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RATIONALE OF SEPARATION PROSTHETIC PLASTY FOR POSTOPERATIVE VENTRAL HERNIAS

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ОБОСНОВАНИЕ СЕПАРАЦИОННОЙ ПРОТЕЗНОЙ ПЛАСТИКИ ПРИ ПОСЛЕОПЕРАЦИОННЫХ ВЕНТРАЛЬНЫХ ГРЫЖАХ

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Summary. The results of treatment of 107 patients with postoperative ventral and recurrent hernias who underwent hernia defect repair using onlay and sublay methods, as well as using separation plasty with restoration of normal topographic anatomy were studied. The algorithm of choosing the method of standard (onlay, sublay) or separation (anterior, posterior) plasty for postoperative ventral hernias W2, W3, W4 is based on the state of muscular-aponeurotic structures of the anterior abdominal wall and the intraoperative intra-abdominal pressure monitoring index. Optimisation of tactical and technical aspects of surgical treatment of patients with postoperative ventral hernias allowed to reduce the frequency of immediate postoperative complications from 16.1% to 9.1% and recurrence from 10.7% to 4.5% (p<0,05).

Key words: *Postoperative ventral hernia, surgical treatment, separation prosthetic plasty.*

Резюме. Изучены результаты лечения 107 пациентов с послеоперационными вентральными и рецидивными грыжами, которым производилась пластика грыжевого дефекта с использованием onlay и sublay методов, а также с использованием сепарационной пластики с восстановлением нормальной топографической анатомии. Алгоритм выбора способа пластики стандартной (onlay, sublay) или сепарационной (передняя, задняя) при послеоперационных вентральных грыжах W2, W3, W4 основывается на состоянии мышечно-апоневротических структур передней брюшной стенки и показателе интраоперационного мониторинга внутрибрюшного давления. Оптимизация тактико-технических аспектов хирургического лечения больных с послеоперационными вентральными грыжами позволила снизить частоту ближайших послеоперационных осложнений с 16,1% до 9,1% и рецидива с 10,7% до 4,5% (p<0,05)

Ключевые слова: *послеоперационная вентральная грыжа, хирургическое лечение, сепарационная протезная пластика.*

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Relevance. Currently, there is significant attention being paid to the use of alloplastic materials in the treatment of postoperative ventral hernias, which necessitates deeper research in this area. This primarily concerns the choice of surgical methods and the prevention of postoperative wound complications [1, 2].

It is important to emphasize that there is no universal surgical method available today. In open hernioplasty techniques, the surgical outcomes and the frequency of postoperative complications depend on the placement of the synthetic material in the abdominal wall tissues, such as the "sublay," "inlay," and "onlay" methods. Furthermore, the development speed of postoperative compli-

cations also depends on the size of the hernia defect, the condition of the tissues, and their handling during surgery [3–6].

In the field of herniology, significant achievements have been made in the treatment of patients with postoperative ventral hernias (OVCH), but the overall number of cases is increasing, and there are still unresolved issues that need attention. Until now, there have been no clear recommendations regarding the choice of a specific surgical method, making this issue highly relevant and requiring further research [7–9].

Research Objective. To improve the surgical treatment outcomes of patients with postoperative ventral hernias by choosing the separation hernio-alloplasty method.

Materials and Methods of the Study. The study analyzed the treatment outcomes of 107 patients who underwent surgery at Samarkand State Medical University's Multidisciplinary Clinic from 2018 to 2022, and at the "Diagmed" private clinic in the Pastdargom district. In the patients we observed, hernia defects were repaired using the onlay and sublay methods, with the separation plastic surgery method, and normal anatomy was restored with separation prosthetics.

Thus, 107 patients were included in this clinical study. All patients were divided into two groups based on the surgical method.

The first (main) group included 51 patients who underwent hernia repair using the open method with separation prosthetic plastic surgery. They were further divided into two subgroups:

1.1 Group: 29 patients underwent anterior separation prosthetics.

1.2 Group: 22 patients underwent posterior separation prosthetics of the abdominal wall muscles. The second (comparison) group consisted of 56 patients who underwent standard hernia plastic methods, either onlay (n=38) or sublay (n=18).

