре и возникновения респираторных осложнений коррелирует с уровнем послеоперационной боли и длительностью оперативного вмешательства. Послеоперационные осложнения в виде жидкостных скоплений в раневой зоне брюшной стенки зависят от метода оперативного вмешательства, расположения сетчатого трансплантата. Использование лапароскопической герниопластики – IPOM у пациентов с ожирением достоверно улучшает результаты оперативного вмешательства за счет уменьшения уровня послеоперационной боли, сокращения длительности оперативного вмешательства, отсутствия осложнений в раннем и отдаленном послеоперационном периоде. При выборе метода оперативного вмешательства у больных с послеоперационной вентральной грыжей следует отдавать предпочтение лапароскопической герниопластике IPOM.*

The problem of surgical treatment of postoperative ventral hernias today remains relevant. Every year, more than 20 million surgical interventions in the world for hernias of the anterior abdominal wall are performed, which is 10-15% of all operations [3, 4]. Due to the constant increase in the number of operations on the abdominal organs, the number of patients with postoperative and recurrent hernias is growing [3, 11].

At present, a large number of methods of surgical interventions for hernias have been proposed, the specific weight being represented by methods of herniography with own tissues. A negative sign is a significant percentage of relapses, ranging from 60% [1, 8]. The main reasons are the tension of the tissues of the anterior abdominal wall, a high level of intra-abdominal pressure which leads to microcirculatory disorders in the area of the suture line [1, 9].

A positive result of hernia removal is assessed as the absence of recurrence and long-term postoperative complications that affect the daily activities of operated patients, namely: chronic pain which significantly reduces the quality of life [6]. In modern herniology there is a clear trend towards the comprehensive use of synthetic materials and laparoscopic techniques. According to the European Association of Herniologists, plasty with local tissues is appropriate only for small ventral hernias with hernia hilus up to 2 cm or in children [5, 6, 9, 12]. Larger hernias should be operated on with tension-free hernioplasty.

The introduction of modern biocompatible prostheses into clinical practice has significantly reduced the frequency of autoplasty of the anterior abdominal wall in patients with postoperative ventral hernias. Among the methods of location of the mesh prosthesis are well known three localizations: Onlay, Inlay, Sublay.

One of the unresolved issues of open hernioplasty is the emergence of postoperative seromas, which often leads to an increase in the duration of inpatient and outpatient treatment, a longer period of rehabilitation. In some cases, infection in seroma causes suppuration of the postoperative wound, the formation of external purulent fistulas, and in obese patients wound infection is twice as common [10, 13]. These complications require re-hospitalization and are often aimed at removing the infected mesh graft to eliminate the purulent-inflammatory process.

The use of laparoscopic hernioplasty allows to minimize the level of surgical trauma, to avoid contact with subcutaneous fat, to avoid fixation ligatures, which, in turn, reduces the likelihood of wound infection. This approach is especially important in patients with a BMI > 30 kg/m^2. The variety of hernioplasty methods requires systematization and analysis of short-term and long-term treatment results regarding the choice of the most optimal method in this category of patients. With this in mind, today surgical treatment of postoperative ventral hernias remains relevant and requires further study. This was the basis for this study.

The aim of the study was to analyze the effectiveness of laparoscopic hernioplasty in patients with postoperative ventral hernia with a body mass index >30 kg/m^2.

MATERIALS AND METHODS OF RESEARCH

The study included 29 patients with postoperative ventral hernia, who underwent various surgeries from 2018 to 2020. There were 8 men (27.5%) and 21 women (72.5%). In 16 (55.2%) patients (main group) laparoscopic hernioplasty – IPOM was performed, in 13 (44.8%) patients (comparison group) open hernioplasty was performed with fixation of the mesh graft in the Sublay position.

The study was conducted in accordance with the principles of bioethics set out in the Helsinki Declaration on Ethical Principles for Human-Based Medical Research and the Universal Declaration on Bioethics and Human Rights (UNESCO).

