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Research Article

ENDOVIDEOSURGICAL PREAPERITONEAL PROSTHETIC HERNIOPLASTY IN VENTAL HERNIAS

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ABSTRACT

The article presents the data of a clinical examination of 105 patients with ventral hernias, who were operated on in the surgical department of the multidisciplinary clinic of Samarkand State Medical University for the period from 2018 to 2022. Depending on the choice of treatment tactics, the patients were divided into two groups. The first group, the comparison group, consisted of 65 (61.9%) patients who underwent open hernia repair. The second group, the main group, consisted of 40 (38.1%) patients who were initially planned for laparoscopic prosthetic hernioplasty.

KEYWORDS

Ventral hernia, alloplasty, endovideosurgery.

INTRODUCTION

The relevance of research. Postoperative ventral hernia (ventral hernia, cicatricial hernia) is a protrusion

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of organs (greater omentum, intestinal loops) that extends beyond the abdominal cavity through defects in the scar formed after surgical treatment.

Postoperative hernias appear in those anatomical areas where typical surgical incisions were made, providing access to the abdominal organs: in the area of the white line of the abdomen, right iliac region, navel, lateral lumbar region, suprapubic region. The number of postoperative ventral hernias in the structure of all abdominal hernias is 20-30.5% [3]. The frequency of their occurrence, despite the widespread use of modern technologies and tactics, ranges from 7.5 to 30.7% [1], while the number of complications in the postoperative period when repairing ventral hernias reaches 30.5% [2].

One of the important factors that determines the results of surgical treatment of postoperative ventral hernias using mesh implants is the frequency of hernia recurrence, reaching 15-20% according to the literature [5]. Often, the cause of recurrence is not only complications after surgery, but also the method of fixing mesh implants when performing prosthetic corrective plasty. This is due, first of all, to the adhesive properties of most mesh prostheses, which ensure the quality of hernioplasty. Attempts to use non-adhesive meshes, for example, from polyteterofluoroethylene, are safe in relation to the development of adhesions and subsequent complications, but are ineffective in relation to the formation of a reliable scar in the area of the hernia ring.

The most promising for the development of laparoscopic hernioplasty technology was the appearance of composite mesh prostheses, consisting of an adhesive component on one surface, providing the effect of reliable hernioplasty, and a non-adhesive surface facing the internal organs of the abdominal cavity, allowing the rapid development of neomesothelium adjacent to the intestine, preventing the formation of adhesions [3, 6].

In the literature and patent sources, there are a number of methods for laparoscopic hernioplasty for ventral hernias. At present, a number of randomized trials have already passed, proving the safety, efficacy, rapid rehabilitation and improvement in the quality of life of patients after laparoscopic ventral hernia repair, compared with traditional open hernioplasty with anterior abdominal wall prosthesis [6].

However, the methods of laparoscopic hernia alloplasty proposed in the sources have a number of shortcomings, which prompted us to look for solutions to these problems.

The aim of the study was to simplify the method of laparoscopic hernioplasty, to prevent the development of adhesions and recurrence of ventral hernia.

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Materials and research methods. The study is based on a clinical examination of 105 patients with ventral hernias who were operated on in the surgical department of the multidisciplinary clinic of Samarkand State Medical University for the period from 2018 to 2022. All patients were operated on in a planned manner. Depending on the choice of treatment tactics, the patients were divided into two groups. The first group, the comparison group, consisted of 65 (61.9%) patients who underwent open hernia repair. The second group, the main group, consisted of 40 (38.1%) patients who were scheduled for laparoscopic prosthetic hernioplasty.

In the main group, 37 (92.5%) laparoscopic prosthetic hernioplasties were performed. They used standard polypropylene mesh implants.

In the main group of patients, several stages of standard endovideosurgical hernioplasty have been improved: the places for conducting working trocars have been standardized; the size of the implant along the perimeter is 5 cm larger than the size of the hernial defect; improved method of laparoscopic hernioplasty.

Surgery was performed according to the standard technique.

