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Optimization of Surgical Treatment of Postoperative Ventral Hernias

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Abstract **Introduction.** Incisional ventral hernias (IVHs) represent a significant problem in surgical practice, and their incidence varies depending on various factors, including the type of surgery, patient age, gender, and the presence of comorbidities. **The aim of the study was** to evaluate the results of surgical treatment of patients with postoperative ventral hernias. **Materials and methods of research.** A retrospective analysis of surgical treatment outcomes was conducted for 149 patients with postoperative hernias treated in the surgical department of the Zafarabad district medical association in the Jizzakh region from 2021 to 2024. Patients were divided into two groups: a study group (n=75), which utilized advanced hernioplasty techniques, and a comparison group (n=74), which utilized traditional methods. **Study results.** Patients in the first comparison group underwent hernioplasty using local tissues and hernioplasty using a polypropylene prosthesis. According to the indications, combined interventions were performed: cholecystectomy, hernioplasty Inguinal hernia. In 19 (35.2%) patients, omental resection was performed due to severe adhesions, viscerolysis, to prevent adhesive intestinal obstruction, and to reduce the volume of the abdominal cavity to prevent increased intra-abdominal pressure. **Conclusion.** The obtained results emphasize that the success of surgical intervention for anterior ventral hernia depends not only on the quality of the technique used but also on comprehensive diagnostics, competent planning, and a personalized approach to each patient. Implementation of these principles contributes to increased safety, improved functional outcomes, and a reduced risk of reoperation.

Keywords Ventral hernias, Hernial defect, Laparoscopy, Hernioplasty, Surgery

1. Introduction

Incisional ventral hernias (IVHs) represent a significant problem in surgical practice, and their incidence varies depending on various factors, including the type of surgery, patient age, gender, and the presence of comorbidities [1].

According to various studies, the incidence of PIH ranges from 10% to 20% in patients undergoing abdominal surgery. Some meta-analyses report higher rates, reaching 30% or more, especially in high-risk patients (e.g., those undergoing repeat surgeries or in obese patients) [2,3,4].

Ventral hernia treatment involves the use of various surgical techniques, which are selected based on the hernia characteristics, the patient's condition, and the surgeon's experience. The main methods are open surgery and laparoscopy.

In an open operation, an incision is made in the area of the hernial orifice, after which the hernial sac is removed, the contents are returned to the abdominal cavity, and the defect in the abdominal wall is closed with sutures or mesh implantation. The laparoscopic technique involves making several small incisions (usually 0.5–1 cm) through which a camera and instruments are inserted. The hernial opening is closed using mesh implants under video guidance [5,6,7].

The choice of surgical treatment method depends on many factors: hernia size, the presence of adhesions, the patient's general condition, and the surgeon's experience. Open surgery remains a reliable method for large or complex hernias, while laparoscopy is the preferred option for small and medium-sized hernias to minimize trauma and speed recovery [8,9]. One of the key elements of modern hernia surgery is the use of mesh implants (meshes) to strengthen the abdominal wall and reduce the risk of hernia recurrence. The correct choice of mesh type and its characteristics significantly impacts the surgical outcome and the patient's quality of life [10].

The aim of the study was to evaluate the results of surgical treatment of patients with postoperative ventral hernias.

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2. Materials and Methods of Research

A retrospective analysis of surgical treatment outcomes was conducted for 149 patients with postoperative hernias treated in the surgical department of the Zafarabad district medical association in the Jizzakh region from 2021 to 2024. Patients were divided into two groups: a study group (n=75), which utilized advanced hernioplasty techniques, and a comparison group (n=74), which utilized traditional methods.

The key factors determining the choice of surgical approach are the location of the hernia, the size of the hernia defect, and the presence of recurrences in the patient's medical history. According to the classification of Chervel JP and Rath AM (1999), 62 patients (41.6%) had large (W3) and giant (W4) hernias.

3. Study Results

Patients in the first comparison group underwent hernioplasty using local tissues and hernioplasty using a polypropylene prosthesis.