Additionally, all patients were divided into subgroups according to the European Hernia Society (EHS, 2009) classification.

In Group I, in the 1.1 subgroup, medium-sized hernias W2 (5-10 cm) were observed in 7 (24.1%) patients, large hernias W3 (10-15 cm) in 20 (68.9%) patients, and giant hernias W4 (more than 15 cm) in 2 (6.9%) patients. In the 1.2 subgroup, medium-sized hernias were observed in 6 (27.3%) patients, large hernias in 14 (63.6%) patients, and giant hernias in 2 (9.1%) patients. In the second group, medium-sized hernias W2 were observed in 34 (60.7%) patients, large hernias W3 in 19 (33.9%) patients, and giant hernias W4 in 3 (5.3%) patients. Overall, patients with W3-W4 hernias accounted for the majority, with 60 (56.1%) patients recorded (Table 1).

Table 1

Hernia Size According to the EHS Classification

Groups	W2		W3		W4	
	Abc	%	Abc	%.	Abc.	%.
1.1 group (n=29)	7	24,1	20	68,9	2	6,9
1.2 group (n=22)	6	27,3	14	63,6	2	9,1
2 group (n=56)	34	60,7	19	33,9	3	5,3
Total (n=107)	47	43,9	53	49,5	7	6,5

The age of the observed patients ranged from 23 to 76 years, with an average age of 51.3±1.2 years. The number of patients under 60 years old was 57 (53.3%). There were 64 (59.8%) female patients and 43 (40.2%) male patients.

The most common cause of postoperative ventral hernia (OVCH) was surgery on the gallbladder and bile ducts, occurring in 26.2% of cases. In 21.6% of patients, two surgical procedures were performed within 12 months, as noted in their medical history.

The anesthesiological-surgical risk assessment was conducted according to the American Society of Anesthesiologists (ASA) scale. In the majority of the observed patients, the ASA scale indicated a risk level of III. Among the patients in Group 1.1, 14 (48.3%) had a risk level of II, while 15 (51.7%) had a risk level of III. In Group 1.2, 10 (45.5%) patients had a risk level of II, and 12 (54.5%) patients had a risk level of III. In Group 2, 27 (48.2%) patients had a risk level of II, while 29 (51.8%) had a risk level of III. Thus, the majority of patients (n=54, 36.5%) had excess body mass. In Group 1.1, the average body mass index was 33.4±3.5 kg/m², in Group 1.2 it was 34.1±2.2 kg/m², and in Group 2 it was 32.2±2.2 kg/m².

In the main group of patients (n=51), in the 1.1 subgroup, the hernia incision procedure was performed using the anterior muscle separation technique. After performing a laparotomy, adhesiolysis

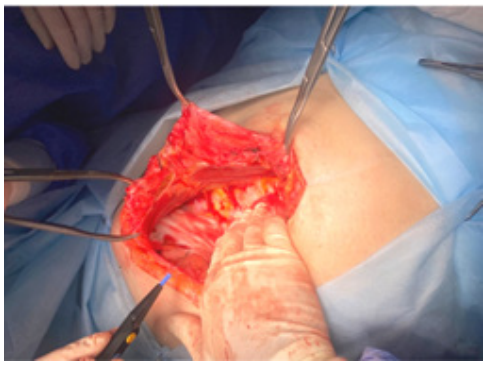

Figure 1. Separation of the Rectus Muscle

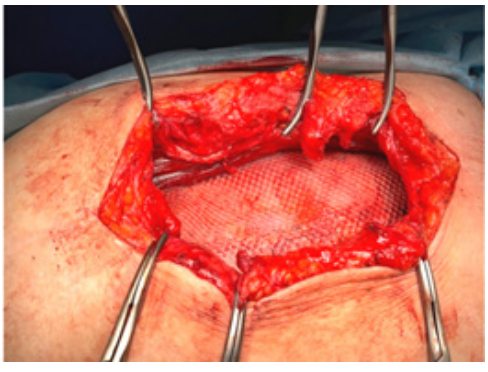

Figure 2. Placement of the Mesh Implant

was carried out. Then, the posterior layer of the rectus abdominis muscle sheath was cut along the edge of 0.5-1 cm.

