EFFICACY OF COMPONENT SEPARATION TECHNIQUE IN THE TREATMENT OF LATERAL INCISIONAL ABDOMINAL HERNIAS

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Abstract. 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 most significant predictors of the development of hernia recurrence are the method of hernioplasty, the hernia defect size according to the EHS classification criteria, and body mass index. Optimization of the tactical and technical aspects of surgical treatment of patients with postoperative ventral hernias allowed a reduction in the rate of immediate postoperative complications from 16.1% to 9.1% and of hernia recurrence from 10.7% to 4.5% ($p < 0.05$).

Keywords: postoperative lumbar hernia; postoperative lateral abdominal hernia; hernioplasty; separation plasty; posterior separation hernioplasty; hernia recurrence; postoperative complications; onlay; sublay; quality of life.

ЭФФЕКТИВНОСТЬ ТЕХНИКИ СЕПАРАЦИОННОЙ ПЛАСТИКИ В ЛЕЧЕНИИ ЛАТЕРАЛЬНЫХ ПОСЛЕОПЕРАЦИОННЫХ ГРЫЖ ЖИВОТА

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Аннотация. Изучены результаты лечения 107 пациентов с послеоперационными вентральными и рецидивными грыжами, которым выполнялось устранение грыжевого дефекта с использованием методов онлей, сублей, а также с применением сепарационной пластики с восстановлением нормальной топографической анатомии. Наиболее значимыми предикторами развития рецидива грыжи являлись метод герниопластики, размеры грыжевого дефекта по классификации EHS и индекс массы тела. Оптимизация тактико-технических аспектов хирургического лечения больных с послеоперационными вентральными грыжами позволила снизить частоту ранних послеоперационных осложнений с 16,1% до 9,1%, а частоту рецидивов грыжи — с 10,7% до 4,5% ($p < 0,05$).

Ключевые слова: послеоперационная поясничная грыжа; послеоперационная боковая грыжа живота; герниопластика; сепарационная пластика; задняя сепарационная герниопластика; рецидив грыжи; послеоперационные осложнения; онлей; сублей; качество жизни.

Relevance. Postoperative lumbar and lateral abdominal hernias are among the most challenging problems in modern surgery. Deformation of the abdominal wall after surgical interventions leads to a reduced quality of life for the patient, a high risk of recurrence, various complications, and a significant increase in the financial cost of treatment. The incidence of postoperative abdominal wall hernias ranges from 10% to 20% among all patients who have undergone abdominal operations, and this is often compounded by additional difficulties related to comorbid conditions such as obesity and metabolic disorders.

Despite advances in reconstructive surgery, the choice of optimal hernioplasty method for these hernias remains a subject of debate. Standard repair techniques like onlay and sublay are frequently associated with a high risk of recurrence and postoperative complications. This underscores the need to develop new surgical approaches. In this context, the method of separation hernioplasty (component separation technique) warrants special attention, as it allows restoration of the normal topographic anatomy of the abdominal wall and reduces tension on the hernia defect. Applying a tailored approach to the selection of the separation hernioplasty method—depending on the hernia's size, location, and the condition of the musculofascial structures—can improve surgical outcomes.

Recent studies indicate that posterior separation hernioplasty (for example, the transversus abdominis release technique) is a promising approach for large incisional hernias. It achieves better anatomical restoration of the abdominal wall, minimizes tissue tension, and reduces the risk of recurrence. However, a differentiated strategy for choosing the repair method based on individual patient characteristics requires further research.

In summary, the optimization of surgical tactics and techniques for separation hernioplasty is of high importance not only for improving clinical outcomes but also for enhancing patients' postoperative quality of life. This defines the relevance of the present study.

The aim of this study is to improve the results of surgical treatment for patients with postoperative lumbar and lateral abdominal hernias by using a differentiated choice of separation hernioplasty method depending on the characteristics of the hernia defect and the condition of the anterior abdominal wall's musculofascial structures.

Materials and Methods. A total of 107 patients who underwent surgery for postoperative ventral (including lumbar and lateral) and recurrent hernias were included in the study. These surgeries were performed at the Department of Surgery of the Postgraduate Faculty, Samarkand State Medical University, from

2018 to 2022. All patients received surgical treatment for ventral abdominal wall hernias, including those that occurred after previous operations (incisional hernias).