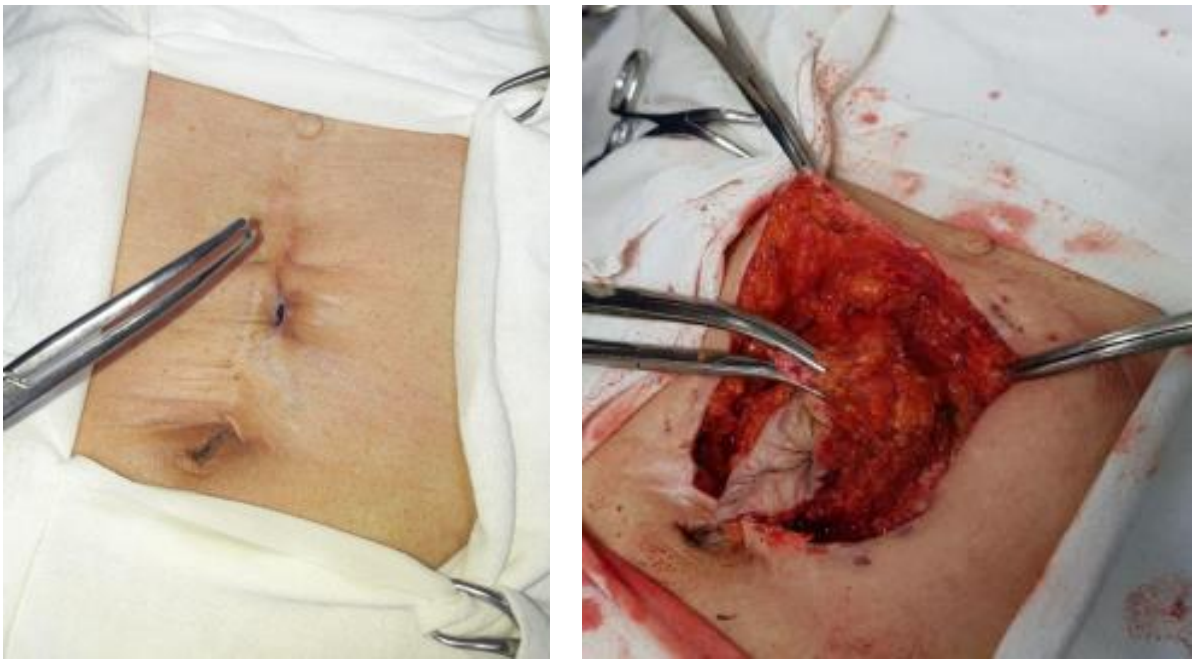


Figure 1. Excision of a postoperative scar with altered subcutaneous fat

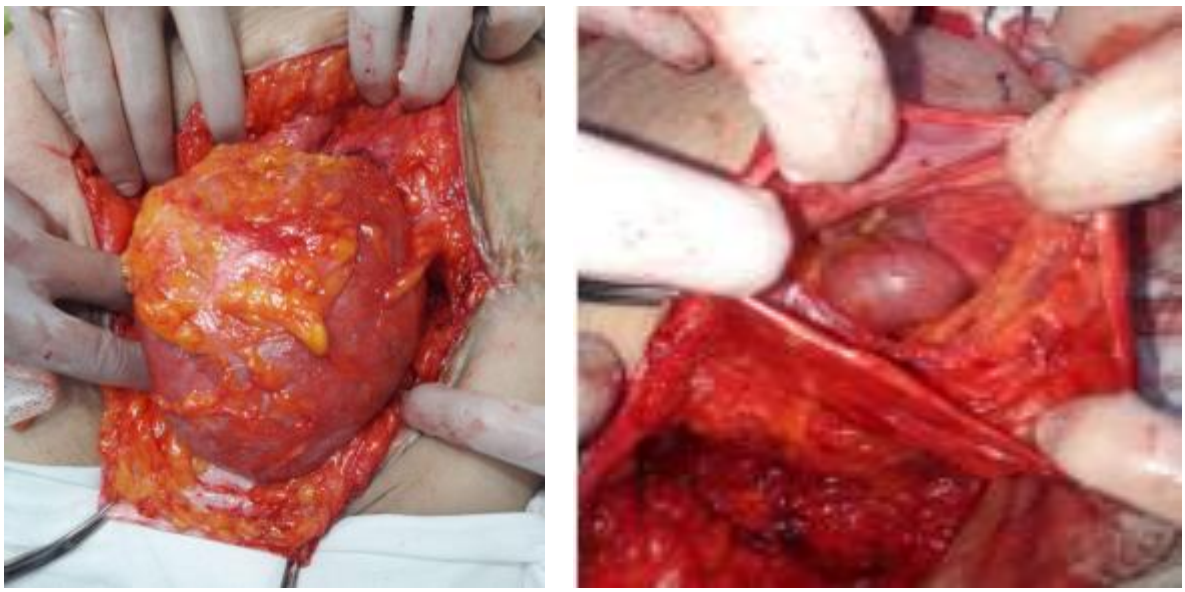


Figure 2. Isolation of the hernial sac while maintaining tissue integrity in order to eliminate the hernial defect

According to the indications, combined interventions were performed: cholecystectomy, hernioplasty Inguinal hernia. In 19 (35.2%) patients, omental resection was performed due to severe adhesions, viscerolysis, to prevent adhesive intestinal obstruction, and to reduce the volume of the abdominal cavity to prevent increased intra-abdominal pressure.

In patients in the comparison group, hernioplasty was performed using tension and non-tension methods, both local tissues and polypropylene implants (Table 1).

Table 1. Type of hernioplasty in patients in the comparison group

Type of operation	Number of patients	
	abs.	%
Tension hernialloplasty using the “on” method lay »	33	44.6