During the separation of the rectus abdominis muscle from the posterior aponeurosis, perforating blood vessels and nerves in the area were successfully preserved. Also, during the surgical wound process, the external abdominal muscles (m. obliquus externus abdominis) aponeurosis was cut from the edge of the rib arc to the inguinal ligament, allowing the mobilization of the anterior abdominal wall (as shown in Figure 1).

In the area created in this way, a polypropylene mesh endoprosthesis was placed and sutured at six points using a long-lasting monofilament suture material via a transdermal method (Figure 2). The anterior abdominal aponeurosis was sutured over the mesh using the Small Byte 4:1 technique, with a continuous suture made from the same type of monofilament suture material.

For drainage of the subcutaneous fat layer, two drainage tubes were inserted into the subcutaneous fat tissue following the Redon method, and the external ends of the tubes were led through separate holes on the anterior abdominal surface. The operation was concluded with skin suturing. The average duration of the surgery in the first group of patients was 134.4±41.2 minutes.

In patients of group 1.2 (n=22), the posterior separation plastic method was applied during the hernioplasty. This method involves sequential laparotomy and separation of the adhesions. Afterward, the posterior leaflet of the rectus muscle sheath of the anterior abdominal wall is opened 5-10 mm away from its edges. It is important to preserve the branches of the thoracoabdominal nerves located at the junction of the anterior and posterior aponeurotic layers. The posterior leaflet of the rectus muscle sheath is then opened from the medial side, 5 mm away from the site where the two aponeurotic layers meet, passing over the transverse abdominal muscle (Figure 3).

This step of the operation is optimally performed in the upper third of the abdominal cavity, where the muscles are the most developed and closest to the midline. Then, the transverse muscle fibers are separated from the fascia of the same name, and the transverse muscle fibers are cut (Figure 4).

In this way, access is created to the space between the lateral edge of the transverse fascia and the cut transverse muscle. The tissues are mobilized upward to the ribs and xiphoid process, and downward to the Resiev space and Cooper's ligaments. Only after these tissues have been separated on both sides can the posterior wall of the rectus muscle sheath be sutured without tension.

Afterward, a mesh endoprosthesis is placed under the rectus muscles and sutured at six points using long-lasting monofilament suture material via a transdermal method (Figure 5).

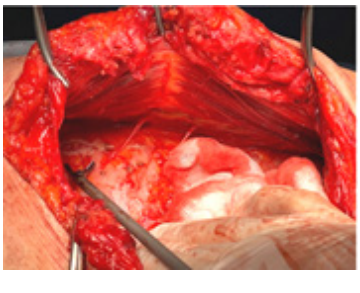

Figure 3. Separation of the Rectus Muscle

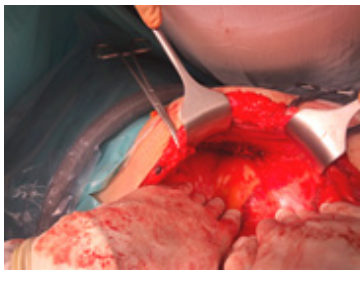

Figure 4. Cutting of the Transverse Muscle

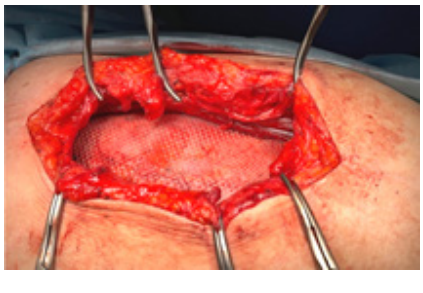

Figure 5. Placement of the Mesh Implant

Two drainage tubes are brought to the endoprosthesis, with their external ends passed through separate holes on the abdominal surface. Then, the edges of the aponeurosis are sutured with absorbable monofilament suture material for a long period of time, and this process is performed using the Small Byte 4:1 technique with continuous suturing. The duration of the surgical procedure averaged 148.6±38.4 minutes. No statistically significant difference in operation duration was found between the two main groups (p<0.05).