The patients were divided into two main groups according to the hernioplasty technique used:

Group 1 (51 patients) – Patients who underwent separation hernioplasty. This group was further divided into two subgroups:

Subgroup 1.1 (29 patients): Anterior component separation hernioplasty.

Subgroup 1.2 (22 patients): Posterior component separation hernioplasty.

Group 2 (56 patients) – Patients who underwent standard hernioplasty using conventional techniques: onlay repair (38 patients) or sublay (Retromuscular) repair (18 patients).

All hernias were classified according to the European Hernia Society (EHS) classification (2009). This allowed for a precise assessment of hernia size and characteristics. In Subgroups 1.1 and 1.2 (separation plasty groups), most patients had large (W3) or very large (W4) hernias, whereas in the standard repair group (Group 2) the hernias were mainly medium (W2) or large (W3).

To evaluate the effectiveness of the surgical treatment, a retrospective analysis of outcomes was performed at different time points:

Early outcomes: The condition of patients was assessed within 30 days post-operation, including the incidence of wound complications and any surgical site infections.

Long-term outcomes: The incidence of hernia recurrence, long-term complications, and patient quality of life were evaluated at 12 to 36 months after surgery.

Additionally, the status of the musculofascial structures of the abdominal wall was assessed in all patients, and intraoperative monitoring of intra-abdominal pressure was conducted. This helped determine the optimal choice of hernioplasty technique for each patient. Clinical and anatomical features of the hernia defects were also analyzed, including the degree of abdominal wall stretching and the presence of comorbid conditions such as obesity, diabetes mellitus, and advanced age, which could affect treatment outcomes.

Results and discussion. After surgical treatment of 107 patients with postoperative ventral (lumbar/lateral) and recurrent hernias, the following data were obtained:

In Subgroup 1.1 (anterior separation plasty, 29 patients), wound complications occurred in 4 patients (13.8%). Of these, 2 cases were superficial surgical site infections, 1 case involved impaired wound healing (delayed healing), and 1 case required a reoperation due to a postoperative hematoma.

In Subgroup 1.2 (posterior separation plasty, 22 patients), wound complications were observed in 2 patients (9.1%). Both cases were related to

superficial wound infections, which were managed successfully without the need for repeat surgical intervention.

In Group 2 (standard hernioplasty, onlay/sublay, 56 patients), wound complications occurred in 9 patients (16.1%). This included 5 cases of wound infection, 2 cases of suture line dehiscence (wound dehiscence), and 2 cases of hematoma formation requiring drainage.

Thus, the patients who underwent posterior separation hernioplasty demonstrated the lowest rate of early postoperative wound complications (9.1%), confirming the effectiveness of this method compared to the others.

Table 1

Hernia sizes by EHS classification in each group

Group	**W2 (moderate)**	**W3 (large)**	**W4 (very large)**
	n	%	*n*
Subgroup 1.1 (n=29) – Anterior separation	7	24.1%	20
Subgroup 1.2 (n=22) – Posterior separation	6	27.3%	14
Group 2 (n=56) – Standard onlay/sublay	34	60.7%	19
Total (n=107)	47	43.9%	53

Table 2

Analysis of postoperative complications by group (number of cases and %)

Type of complication	**Subgroup 1.1(n=29)**	**Subgroup 1.2(n=22)**	**Group 2(n=56)**	**p-value**
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 site infection	1 (3.4%)	0 (0%)	3 (5.3%)	>0.05
Total wound complications	4 (13.8%)	2 (9.1%)	9 (16.1%)	<0.05
Systemic complications				
Deep vein thrombosis	1 (3.4%)	1 (4.5%)	2 (3.5%)	>0.05
Pneumonia	1 (3.4%)	0 (0%)	4 (7.1%)	>0.05
Total systemic complications	6 (20.7%)	3 (13.6%)	15 (26.8%)	<0.05
Mortality	0 (0%)	0 (0%)	1 (1.8%)	>0.05
Hernia recurrence	2 (6.9%)	1 (4.5%)	6 (10.7%)	<0.05

Note: p-values indicate the significance of differences between groups (chi-square or Fisher's exact test, as appropriate). A single patient may have multiple complications, thus the total number of patients with complications is less than the total number of complications.

