

Recurrent Ventral Hernia's Prevention And Treatment After Hernioplasty

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ABSTRACT

The article describes the results of surgical treatment of patients with postoperative ventral hernias. The incidence of postoperative ventral hernias (PVH) in patients with hernias ranges from 3 to 19%; and 20–26% in patients after laparotomy (this is the 2nd place from frequencies after inguinal hernias). More than 4 million laparotomies annually performed in the United States in various diseases cases, and of which 2–30% of patients develop PVH. Hernia repairs occur in 150-250 thousand patients. And recurrences happened in 100 thousand patients, which were operated on again for their . The cost of treating such patients is over \$ 2 billion per year. In the Netherlands, according to the national medical registration data, there are about 4 thousand hernioplasty procedures for PVH per 100 thousand laparotomies. In this case, in 57–83% of patients, ventral hernias of median localization are formed. In general, the number of reoperations in patients for recurrent PVH ranges from 2.5 to 54.8%.

Purpose of the work: prevention and treatment of wound complications during hernioplasty of incisional ventral hernias.

Materials and methods: All patients were treated in the department of surgery of the Pavlodar regional hospital named after I.G. Sultanov, city hospitals No.1 and 3 of Pavlodar from 2010 to 2020. The study was dominated by female patients 91 (63%), men 53 (37%). The patients were divided into 2 groups. Observation group (I) 77 (53%) patients were treated according to the proposed improved method with prevention complications. Comparison group (II) consisted of a retrospective sample of 67 (47%) consecutive patients, whose examination and treatment was carried out according to the existing standard.

Results and discussion: Using of autodermal plastics by the developed method reduced the percentage of local postoperative complications from 19.8% to 5.3%, and the frequency of hernia recurrences from 28% to 4.5%, which indicates its effectiveness, especially in patients with large and recurrent hernias.

Conclusion: the developed method is easy to carry out, reduces the risk of wound complications and prevents hernia recurrence.

Keywords: hernioplasty, wound complications, ventral hernias, infection of the surgical site.

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INTRODUCTION

Over the past 20 years, the improvement in the results of treatment of patients with primary and incisional hernias is associated with the introduction into practice of synthetic prostheses made of various materials [1, 2].

Prosthetic hernioplasty made it possible to expand the indications for surgical treatment of patients with hernias, reduce the number of refusals in surgery due to severe concomitant diseases, including for elderly and senile patients [3-5]. This increased the quality and duration of life in operated patients by eliminating physical inactivity and the constant threat of complications in hernia carriers [6-8].

The European Society of Herniology (EHS) had proposed the classification of hernias at 2009 (Fig. 1). It is more convenient for clarifying the localization of the defect and had been justified in practise. The indisputable advantage of this classification is its simplicity against the background of numerous existing cumbersome and poorly perceived classifications.

EHS			
Incisional Hernia Classification			
Midline	subxiphoidal	M1	
	epigastric	M2	
	umbilical	M3	
	infraumbilical	M4	
	suprapubic	M5	
Lateral	subcostal	L1	
	flank	L2	
	iliac	L3	
	lumbar	L4	
Recurrent incisional hernia?		Yes <input type="radio"/>	No <input type="radio"/>
length:	cm	width:	cm
Width	W1	W2	W3
	<4cm	≥4-10cm	≥10cm
cm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 1. Hernia's classification by the European Society of Herniology [9]

The results of treatment of patients with hernias with the use of synthetic materials are of great importance for the location of the prosthesis in the tissues ("sub lay", "in lay", "on lay") and the principle (tension or non-tension)

inherent in the method of the operation performed. The recurrence rate of ventral hernias after plastic surgery using autoplasmic methods ranges from 20 to 46%, after prosthetic methods it ranges from 8 to 15.3% of patients. Moreover, according to statistics, their number is constantly increasing [10-12]. Along with the known factors leading to the recurrence of hernia, in patients after prosthetic methods of plastic surgery there are additional reasons that have not been sufficiently studied so far [13-16]. Currently, the pathogenesis of recurrent hernias is considered from the point of view of the development of a constantly progressive local inflammatory process in the tissues around the prosthesis [17, 18], which indicates an increase in the risk of wound complications during repeated operations. At the same time, the methods of preventing complications and relapses of the disease have not been developed enough [19-21]. Answers to the questions posed can only be obtained by analyzing the features of the surgical technique, assessing the physicochemical properties of the materials from which the prosthesis is made, and identifying the effect of the implanted material on morphological and functional changes in the tissues [22-23].