Stage I - the introduction of the first trocar. Depending on the primary or postoperative hernia, the introduction of the first trocar was carried out in two ways:

1. Patients with primary ventral hernia used the standard method with the introduction of a Veresh needle (Fig. 1), pneumoperitoneum was applied to a pressure of 12-14 mm Hg. st., after removing the needle, a trocar was inserted into the abdominal cavity. Usually, entry into the free abdominal cavity was carried out using a special optical trocar "Visiport™" (Covidien), followed by a revision of the abdominal cavity;

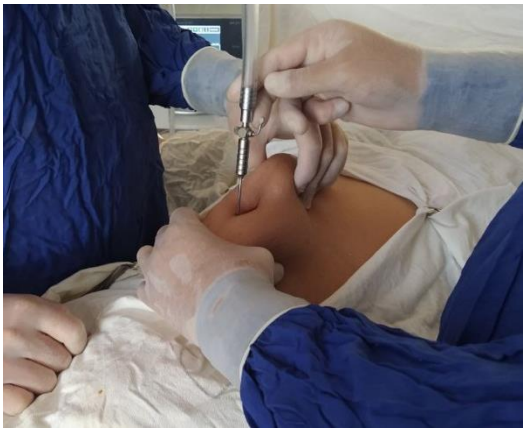

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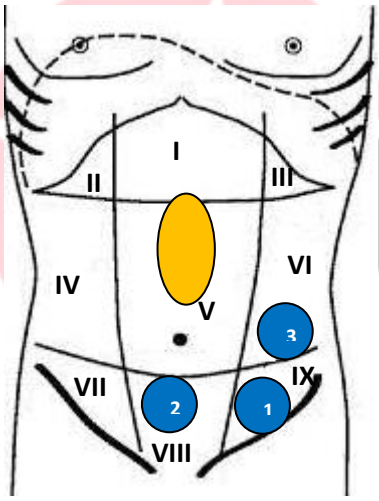
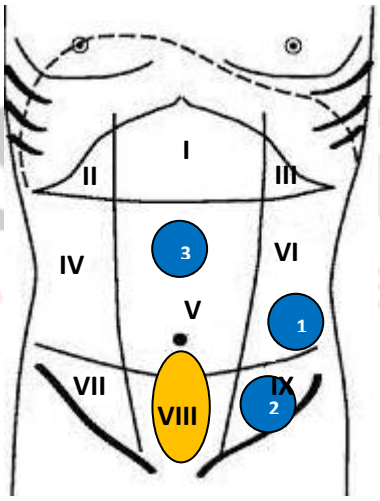
Fig. 1. Insertion of the Veresh needle and application of the pneumoperitoneum

2. If adhesions were likely, patients with postoperative ventral hernias were treated with the Hassen technique, i.e. the abdominal wall was opened in layers with a 2-4 cm long incision, adhesions around the wound were separated under visual control, and a trocar with an obturator was inserted through the incision, the wound was sealed.

Stage II of the operation - after the introduction of the first trocar with optics and revision of the abdominal cavity, 2 or 3 working trocars were inserted. Places of introduction of trocars were standardized and were chosen where it was more convenient and safe. At the same time, we tried to observe the principle of interaction of two laparoscopic instruments at an angle to each other of at least 45° (Fig. 2).



Hernia of the white line of the abdomen above the umbilicus (M1)



Hernia of the white line of the abdomen below the umbilicus (M3)

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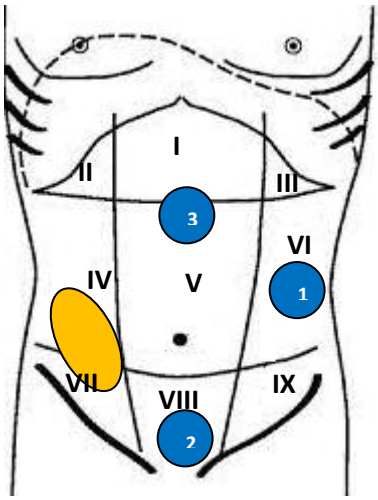
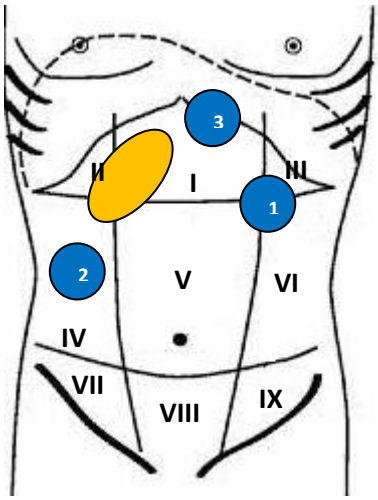