The average wound healing time (time to complete wound epithelialization) also differed between groups. In Subgroup 1.1, the mean wound healing time was 14 days; in Subgroup 1.2 it was 12 days. In Group 2 (onlay/sublay), the average wound healing time was longer, about 16 days. This indicates an advantage of the separation techniques, especially the posterior approach, in accelerating recovery.

Regarding hernia recurrence, in Subgroup 1.1 (anterior separation) hernia recurrences were recorded in 3 patients (10.3%), mostly in those with large and very large hernias (W3 and W4 defects). In Subgroup 1.2 (posterior separation), recurrences occurred in 2 patients (9.1%). In Group 2 (standard repair), hernia recurrences were observed in 6 patients (10.7%). Thus, both separation technique groups had recurrence rates numerically lower than or comparable to the standard group.

Over a follow-up period of 12–36 months post-surgery, the overall recurrence rate remained significantly lower in the separation hernioplasty groups. Recurrence was observed in only 4.5% of patients in the posterior separation group (Subgroup 1.2) and 6.9% in the anterior separation group (Subgroup 1.1), compared to 10.7% in the standard technique group. These findings suggest greater long-term durability of the repair with separation techniques, particularly the posterior component separation.

Patients in the posterior separation group also demonstrated an improvement in quality of life in the long term. This was assessed 12 months after surgery, for example using a Quality of Life (QoL) questionnaire, and improvements were more pronounced in Subgroup 1.2. The better QoL outcomes in this group are likely due to the lower complication rate and faster recovery. Patients in both the anterior separation and standard repair groups also experienced improved postoperative quality of life, but recovery was slower, especially for those with larger hernias. This further supports the advantages of the separation hernioplasty approach.

In summary, our results showed that the posterior separation hernioplasty method was the most effective for patients with complex incisional hernias. This technique led to a reduced frequency of postoperative complications, faster rehabilitation, and a lower likelihood of long-term recurrence.

The results of our study highlight the importance of choosing the appropriate hernioplasty method to achieve successful outcomes in the treatment of postoperative lumbar and lateral abdominal hernias. Firstly, the use of separation plasty techniques (both anterior and posterior) clearly demonstrated advantages over traditional onlay and sublay methods, which are widely used for ventral hernias. We observed fewer wound complications—such as infections, hematomas, and suture dehiscence—in the groups where a separation technique was used, particularly in the posterior separation group (Subgroup 1.2). The

posterior approach's more physiological restoration of the abdominal wall anatomy likely accounts for this improvement, as it reduces tension on the tissues and preserves blood supply and innervation better than the conventional methods.

Although the anterior separation group (Subgroup 1.1) did experience some complications, these were less severe and were manageable with appropriate treatment, indicating that even this technique can mitigate the severity of complications compared to traditional repairs.

Our findings confirm that posterior separation hernioplasty not only decreases the rate of early postoperative complications but is also more effective in preserving the normal topographic anatomy of the abdominal wall. This anatomical restoration is a key factor in reducing the likelihood of hernia recurrence. By recreating a functional, continuous abdominal wall, the posterior component separation (transversus abdominis release) technique addresses one of the main causes of recurrence—excessive tension and weak tissue overlap at the repair site.

In contrast to anterior separation plasty, the posterior approach avoids extensive dissection of the anterior abdominal wall layers, thereby lowering the risk of tissue damage to the anterior wall and injury to neurovascular bundles. This may explain the fewer wound issues seen with the posterior method. Additionally, the recurrence rate—a critical indicator of long-term success—was significantly reduced with posterior separation (4.5% in our series) compared to traditional methods (10.7%). This supports the hypothesis that creating a more robust and functionally integrated musculofascial layer via separation techniques decreases the chance of new defects forming.

One of the most important factors contributing to recurrences, as identified in our study, is the size of the hernia defect (W3, W4) along with intraoperative parameters like elevated intra-abdominal pressure. Large hernias present unique challenges; these factors necessitate special consideration when selecting a repair method. Our findings suggest that separation plasty is more suitable for patients with large hernias, as it achieves a more secure and long-lasting result in this context.

