



FEATURES OF PERFORMING NON-TENSION HERNIALLOPLASTY FOR LARGE AND GIANT VENTRAL HERNIAS TAKING INTO ACCOUNT A DIFFERENTIATED APPROACH

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Abstract. The article presents the materials of a clinical and surgical study of 137 patients with large and giant ventral hernias, operated on in 2018–2025. A comparison was made between standard tactics (2018–2021, n=58) and a differentiated approach (2022–2025, n=79), which included tension-free reconstruction options with Ramirez mobilization and, in cases of a high risk of tension/growth of the IAP and a defect >15 cm, a modified technique with aponeurosis mobilization and formation of a barrier aponeurotic layer. In the main group, the incidence of early postoperative complications was significantly reduced (18.9% versus 8.9%; $p=0.045$) and the incidence of relapses in the late period was reduced (11.4% versus 1.8%), which confirms the clinical feasibility of the risk-stratified choice of tension-free hernioalloplasty in patients with large defects.

Key words: ventral hernia; large hernial defects; tension-free hernioalloplasty; Ramirez component separation; intra-abdominal pressure.

Relevance of the study. The scientific basis of the modern approach is based on the evolution of component separation methods: the anatomical and clinical concept of separating abdominal wall components, formulated by OM Ramirez et al., became the foundation for closure of large defects with reduced tissue tension, and subsequent modifications (including posterior component separation and TAR) expanded the possibilities of reconstruction for complex hernias, including cases with domain loss. Crucially, for "giant" defects, a universal technique is insufficient: risk stratification for leakage and hypertension is required, the choice of "bridging/without defect suturing" or methods with extended mobilization, and the creation of a reliable barrier between the mesh implant and visceral structures to prevent adhesive and fistula complications.

The practical significance of this topic is confirmed by the fact that even in leading centers, an active search for the optimal balance between the radicality of reconstruction and safety continues: European studies and reviews compare open and robot-assisted TAR options and evaluate their impact on early outcomes and wound complications, forming the basis for a more personalized choice of intervention. In East Asian countries, the role of modern reconstruction strategies for large defects is also emphasized: Korean authors (SH Kim et al.; JK Park et al.) systematize the indications and technical nuances of TAR/eTEP approaches in the treatment of ventral and incisional hernias, Chinese researchers (P. Wang et al.; R. Tang et al.) offer CT-oriented predictors of the complexity of fascia closure and multicenter data on extraperitoneal techniques, and Japanese authors (S. Nagato et al.) demonstrate the clinical applicability of component separation in incisional hernias, which emphasizes the global relevance of the problem.

For Uzbekistan, the relevance of this approach is further enhanced by the increasing surgical activity, the growing cohort of patients with incisional hernias, and the high proportion

of patients with obesity and comorbidities. This necessitates the implementation of evidence-based, reproducible, and resource-efficient algorithms for selecting tension-free hernioplasty. Publications reflect interest in improving prosthetic techniques, evaluating treatment outcomes, and the need for unification of tactical and technical solutions for ventral hernias, which forms the scientific and practical basis for developing a differentiated approach specifically for large and giant defects.

The aim of the study was to evaluate the effectiveness of differentiated tension-free hernioplasty for large and giant ventral hernias.

Materials and methods of the study. The study was based on the results of clinical examination, surgical treatment and subsequent observation of 137 patients with large and giant ventral hernias of the anterior abdominal wall, treated in the surgical department of the multidisciplinary clinic of Samarkand State Medical University in the period 2018-2025. To objectively evaluate the effectiveness of various approaches to surgical treatment and analyze the outcomes, patients were divided into two comparable groups depending on the applied surgical tactics and the time period of observation. The comparison group consisted of 58 patients treated in 2018-2021; the majority (87.9%) underwent tension-free hernioalloplasty with a synthetic endoprosthesis in the "onlay" position, and in 12.1%, "onlay" was used without closure of the defect with mobilization of the sheaths of the rectus abdominis muscles according to Ramirez. The main group consisted of 79 patients (2022–2025), where the tactics were differentiated: in 59.5% of cases, an "onlay" without suturing the defect was performed in combination with Ramirez, in 40.5% - a modified tension-free hernioplasty to improve reliability and reduce complications/recurrences; in case of obesity and ptosis of the anterior abdominal wall, abdominoplasty was performed in 51.9% of patients.

Preoperative preparation of patients in both groups was carried out using standard methods with correction of concomitant pathologies of the cardiovascular, respiratory, and gastrointestinal systems; cleansing enemas and laxatives were used as indicated.

All patients in the study group underwent surgery. In the study group, the choice of optimal hernioplasty was more differentiated. Patients in the study group were divided into two subgroups (Table 1). In the first subgroup of examined patients with large and giant ventral hernias, the total score on the tissue tension prognosis scale and the risk of increased intra-abdominal pressure was 10–15 points, corresponding to a high risk of significant tissue tension during hernia defect closure and a probable increase in IAP in the early postoperative period. Patients in the first subgroup were preferred to undergo onlay endoprosthesis implantation without defect suturing with mobilization of the rectus abdominis muscle sheaths using the Ramirez technique.

In patients with large and giant ventral hernias, scoring more than 15 points on the integrated risk scale for tissue tension and increased intra-abdominal pressure, as well as with a defect diameter greater than 15 cm, standard hernia repair was associated with a high risk of abdominal compartment syndrome and other complications due to a critical increase in intra-abdominal pressure in the early postoperative period. Therefore, a modified hernia alloplasty was used, aimed at restoring the anterior abdominal wall without reducing the functional volume of the abdominal cavity, reducing tension, and creating a reliable barrier between the mesh implant and the abdominal organs.