Postoperative hernia of the abdomen of the right iliac region (L3)



Postoperative abdominal hernia in the right hypochondrium (L1)

Fig. 2. Scheme of trocar insertion points for the most typical localizations of ventral hernias

Stage III was adhesiolysis. Separation of adhesions between the hernial sac, anterior abdominal wall and nearby organs was performed using electrocoagulation.

Stage IV - identification of the aponeurosis defect, determination of the true size of the hernia ring, selection of a mesh implant of the appropriate size.

Stage V - cutting out the implant, the dimensions of which along the perimeter are 5 cm larger than the dimensions of the hernial defect and modeling the mesh implant (if necessary), marking the hernia orifice and fixation points of the ligatures, stitching the edges of the mesh implant with ligatures for its intra-abdominal expansion and pressing against the anterior abdominal wall in front of final fixation (Fig. 3).

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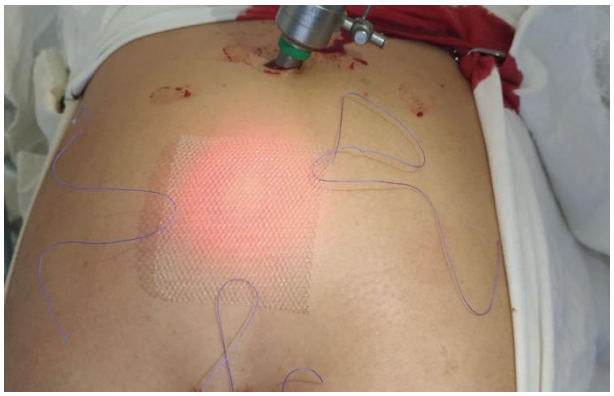

Fig. 3. View of a mesh polypropylene implant, the dimensions of which along the perimeter are 5 cm larger than the dimensions of the hernial defect

VI stage. At this stage, before the introduction of the implant into the abdominal cavity, the peritoneum was opened, the hernial sac was isolated and a "pocket" was created in the preperitoneal space, the indentation along the perimeter from the hernial orifice was 5-6 cm. In the lower part of the anterior abdominal wall, the "pocket" was created from the hernial defect to the bottom of a full bladder. The bladder during the operation was filled with a solution of furacilin through a urethral catheter. Then, a mesh implant rolled into a tube was introduced into the abdominal cavity through the trocar, unfolded and placed in the created preperitoneal "pocket" (Fig. 4). It was pressed against the anterior abdominal wall using ligatures tied around the edges of the implant.

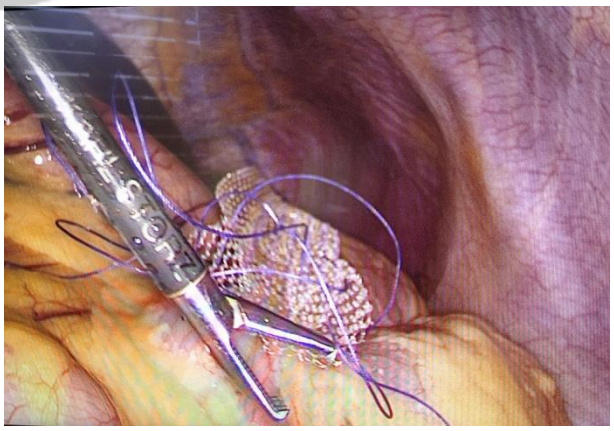

Fig. 4. Unfolding into a tubed mesh implant

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The implant was sutured to the anterior abdominal wall using an Endo Close needle (Fig. 5).

