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Implementation of an enhanced recovery protocol for open and laparoscopic repair of ventral hernia

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Abstract

In the light of introduction of the concept of rapid recovery and the use of miniinvasive methods of treatment of postoperative ventral hernias, laparoscopic herniology attracts more and more attention of practical surgeons. This is due to virtually no wound complications, a reduction of the duration surgery and inpatient stay, which greatly improves social and labor adaptation.

Objective. Evaluate the benefits of laparoscopic hernioplasty over the open one in the light of the concept of rapid recovery of ERAS – enhanced recovery after surgery.

Materials and methods. For a comparative evaluation in the period from 2015 to 2017, 81 patients with postoperative ventral hernias were examined and surgically treated. According to the methods of hernioplasty, all patients were divided into two groups. The group 1 consisted of 38 (46.91 %) persons who underwent laparoscopic hernioplasty. The group 2 consisted of 43 (53.09 %) persons who underwent "open" allohernioplasty. The multimodal patient management program provided for common elements for both groups aimed at rapid recovery in the postoperative period.

Results. The average duration of "open" hernioplasty was (143±25) min, laparoscopic – (98±14) min. The laparoscopic technique of hernioplasty does not require routine drainage

of the abdominal cavity. When open allohernioplasty drainage was performed in 72 (69.20 %) cases. 5–6 hours after the surgery, using the "sublay" technique 66 (63.50 %), patients were able to take the vertical position and activate the motor activity within the hospital ward, the rest – during the first day. The postoperative stay in the stanionarium in the group of patients after the "open" hernioplasty was on average (7.98±1.36) days, after the laparoscopic operation – (2.63±1.28) days, respectively.

Conclusions. Endovideo-surgical methods for the elimination of primary and postoperative ventral hernias are effective, safe, provide early mobilization of patients and their rapid labor and social adaptation due to a significant smaller number of early and late complications. Restrictions in the use of these treatments are considered to be hernia of a gigantic size, especially postoperative with pronounced joint process and severe concomitant diseases, in which the increase in intraabdominal pressure will be critical and will negatively affect the immediate results of surgical treatment.

Key words: postoperative ventral hernia, open hernioplasty, laparoscopic hernioplasty.

Introduction. To date, the problem of ventral hernia remains to be actual, mainly due to the constant increase in the number of postoperative ventral hernias (POVH). After all, with each passing year the number of laparotomies increases due to various diseases of the abdominal cavity [3, 6].

Many methods of hernioplasty were offered, however, today, alloplasty methods are the dominant ones. This was facilitated by the wide introduction of various types of mesh implants, the use of which greatly reduced the number of relapses [4, 7, 9]. The "sublay" method, which became very popular due to its "anatomy", small frequency, both local and general complications accompanying it, is considered an effective and reliable method for today.

However, in light of the widespread introduction of the rapid recovery concept (ERAS- enhanced recovery after surgery), the use of minimally invasive treatments for many surgical diseases, laparoscopic herniology, attracts more and more attention to practical surgeons. This is due to near-zero wound complications, shorter duration of surgical intervention and inpatient stay, which greatly improves social and labor adaptation [5, 8, 10].

According to domestic and foreign researchers, the actual frequency of local complications, which reaches 20–30 %, leads to the widespread introduction of laparoscopic hernioplasty in the treatment of ventral hernias [1, 2, 11].

Objective. To evaluate the advantages of laparoscopic hernioplasty over the "open" methods of surgical treatment of postoperative ventral hernias in the light of introduction of the rapid recovery concept (ERAS).

Materials and methods. For a comparative evaluation in the period from 2015 to 2017, 81 patients with ventral hernias were examined and surgically treated. The age of patients was from 42 to 69 years (mean age – (45±1.6) years). All surgical interventions were performed under endotracheal anesthesia. In accordance with the methods of hernioplasty used, all patients were divided into two experimental groups. The group 1 consisted of 38 (46.91 %) persons who underwent laparoscopic elimination of ventral hernia. The group 2 consisted of 43 (53.09 %) persons who underwent "open" allohernioplasty. The "sublay" method was the most commonly used – 83.72 % of cases.