In the second group (n=56), hernioplasty was performed using standard methods (onlay and sublay) without tissue separation, with the autoplasty technique. 38 (67.8%) patients underwent surgery using the onlay method, and 18 (32.1%) patients underwent surgery using the sublay method. The average duration of surgery in this group was 81.7±21.4 minutes.

Results and Analysis. The postoperative period was monitored for 30 days, and later results were analyzed from 12 to 36 months.

In group 1.1, where anterior separation plastic surgery was used, wound complications occurred in 4 (13.8%) cases in the early postoperative period. In group 1.2, where posterior separation plastic surgery was applied, similar wound complications were noted in 2 (9.1%) patients who were over 60 years old, had a large epigastric hernia, and had obesity. In group 2, where standard "tension-free" methods were used, wound complications were observed in 9 (16.1%) cases. Thus, wound complications were less frequent in group 1.2, where posterior separation plastic surgery was used, occurring in 9.1% of cases (Table 2).

Table 2

Postoperative complication risk, abs(%)"

«Complication.»	1.1 group (n=29)	1.2 group (n=22)	2 group (n=56)	p
Wound complications				
Seroma	2 (6,9%)	1 (4,5%)	4 (7,1%)	>0,05
Hematoma / bleeding	1 (3,4%)	1 (4,5%)	2 (3,6%)	>0,05
Surgical wound infection	1 (3,4%)	-	3 (5,3%)	>0,05
Total number of complications	4 (13,8%)	2 (9,1%)	9 (16,1%)	<0,05
Somatic complications				
Leg vein thrombosis	1 (3,4%)	1 (4,5%)	2 (3,5%)	>0,05
Pneumonia	1 (3,4%)	-	4 (7,1%)	>0,05*
Total complications	6 (20,7%)	3 (13,6%)	15 (26,8%)	<0,05
Death	-	-	1 (1,8%)	>0,05*
«Recurrence, n (%)	2(6,9%)	1 (4,5%)	6 (10,7%)	<0,05

*Explanation: p – statistical significance of the difference between groups (according to the χ2 criterion for a contingency table; *according to Fisher's exact test), **multiple complications may occur in one patient, so the total number of complications may be greater than the number of patients with complications.*

In group 2, death was recorded in 1 (1.8%) and 1 (2.8%) cases, with the primary cause of death being the development of multiple organ failure. It is important to note that this patient was over 65 years old and had grade III obesity, as well as a history of diabetes.

Thus, no statistically significant differences were observed between the groups regarding various postoperative complications (p > 0.05). However, when analyzing the total number of complications that occurred in the early postoperative period, an increase in the number of complications was noted in 6 (20.6%) cases in group 1.1 and 15 (26.8%) cases in group 2. In group 1.2, where posterior separation plastic surgery was applied, these complications were observed in 3 (13.6%) cases. The recurrence rate of the disease was highest in groups 2 and 1.1, with rates of 10.7% and 6.8%, respectively. In group 1.2, where posterior separation plastic surgery was used, this rate was 4.5%.

Conclusion.

1.The algorithm for choosing the standard (onlay, sublay) or separation (anterior, posterior) plastic surgery technique for postoperative ventral hernias W2, W3, W4 is based on the condition of the

abdominal wall muscle-aponeurotic structures and intraoperative monitoring indicators of intra-abdominal pressure.

2. Optimizing the tactical and technical aspects of surgical treatment for patients with post-operative ventral hernias allowed for a reduction in the frequency of early postoperative com-plications from 16.1% to 9.1% and a decrease in the recurrence rate from 10.7% to 4.5% ($r < 0.05$).

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