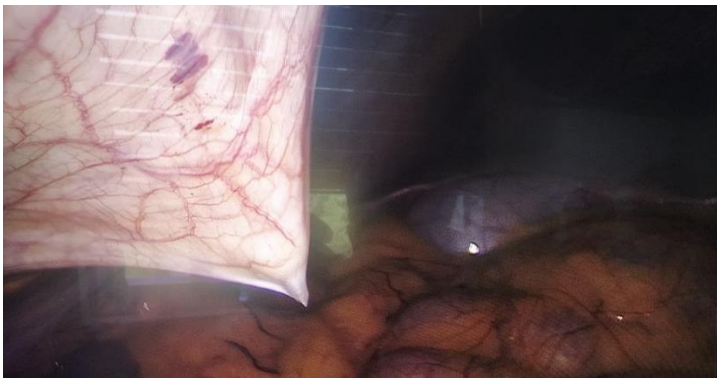

Fig. 5. Puncture of the needle from the side of the abdominal cavity visually under the control of the endovideolaparoscope

Thus, the caudal part of the endoprosthesis does not reach the bottom of the full bladder, and visual fixation of the endoprosthesis to the anterior abdominal wall does not injure the bladder wall. Desufflation is performed under visual control. The trocars are removed, the wounds are sutured in layers. A schematic representation of the improved endovideosurgical preperitoneal prosthetic hernioplasty for ventral hernias is shown in Figure 6.

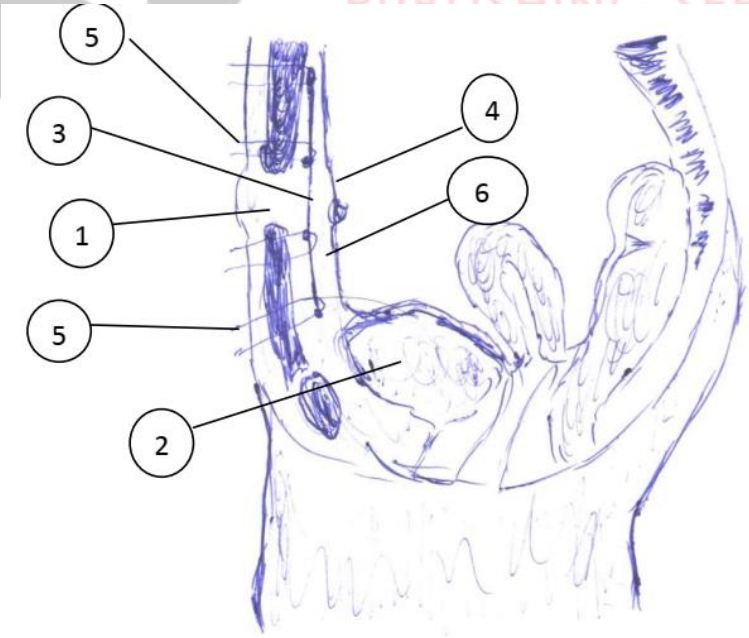

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Fig. 6. The method of laparoscopic ventral hernia repair proposed by us: 1-hernial defect; 2-full bladder; 3 - non-composite (conventional) mesh implant; 4-peritoneum; 5-pre-imposed U-shaped seams; 6-pocket between the peritoneum and the muscular-aponeurotic layer extending from the hernial defect to the bottom of the full bladder

The implant was fixed by suturing with an Endo Close needle using a non-absorbable suture material. The threads were tied extracorporeally after they were completely removed (Fig. 7).