Laparoscopic hernioplasty was performed in two ways. In the first variant, in case of small-sized (W1) umbilical hernia, the sewing of the umbilical ring was carried out using the endoscopic suture. Another variant when larger hernias (W2-3) was performed intraperitoneal placement (IPOM) of the mesh implant (Proceed Ethicon) and its fixation using the Endoclose needle to the anterior abdominal wall, with nodes knitting over aponeurosis and stapler (Protak) from the peritoneum side by the perimeter of the implant.

The "sublay" technique was performed in the variant of retro-muscular location of the polypropylene mesh with the removal of the pre-sutured and fixed prolene sutures around the perimeter of the mesh with a special needle through - + all layers of the anterior abdominal wall, followed by their binding over aponeurosis. When performing the "onlay" method, the polypropylene mesh was fixed over the aponeurosis and suture lines (uninterrupted prolene suture). The mesh implants used were Ukrainian Kolchuha (Chainmail) (Ukraine) and Ethicon (USA). Patients with large ventral hernia had pre-operative determination of the level of intra-abdominal pressure and their monitoring after a surgical intervention. Distribution of patients by localization and size of ventral hernias was performed according to the classification of EHS, 2008. In both groups, localization was M1-3 ventral hernia. Regarding the size in the group 1, there were mainly hernias W1-2 – 29 (76.32 %), W3 – 9 (23.68 %). In the group 2, all hernias were W2-3 in size. Primary ventral hernias in the group 1 were – 21 (55.26 %), POVH – 17 (44.74 %). In the group 2 – 18 (41.86 %) and 25 (58.14 %), respectively. All POVH arose after the previous history of laparotomy with regard to surgical and gynecological pathology. There was no recurrence after relapse (R1 or more).

Concomitant pathology was detected in all patients in both experimental groups. Coronary heart disease, hypertension, varicose veins disease of the lower extremities, diabetes mellitus type 2 were diagnosed the most often (Table 1).

Table 1

Concomitant diseases	Laparoscopic hernioplasty (n=38)		"Open" methods of hernioplasty (n=43)	
	Absolute	%	Absolute	%
Ischemic heart disease	32	84.22	38	88.37
Hypertensive heart disease	29	76.32	35	81.40
Diabetes mellitus	11	28.95	10	23.26
Peptic ulcer	4	10.52	3	6.98
Undifferentiated connective tissue dysplasia	10	26.32	14	32.56
Obesity (stage I-III)	15	39.47	18	41.86
Varicose veins disease of the lower extremities (with insufficiency of the valvular apparatus of the veins of the legs)	25	65.79	28	65.11

The evaluation of "life quality" of patients after various methods of hernioplasty was performed on the basis of the questionnaire SF-36.

Results. The problem with laparoscopic hernioplasty was the presence of a postoperative adhesive process, especially in a hernial sac in patients with postoperative ventral hernias. This created difficulties in visualizing of the contents in a sac and its removal into the abdominal cavity. In such cases, a phased decollement with a bipolar adhesion coagulator was conducted. After completion of this stage, there were no other technical difficulties in the implementation of hernioplasty. In patients with small umbilical hernias, the duration of laparoscopic hernioplasty generally did not exceed 30 minutes, because of its simplicity, as a result, a small traumatic operative intervention provided an excellent course of postoperative period after intervention.

Consequently, evaluating the early postoperative period, the best results were obtained in patients who underwent the elimination of small-sized umbilical hernias (W1) – 7 (%) using endoscopic suture. The early mobilization of these patients (an average of (0.8±0.2) days) was due to near-zero pain syndrome. There were recorded no early and late local complications.