Non-tensioned hernialloplasty using the “on” method lay »	29	39.2
Suturing the anterior abdominal wall with duplicated own tissues	12	16.2

When a patient had a postoperative hernia, excision of the postoperative scar with altered subcutaneous fat was always performed. This eliminates foci of "dormant" infection (ligature fistulas, ligatures). Furthermore, scar- affected tissues typically revascularize poorly, preventing the creation of a sufficiently mechanically strong postoperative scar (Fig. 1).

The hernial sac was isolated to the base, preserving its integrity as much as possible, since the tissues of the sac may be needed when performing the elimination of the hernial defect (Fig. 2).

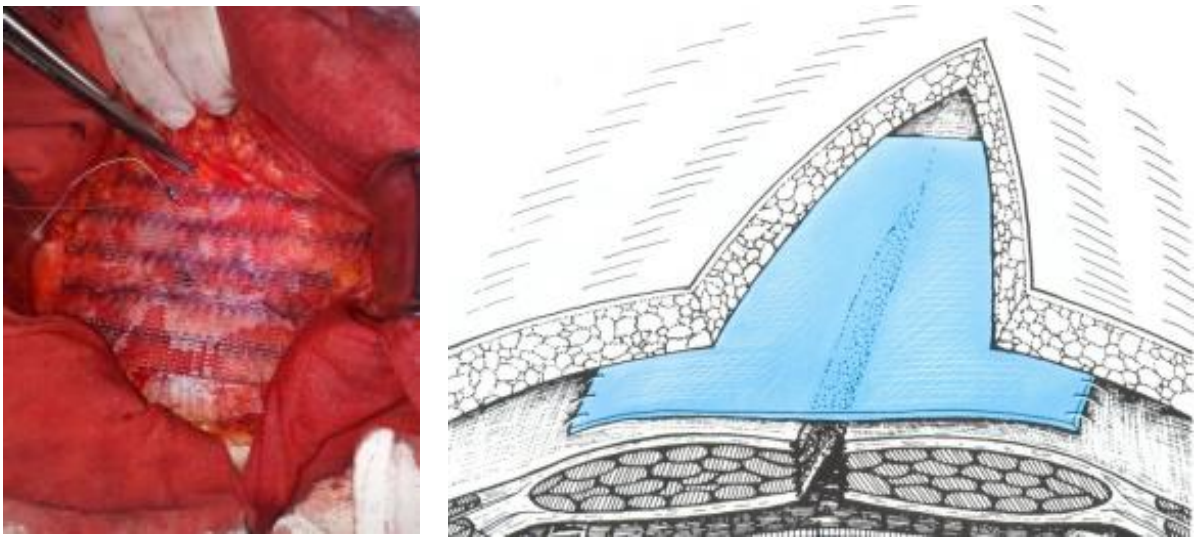
The hernial sac was opened along the midline, maintaining its connection with the edges of the rectus abdominis sheaths on both sides. The abdominal organs were then inspected and adhesions were separated (Fig. 3).