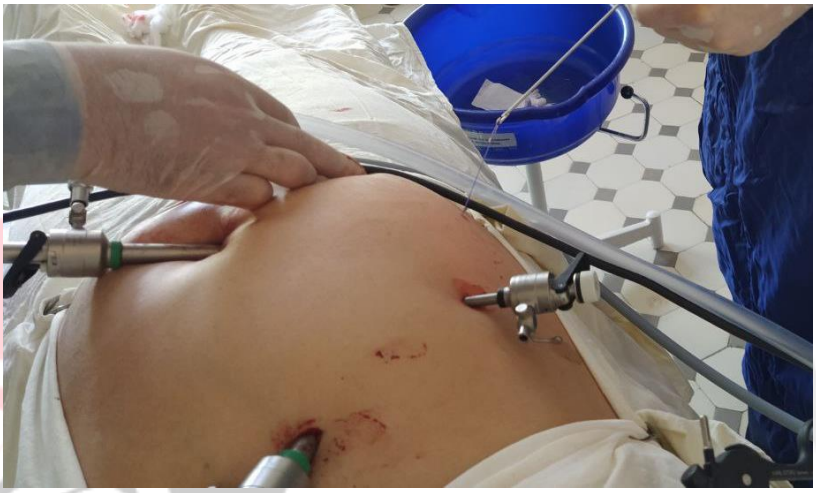

Fig. 7. View of the removed sutures from the side of the abdominal wall

VII stage. Next, in order to prevent adhesions in the abdominal cavity, peritonization of the implant is performed (Fig. 8).

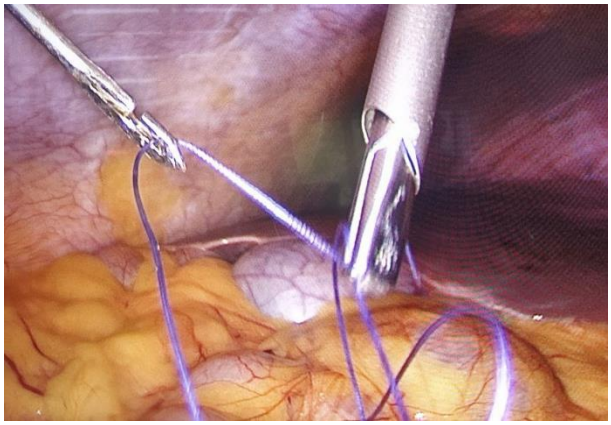

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Fig. 8. Peritonization of a Standard Mesh Implant with an Endo Close Needle

At the end of the operation, hemostasis control, gas desufflation, removal of trocars and suturing of 10 mm punctures of the anterior abdominal wall, intradermal absorbable sutures on skin incisions and aseptic dressings were performed.

Research results. Improving the choice of tactics for surgical treatment of ventral hernias, the technique of performing laparoscopic prosthetic hernioplasty, and other innovations developed and implemented within the framework of this study could not but affect the immediate results of managing this category of patients.

In the first years, i.e. during the period of mastering the laparoscopic technology, performing prosthetic hernioplasty took a rather long time (up to 71.6 ± 0.7 minutes), however, with the growth of the experience of surgeons and the development of technology, the course of the operation significantly decreased to 51.4 ± 0.6 minutes (T-criterion = 6.74, P<0.001) (Fig. 9).