Criteria for inclusion in the study: persons of both genders, reducible postoperative ventral hernia, BMI >30 kg/m^2, age from 18 years, the presence of informed consent of the patient to surgery. Exclusion criteria: pinched and unreduced postoperative ventral hernia, BMI <30 kg/m^2, functional decompensation of the cardiorespiratory system.

The distribution of patients depending on BMI was as follows: BMI 30-34 kg/m^2 (obesity 1 degree) was determined in 23 patients; BMI from 35-39 kg/m^2 (obesity 2 degree) – in 4; BMI > more than 40 kg/m^2 – in 2 (obesity 3 degree) (Table 1).

Table 1

Stratification of patients by BMI in groups, (n (%))

BMI kg/mg^2	Main group (n=16)	Comparison group (n=13)	p
30-34 kg/m^2	13 (81.25)	10 (76.92)	p>0.05
35-39 kg/m^2	2 (12.50)	2 (15.38)	p>0.05
> more than 40 kg/m^2	1 (6.25)	1 (7.70)	p>0.05

Note. *p – significance of differences between main and comparison group.

As shown in Table 1, there was no significance of differences in groups of patients depending on BMI (p>0.05).

For patients of both groups, the SWR classification developed by J. Chevrel and A. Rath (1999) was used: [7]: S – localization (medial hernia – M, lateral – L, combined – ML); W – width of the hernia hilus (W1 – up to 5 cm, W2 – from 5 to 10 cm, W3 – from 10 to 15 cm, W4 – more than 15 cm); R – the presence of recurrence and the frequency of its occurrence (R1, R2, R3, etc.) (Table 2).

According to Table 2, there was no significant difference in the groups by location and size of the hernia defect (p>0.05). No recurrences were observed in either group.

When performing laparoscopic hernioplasty, the elimination of the hernia defect was achieved by transfacial sutures with polypropylene suture material, followed by fixation of the composite mesh with a herniostepler to the peritoneum along the anterior abdominal wall.

Open hernioplasty was performed according to the standard method using a light polypropylene mesh in the Sublay position.

Before discharge from the hospital, all patients underwent ultrasound examination of the abdominal cavity and anterior abdominal wall to assess the course of the postoperative period and early detection of possible complications.

To determine the intensity of the pain syndrome, a numerical rating scale was used, which is a digital version of the Visual Analog Scale for pain.

On the first day after surgery, the intensity of pain was determined in points from 0 to 10, with 0 – no pain, 10 – severe pain. The rating of other positions was as follows: 1-3 points were characterized as mild pain, 4-6 – as moderate, 7-10 – as severe. Determination of pain intensity was performed in all patients of both groups (main, comparison).

After surgery in 6 months all patients underwent a follow-up examination to determine postoperative complications in the long term.

Statistical data were processed using the program Statistica 13. License number JPZ8041382130ARCN10-J, in accordance with generally accepted statistical methods [2].

Table 2

Distribution of patients by SWR classification in groups (n (%))

SWR classification	Main group (n=16)	Comparison group (n=13)	p
S – localization (M)	**16 (100.00)**	**13 (100.00)**	**p>0.05**
W – width of hernia hilus			
W1	**3 (18.75)**	**4 (30.77)**	**p>0.05**
W2	**7 (43.75)**	**5 (38.46)**	**p>0.05**
W3	**4 (25.00)**	**3 (23.08)**	**p>0.05**
W4	**2 (12.50)**	**1 (7.69)**	**p>0.05**

Note. *p – significance of differences between main and comparison group.

RESULTS AND DISCUSSION

The total duration of surgical interventions when performing laparoscopic and open hernioplasty are presented in Table 3.

According to the analysis of the duration of laparoscopic and open hernioplasty, it was noted an increase in time duration when performing open hernioplasty with a statistically significant difference, $p<0.0001$. In the course of the study, the duration of surgical intervention was compared depending on the BMI (Table 4).