Purpose of the research: prevention and treatment of wound complications during hernioplasty of incisional ventral hernias.

MATERIALS AND METHODS

All patients were treated in the department of surgery of the Pavlodar regional hospital named after G. Sultanov, city hospitals No. 1 and 3 of Pavlodar for the periods from 2010 to 2020.

Study groups were forming following such patient inclusion criteria:

1. The patient's age is from 18 to 80 years.
2. Medium (medium) and large (large) VG, PG W2 and W3 hernias (by classification EHS, 2009).
3. Planned surgical intervention.

4. Hernioplasty according to our technologies.
5. Simultaneous interventions on the abdominal organs.
6. Class of operational and anesthetic risk I-III according to ASA.

The exclusion criteria were:

1. Refusal of the patient to participate in the study.
2. Inguinal and femoral hernias.
3. Small (small) VG and PG W1.
4. Emergency surgical intervention.
5. Hernioplasty with local tissues or onlay and inlay technology.
6. Operational and anesthetic risk class IV and V according to ASA.

The age of the patients ranged from 21 to 76 years, the median was 54±2.3 years. The study was dominated by female patients - 91 (63%) patients, men - 53 (37%). The patients were divided into 2 groups: I - *observation group*, 77 (53%) patients, the treatment of which was carried out according to the proposed improved method with the prevention of complications; Group II (*comparison*) consisted of a retrospective sample of 67 (47%) consecutive patients, whose examination and treatment was carried out according to the existing standard.

To predict SSI in all patients, we used the Modified Hernia Grading Scale (MHGS). For class 3 patients (infected), the degree of wound infection was determined based on the classification of wounds of the Center for Disease Control and Prevention (CDC, USA):

- Class I - clean wound;
- Class II - conditionally infected wound;
- Class III - infected wound;
- Class IV - contaminated wound.

RESULTS

First of all, we have made an analysis of the general condition of the patients with hernias. So we have assessed the nature and frequency of concomitant diseases in the groups of patients with recurrent hernias (Table 1).

Table 1. Concomitant diseases in the patients groups with recurrent hernias

The nature of the disease	Main group n=77	Comparison group n=67	Total
Cardiac ischemia $\chi^2=5.65, p=0.059$	16 (20.7%)	14 (20.8%)	30
Essential hypertension $\chi^2 = 5.36, p=0.068$	14 (18.1%)	13 (19.4%)	27
Obliterating atherosclerosis n/a $\chi^2 = 1.59, p=0.452$	5 (6.4%)	6 (8.9%)	9
Postinfarction cardiosclerosis $\chi^2 = 4.83, p=0.089$	7 (9%)	5 (7.4%)	12
Consequences of stroke $\chi^2=3.29, p=0.193$	4 (5.1%)	4 (5.9%)	8
Varicose veins disease n/a $\chi^2=10.23, p=0,$	12 (15.5%)	10 (14.8%)	22
COPD $\chi^2=5.55, p=0.062$	4 (5.1%)	5 (7.4%)	9
BPH $\chi^2=1.70, p=0.426$	5 (6.4%)	3 (4.4%)	8
Chronic pyelonephritis $\chi^2 = 2.57, p = 0.277$	10 (10.2%)	9 (13.4%)	19
Obesity $\chi^2 = 4.55, p = 0.103$	16 (20.7%)	13 (19.4%)	29
Diabetes mellitus $\chi^2 = 0.22, p = 0.894$	11 (14.2%)	14 (20.8%)	25

As the analysis of Table 1 shows, the differences in the incidence of concomitant diseases in patients in all groups were statistically insignificant ($p>0.05$). In patients with recurrent hernias, obesity, diseases of the cardiovascular system (IHD, hypertension, varicose veins of the lower extremities), COPD, diabetes mellitus were most often observed. Concomitant background diseases

affecting the general condition of patients required taking into account when choosing and carrying out anesthesia. This is especially important in emergency situations, as it was not possible to provide treatment aimed at compensating them. Distribution of patients by localization in the group of primary hernias Table 2

Table 2. Localization of the primary hernias

Hernia localization	Group of patients with primary hernias	Group of patients with primary
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	(n=144) Abs. number	hernias, %
M	18	12.5
M1	38	26.3
M2	16	11.1
M3	30	20.8
M4	9	6.4
ML	19	13.2
L	14	9,7
Total	144	100

Analysis of Table 2 showed that the first place was taken by patients with hernias of median localization, the second with anterolateral hernias and the third with lateral hernias.