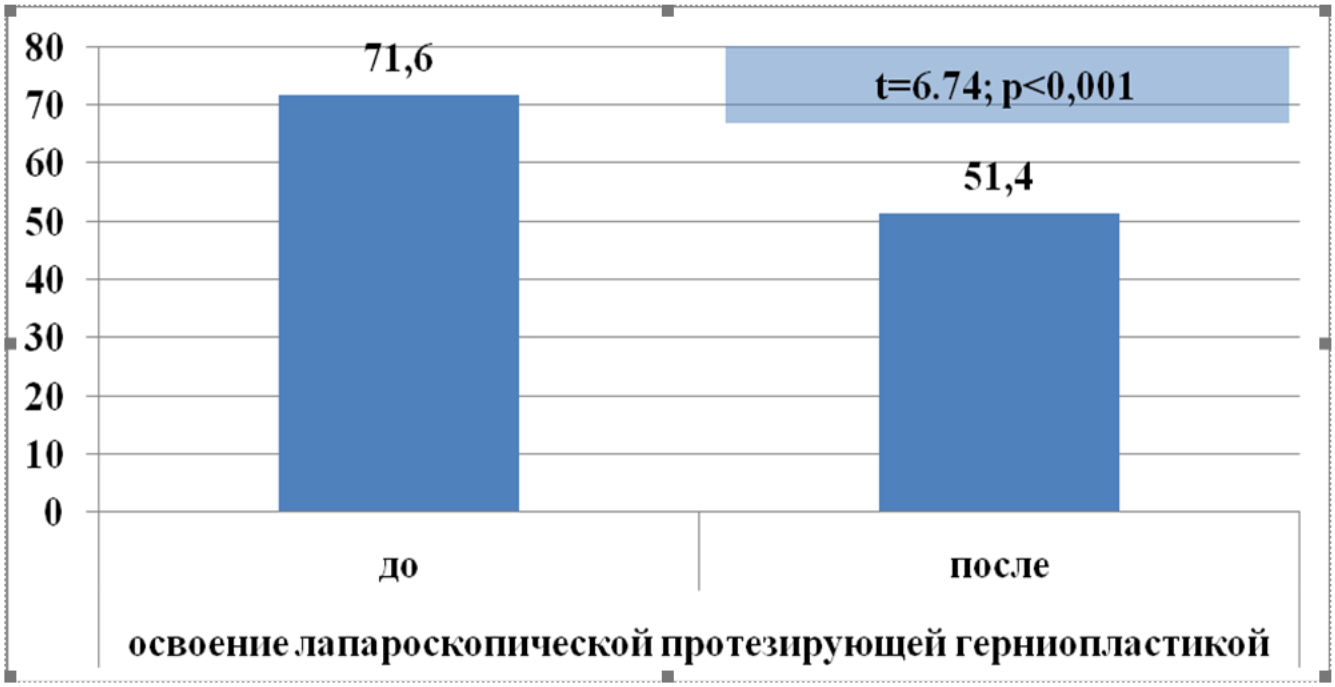

Fig. 9. Time of the operation during the period of mastering the endovideosurgical operation (min.)

In addition, it should be noted that during the period of mastering the technique, 3 (5.8%) patients underwent conversion, i.e. hernioplasty was completed by the open method.

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The reason for the conversion was associated with a pronounced adhesive process in the abdominal cavity, concomitant diseases of the cardiovascular and respiratory systems, which responded to prolonged pneumoperitoneum. The reasons for the conversion are shown in Table 1.

Table 1 Reason for conversion of laparoscopic prosthetic hernia repair

Reason for conversion	Number of patients(n=3)	
	abs.	%
Pronounced adhesive process and lengthening of the stage of separation of adhesions for more than 50 minutes:	3	100,0
- Intraoperative increase in arterial blood pleasure	2	66,7
- Intraoperative reduction of saturation	1	33,3

As can be seen from the table, in all cases (5.8% of the total number of patients in the main group), the cause of conversion was a pronounced adhesive process of the abdominal cavity in patients with postoperative ventral hernias.

Long-term separation of adhesions for more than 50 minutes, i.e. prolonged pneumoperitoneum manifested itself as an increase in blood pressure intraoperatively up to 200/100 mm Hg. Art. in 2 patients and in 1 patient with a concomitant chronic respiratory disease, it led to a decrease in blood oxygen saturation.

In all of the above 3 cases, operations were completed with open allohernioplasty using the "on lay" method.

Spasmodic changes in the parameters of the cardiovascular and respiratory system during surgery can be explained by the long course of pneumoperitoneum, which is a rather stressful factor associated with stretching of the peritoneum, rich in nerve endings. It should also be noted that the return to the initial level of indicators of the cardiovascular and respiratory system occurred after the conversion, i.e. elimination of pneumoperitoneum.

CONCLUSION

Improvement of technical aspects allowed: due to the differentiated introduction of the first trocar, to eliminate such complications as perforation of the wall of a hollow organ; by standardizing the management of working trocars, the technique of the operation was simplified; by fixing the implant with a 5-6 cm offset from the hernia orifice, hernia recurrence was minimized in the late postoperative period; due to the use of a modified needle, it was possible to level out technical difficulties in fixing the prosthesis and during prisonization of standard non-composite mesh

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implants with a reduction in this stage of the operation from 27.4 ± 0.5 to 12.6 ± 0.7 minutes (P<0.001).

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