In the rest of patients who underwent the IPOM technique in 14 (36.84 %) patients an unexplained pain syndrome was observed in the early postoperative period requiring the use of nonsteroidal anti-inflammatory drugs within 48–72 hours. Unlike patients after "open" methods of hernioplasty in patients after laparoscopic methods, an earlier recovery of motor-evacuation function of the intestine was observed, which contributed to the early restoration of enteral nutrition after surgery.

Later mobilization in patients undergone "open" methods of hernioplasty (1.7±0.3) days was due to a larger operational "injury". Actually, more operational access and longer duration of surgical intervention in these patients contributed to the occurrence of local complications in the postoperative period (Table 2).

Table 2

Surgery type Complication	"Open" methods of hernioplasty (n=43)	Laparoscopic hernioplasty (n=38)
Prolonged lymphorrhoea	5 (11.63 %)	-
Seroma	8 (18.60 %)	2 (5.26 %)
Hematoma	4 (9.30 %)	1 (2.63 %)
Infiltrate	7 (16.28 %)	3 (7.89 %)
Marginal skin necrosis	2 (4.65 %)	-
Suppuration	4 (9.30 %)	-

The obtained data testify to the minimization of an operating trauma in patients who underwent laparoscopic methods of hernioplasty compared to "open" methods. This shows a decrease in the number of early local complications, namely seromas – on 13.34 %, hematomas on 6.77 %, and infiltrates – on 8.31 % in comparison with similar data in patients after "open" herniotomy ($p < 0.05$).

Therefore, summarizing these data, it was confirmed that the duration of hospitalization was (5.7±0.8) days at the average in laparoscopic hernioplasty and (9.4±0.7) days in open methods of hernioplasty ($p<0.05$). The results of the assessment of life quality are shown in Table 3.

The obtained data testify to significantly higher total physical and mental health indices in patients after endoviduosurgical methods of hernioplasty ($p < 0.05$).

Table 3

Index	"Open" methods of hernioplasty (n=43)	Laparoscopic hernioplasty (n=38)
PF	71.5±3.6	86.5±3.2
RP	69.7±2.8	80.7±2.9
BP	66.4±3.1	84.8±3.0
GH	70.2±2.4	78.4±3.5
VT	66.9±3.7	87.3±2.8
SF	36.1±4.1	47.3±2.8
RE	71.6±3.3	77.6±2.3
MH	68.7±2.6	83.2±3.1

Discussion. The evolution of laparoscopy, its feasibility and benefits continue to change the surgical tactics of primary and postoperative ventral hernias. Single center studies in the literature showed the short-term benefits of laparoscopic hernioplasty against open one [5, 8]. Our research demonstrates a growing national tendency to use laparoscopic elimination of ventral hernias. This increase may be the result of the improvement of laparoscopic equipment and high-quality equipment.

Our study demonstrates a significant reduction in the number of early postoperative studies of the laparoscopic hernioplasty. This, in turn, contributes to the significant economic benefits of laparoscopic hernioplasty, as the modern economic and political environment requires the optimal use of health care resources. Clinical benefits of laparoscopic hernioplasty in patients are detected by reducing hospitalization in comparison with "open" methods, without a significant increase in postoperative or intraoperative complications.

Surgical infections of the surgical wound is one of the most common complications associated with operations for patients with primary and postoperative ventral hernias. We found that laparoscopic hernioplasty is associated with lower rates of wound infection and iatrogeny. The results of our study demonstrate an increasing surgical tendency towards minimally invasive procedures and confirm its safety and feasibility.

Conclusions. Endovideosurgical methods for the elimination of primary and postoperative ventral hernias are effective, safe, provide early mobilization of patients and their rapid labor and social adaptation due to a significant smaller number of early and late complications.

Restrictions in the use of these treatments are considered to be hernias of a gigantic size, especially postoperative with pronounced adhesive process and severe concomitant

diseases, in which the increase in intraabdominal pressure will be critical and will negatively affect the immediate results of surgical treatment.

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