Table 3

Total duration of surgery in groups of patients with postoperative ventral hernia (main, comparison), (M±m)

Indicator, unit	Main group (n=16)	Comparison group (n=13)	p
Duration of surgery, min.	**63.2±1.2**	**91.8±1.5**	**<0.0001**

Note. *p – significance of differences between main and comparison group.

As can be seen from Table 4, the duration of laparoscopic hernioplasty – IPOM did not actually depend on body mass index and, on average, remained within one level, while the duration of surgery for open hernioplasty increased by 8.6% for patients with second-degree obesity compared with patients with first-degree obesity and by 11.2% for patients with third-degree obesity compared with patients with second-degree obesity.

According to the study, there were 13 (81.3%) patients (main group) with minimal pain intensity (mild pain 1, 2, 3 points by the rating scale), while in the comparison group – only 3 (23.1%) ($p<0.01$). Moderate pain (from 4 to 6 points by the rating scale) on the first day after surgery was in 3 (18.8%) patients of the main group, in the comparison group – in 9 (62.2%) ($p<0.05$). Severe pain (from 7 to 10 points by the rating scale) in patients of the main group was not determined, in the comparison group – in 1 (7.6%) patient ($p<0.05$).

Table 4

Duration of surgery in groups (main, comparison) depending on body mass (M±m)

Groups		Obesity 1 degree (BMI: 30-34,9kg/m^2)	Obesity 2 degree (BMI: 35,0-39,9 kg/m^2)	Obesity 3 degree (BMI: >40 kg/m^2)
Main group	number of patients	13	2	1
	(duration, min.)	62.3±1.2	65.9±1.3	69,5
Comparison group	number of patients	10	2	1
	(duration, min.)	89.2±1.2	96.9±1.4	107,8
p between groups (main, comparison)		<0,0001	<0.01	

Note. *p – significance of differences between main and comparison group.

In the main group, the average bed-day was 3.9±0.4, in the comparison group – 7.6±0.6 ($p<0.05$).

All patients in the early postoperative period underwent USI of the abdominal cavity and anterior abdominal wall to determine possible complications. According to the study, there were no complications in the group of patients who underwent IPOM, while in the group with open hernioplasty in 11 (84.6%) patients fluid accumulation in the wound area of the anterior abdominal wall was revealed, and this required puncture and aspiration of fluid accumulations under ultrasound control in 7 (63.6%) patients.

There were no cardiorespiratory complications in the main group, in contrast to the comparison group, in which 4 (30.6%) patients had hypostatic pneumonia.

According to the analysis, in the long-term postoperative period for 6 months there were no complications in the main group, in the comparison group 2 (15.4%) patients were diagnosed with ligature fistulas, eliminated by conservative measures.

Analysis of the duration of surgery indicates that in open hernioplasty there duration of surgery is longer, which has a negative impact in the postoperative period in this category of patients. Comparison of the duration of surgery in both groups depending on the body mass index also indicates the dependence of duration of surgical intervention on this indicator. Thus, in the comparison group there was a tendency to increase in duration of surgery with increasing body weight of patients with a significant difference in duration of surgery in the main and comparison group.

The duration of the patient's stay in the hospital and the occurrence of respiratory complications correlates with the level of postoperative pain and the duration of surgery. Postoperative complications in the form of fluid accumulations in the wound area of the abdominal wall depend on the method of surgery, the location of the mesh graft.

CONCLUSION

The use of laparoscopic hernioplasty – IPOM in obese patients significantly improves the results of surgery by reducing the level of postoperative pain, the duration of surgery, the absence of complications in the short-term and long-term postoperative periods. When choosing a method of surgery in patients with postoperative ventral hernia, laparoscopic hernioplasty – IPOM should be preferred.

Conflict of interests. The authors declare no conflict of interest.

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