Figure 3. Separation of adhesions between the hernial sac and contents

When implanting an "onlay" endoprosthesis with suturing of the hernia defect, the hernia orifice was strengthened by suturing a graft over the autograft. The edges of the hernia defect were sutured with interrupted sutures until tight contact was achieved or duplicated. The anterior surface of the muscular-aponeurotic layer was then separated from the subcutaneous tissue for 8-10 cm from the suture line in both directions, and the graft was sutured over the aponeurosis with interrupted sutures (Fig. 4).

In the main group, the choice of optimal hernioplasty was more differentiated.

Patients of the 1st subgroup with a total score of up to 10, as well as with a hernial orifice diameter of less than 5 cm according to computer hernioabdominometry, underwent implantation of an “onlay” endoprosthesis with suturing of the defect. This group consisted of 24 (32.0%) patients, who, as a rule, had small defects.



A. B.

Figure 4. a. Placement of the explant in front of the muscular-aponeurotic layer, b. Schematic representation according to V.V. Zhebrovsky, F.N. Ilchenko, 2004

In 38 patients of the 2nd subgroup with scores from 11 to 15, taking into account CTGA data showing a hernial orifice diameter of up to 10 cm, the risk of tissue tension, and constitutional features affecting the postoperative course, we performed tension-free plasty. To increase the volume of the abdominal cavity and prevent the development of subacute hematoma, after delimiting the abdominal cavity with a hernial sac flap, plasty of the anterior abdominal wall was performed by applying a mesh to the aponeurosis without suturing it (Figs. 5, 6).

Thus, by rationally selecting a surgical approach for the treatment of postoperative ventral hernias, as well as by using a modified hernioalloplasty technique, we were able to simplify the surgical technique and mitigate the technical difficulties encountered during suturing the anterior abdominal wall and fixing the synthetic implant. This significantly reduced the duration of this stage of the surgery from 32.6 ± 0.5 to 23.4 ±0.7 minutes ($P < 0.001$), demonstrating the high efficacy of the proposed method (Fig. 7).

The obtained results confirm the clinical feasibility of using a modified approach in the reconstruction of the anterior abdominal wall, demonstrating not only its technical simplicity, but also high reproducibility, which is especially important when introducing the technique into widespread surgical practice.