Patents were obtained for the developed method of surgical treatment of incisional ventral hernias. The method is carried out as follows: with two ellipse-shaped incisions, according to the size of the hernia, a skin flap carrying the postoperative scar is excised. The hernial sac is opened and the existing adhesions are separated. Then the de-epithelialized autodermal flap, treated with a heated isotonic sodium chloride solution at a temperature of 90-94 °C, is sutured to the inner edge of the peritoneal-muscular-aponeurotic layer with the dermal surface facing the free abdominal cavity in 4 stages:

Stage 1 - suturing the flap with one of the edges of the hernial orifice. To do this, U-shaped sutures are applied on one side of it, first piercing from the outside to the inside of the aponeurosis, muscle and peritoneum, then an autodermal flap 2/3 of its thickness with a blind suture, then the needle is removed through the peritoneal-muscular-aponeurotic layer in reverse order. The ends of the thread are tied on the surface of the aponeurosis.

Stage 2 - the imposition of blind interrupted sutures on the skin flap at the adjacent edge of the gate, while the ends of the sutures are not tied.

Stage 3 - suturing the flap with the opposite edge of the hernial orifice. To do this, U-shaped sutures are applied to it at the edge of the peritoneal-muscular-aponeurotic tissues of the hernial orifice from the opposite side, capturing the flap by 2/3 of its thickness. The ends of the thread are tied on the surface of the aponeurosis.

Stage 4 - the ends of the threads passed through the flap (see Stage 2) with a needle are further passed from the inside to the outside through the peritoneal-muscular-aponeurotic tissues of the hernial orifice and tied with a measured tension. The skin wound is sutured.

The grasping of the flap with blind suture material by 2/3 of its thickness ensures its firm fixation to the edges of the hernial orifice, the absence of "gaping" of the suture material in the abdominal cavity reduces the risk of adhesions along the suture line.

When tying the ends of the thread at stage 4 to eliminate tension, there is no need to completely match the edges of the hernial orifice, which allows achieving the principle of "tension-free" hernioplasty.

In total, 77 patients were operated on by the described method. The use of autodermal plastics by the developed method reduced the percentage of local postoperative complications from 19.8% to 5.3%, and the frequency of hernia recurrences from 28% to 4.5%, which indicates its effectiveness, especially in patients with large and recurrent hernias.

The advantages of the proposed method are that as a result of using an autodermal graft to close the hernial

defect of the anterior abdominal wall, the normal volume of the abdominal cavity is preserved.

The possibility of hernia recurrence is excluded, since the pathogenetic mechanisms of the wound process in the area of surgery are eliminated (prolonged exudation in the wound of the abdominal wall, the formation of seromas with the subsequent development of purulent wound complications and long-term functioning ligature fistulas, suppuration) due to the use of the technique of intraperitoneal location of the skin flap, the dermal surface facing the free abdominal cavity; prevention of adhesion in the abdominal cavity is achieved, due to the moist dermal surface due to the exudation of the parietal and visceral peritoneum and due to the exclusion of contact of the suture material of the graft with the abdominal organs by using "blind" intradermal sutures.

CONCLUSIONS

The method presented by us allows us to reduce the risk of developing wound complications and prevent hernia recurrence due to eliminating the pathogenetic mechanisms of the wound process in the area of surgical intervention (prolonged exudation in the wound of the abdominal wall, the formation of seromas with the subsequent development of purulent wound complications and long-term functioning ligature fistulas, suppuration).

The innovative method of hernioplasty is simple to perform, since it only requires the use of an autodermal graft to close the hernial defect of the anterior abdominal wall while maintaining the normal volume of the abdominal cavity.

A patent № (19) KZ (13) B (11) 32408 was received for the developed method of surgical treatment of postoperative ventral hernias by the Ministry of Justice of the Republic of Kazakhstan 2017.

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