We also observed a meaningful improvement in patient quality of life in the posterior separation group. Patients who underwent posterior component separation showed better recovery of physical activity and social adaptation in the long term. This positive outcome is directly tied to the minimal complications and low recurrence rate achieved with this method. These patients were able to return to normal life more quickly, even if they had more complex hernia conditions to begin with. This makes the posterior separation technique particularly preferable for older patients or those with significant comorbidities.

Advantages of separation hernioplasty: Our experience and the literature suggest several key advantages of separation hernioplasty over standard methods:

Improved anatomical restoration of the abdominal wall, providing a stronger and more stable reconstruction.

Reduced risk of tissue overload and overstretching, which leads to a lower recurrence rate.

Fewer early postoperative complications, such as wound infections, hematomas, and suture dehiscence.

However, it should be noted that our study has certain limitations. First, the observations were limited to a sample of 107 patients, which may affect the generalizability of the findings to a broader population. Second, longer-term follow-up studies are needed to fully assess the durability of outcomes and to detect any late complications after separation hernioplasty.

Nonetheless, our results support the hypothesis that posterior separation hernioplasty is a highly effective method for treating postoperative ventral (including lumbar and lateral) hernias. This technique not only lowers the incidence of postoperative complications but also reduces the likelihood of recurrence while improving patients' quality of life. At the same time, the choice of hernioplasty method should be individualized, taking into account the hernia defect size and the patient's condition, in order to achieve the best possible surgical outcome.

Furthermore, our findings confirm the clinical benefits of separation hernioplasty compared to traditional methods (onlay and sublay) in the treatment of postoperative abdominal wall hernias. The use of posterior separation plasty resulted in the lowest rates of postoperative complications and recurrences, which we attribute to a more physiological reconstruction of the abdominal wall and reduced tissue tension. This is especially important for patients with large defects and weakened musculofascial structures. We noted that predictors of a successful outcome include the choice of repair method and a comprehensive evaluation of risk factors such as body mass index and hernia defect size as per the EHS classification. Patients with large hernias (W3 and W4) particularly require careful consideration in method selection, as they face a higher risk of recurrence and complications.

In comparing separation techniques with traditional hernioplasty, we found that the separation approach yields more stable long-term results. In our series, the posterior separation group had a wound complication rate of only 9.1%, much lower than the 16.1% observed with onlay/sublay repairs. This aligns with reports from other studies, which also confirm that by restoring the topographic anatomy and reducing tissue tension, separation hernioplasty is preferable for large and recurrent ventral hernias.

An important aspect of our surgical strategy was the use of intraoperative intra-abdominal pressure monitoring. This allowed for a more precise choice of operative tactics and helped reduce the risk of postoperative complications related

to elevated intra-abdominal pressure. We recommend incorporating such monitoring, as it can guide the surgeon in achieving optimal tension-free closure.

In conclusion, our study underscores that posterior separation hernioplasty is the method of choice for treating complex cases of postoperative abdominal wall hernias (especially large and lateral incisional hernias). Optimizing the technical and tactical aspects of this method not only lowers the rate of complications and recurrences but also improves long-term outcomes and patient quality of life.

Conclusion

1. Our study demonstrated the high clinical efficacy of using separation hernioplasty in the treatment of postoperative lumbar and lateral abdominal hernias. In particular, the posterior separation technique provided a markedly lower rate of postoperative complications and hernia recurrences compared to traditional methods such as onlay and sublay. The use of posterior separation plasty not only reduced early complications but also yielded superior long-term results, including a significant decrease in hernia recurrences. This success is attributable to a more physiological restoration of abdominal wall anatomy and better preservation of its function.

2. Our findings indicate that the choice of hernioplasty method should be based on a careful assessment of the hernia defect size, the condition of the musculofascial structures, and intraoperative control of intra-abdominal pressure. By optimizing the surgical strategy—such as selecting the appropriate type of separation hernioplasty according to the patient's individual characteristics—we can significantly reduce postoperative complication rates and recurrences. This leads to improved long-term treatment outcomes and a higher quality of life for patients.

3. The data obtained support the advisability of using posterior separation hernioplasty as the preferred method for repairing large and recurrent abdominal hernias, especially in patients with various comorbidities and in older age groups. Further research with longer follow-up is necessary to confirm the long-term effectiveness and safety of this technique.

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