Figure 5. CTGA of patient R., 49 years old, No. IB 2965/268

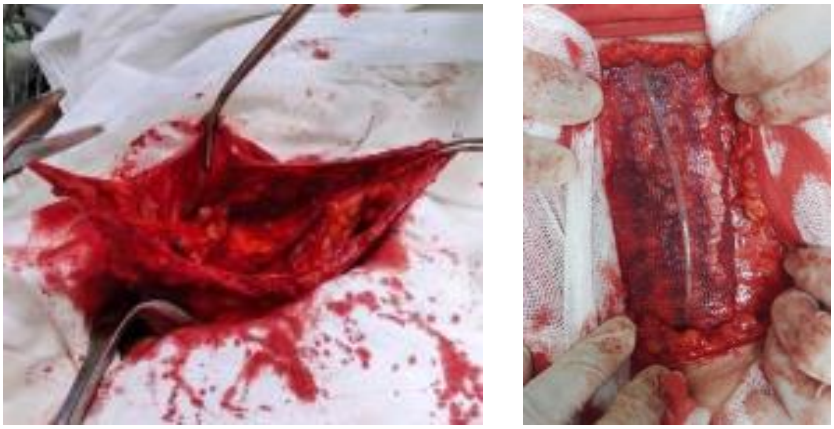


Figure 6. Implantation of the “onlay” endoprosthesis without suturing the defect

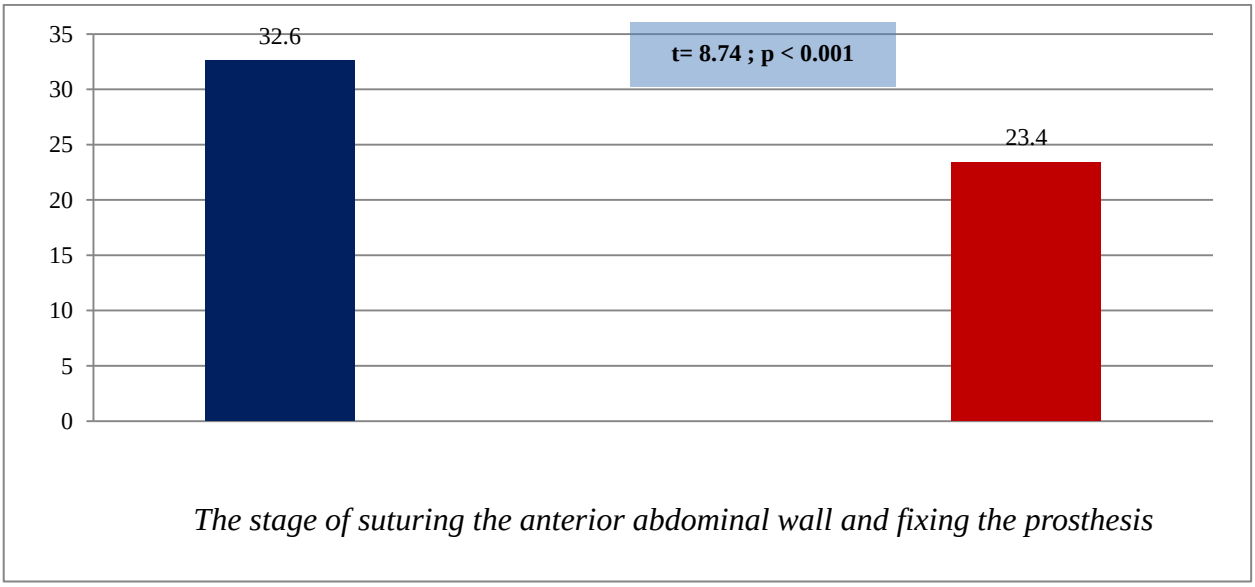


Figure 7. Time period for suturing the anterior abdominal wall and fixing the prosthesis using modernized technical aspects

4. Conclusions

Overall, technical improvements implemented in the study group significantly enhanced intraoperative control, ensured anatomically sound restoration of the anterior abdominal wall layers, and provided more stable fixation of the prosthetic implant. In contrast to the comparison group, where standard onlay and sublay techniques were used without modification, the study group employed optimized stages of hernioplasty, including refined dissection planes, improved mesh positioning, and enhanced methods of fixation aimed at reducing dead space and tissue tension. These modifications contributed to a lower incidence of postoperative complications-particularly seromas, hematomas, and inflammatory reactions at the implantation site-and resulted in a shorter postoperative recovery period.

The absence of laparoscopic hernia repair in this study is explained by the predominance of large and complex postoperative ventral hernias, extensive scar tissue, and previous multiple abdominal surgeries in the examined patient cohort, which limited the feasibility and safety of minimally invasive approaches. Under these conditions, open reconstructive techniques allowed for better visualization, adequate excision of scar tissue, precise anatomical reconstruction, and reliable mesh fixation.

The obtained results emphasize that successful surgical treatment of postoperative ventral hernias depends not only on the technical execution of the procedure but also on comprehensive preoperative diagnostics, careful surgical planning, and a personalized approach to each patient. Implementation of these principles improves surgical safety, enhances functional outcomes, and reduces the risk of reoperation.

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