Table 1. Types of hernioplasty in the main group



Subgroups	Type of operation	Quantity	%
1st subgroup	Implantation of an onlay endoprosthesis without suturing the defect with mobilization of the rectus abdominis muscle sheaths according to Ramirez + DLE (for abdominoptosis)	47 (24)*	59.5
2nd subgroup	Implantation of an onlay endoprosthesis without suturing the defect with mobilization of the rectus abdominis muscle sheaths according to Ramirez + Mobilization of the aponeurosis (i.e., the anterior wall of the rectus abdominis muscle) along the perimeter of the hernial defect + DLE (for abdominoptosis)	32 (17)*	40.5
Total		79	100

*Note: * in brackets is the number of patients who underwent dermatolipidectomy.*

Technically, the method combined component separation according to Ramirez with the formation of viable aponeurotic flaps on a feeding pedicle: after mobilization of the rectus muscles, circular mobilization of the aponeurosis was performed along the perimeter of the defect (approximately 6–7 cm on both sides), flaps were formed while maintaining the blood supply (Fig. 1), they were brought together and sutured “edge to edge”, creating a closed aponeurotic layer (Fig. 2), after which a polypropylene mesh was fixed over the restored aponeurosis using the “onlay” type (Fig. 3). Pathogenetically, this made it possible to close a super-large defect without critical tension and a relative decrease in the capacity of the abdominal cavity, thereby reducing the risk of clinically significant intra-abdominal hypertension and compartment syndrome, and also provided a barrier isolation of the implant from intestinal loops, which was considered as a mechanism for preventing adhesions and fistula complications in the long term.

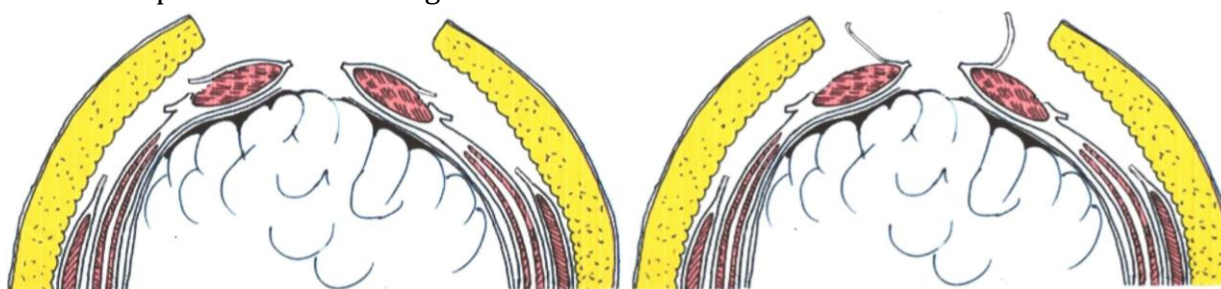


Fig. 1. Mobilization of the aponeurosis (i.e. the anterior wall of the rectus abdominis muscle) along the perimeter of the hernial defect

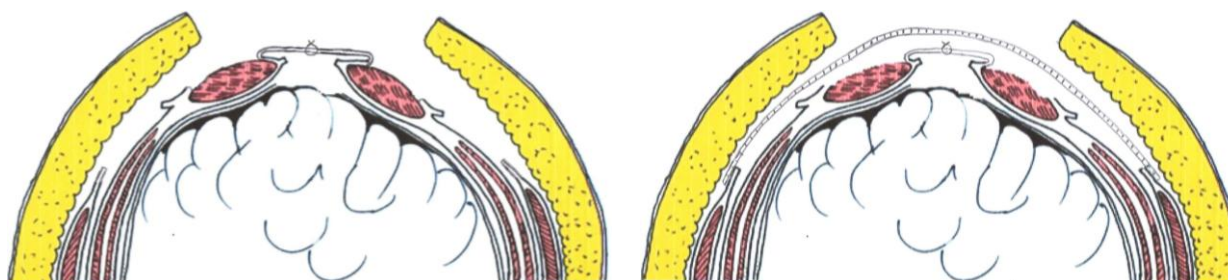


Fig. 2. Comparison of the edges of the formed flaps “edge to edge” and joining them together with a continuous suture

Fig. 3. Fixation of a polypropylene mesh over the mobilized muscles and restored aponeurotic layer using the “on” method lay »

Study results. In the early postoperative period, gastrointestinal function remained satisfactory in most patients; intestinal paresis was observed in 3 patients (2 in the comparison group and 1 in the study group) and was treated conservatively. Extra-abdominal complications (bronchopulmonary and cardiovascular) were more frequently recorded in the comparison group; abdominal compartment syndrome was detected in 1 patient (1.7%) only in the comparison group, which is consistent with the risk of a transient increase in IAP during reconstruction of large and giant defects. The pattern of wound complications was also more unfavorable in the comparison group (hematomas, seromas, lymphorrhea, isolated suppuration), and a combination of 2-3 complications in one patient was often observed.

Overall, complications in the early postoperative period were observed in 11 of 58 patients in the comparison group (18.9%) and in 7 of 79 in the main group (8.9%); the reduction in the overall complication rate in the main group was statistically significant ($\chi^2=4.043$; $p=0.045$). Dynamic monitoring of intra-abdominal pressure confirmed its transient increase at the stages of hernia content reposition and plastic surgery; however, the use of tension-free technologies with component mobilization according to Ramirez and aponeurosis mobilization (in 32 patients in the main group) reduced the risk of clinically significant intra-abdominal hypertension and associated respiratory/hemodynamic disorders.

In the long-term period (1–5 years), the results were studied in 98 of 137 patients (71.5%); relapses were detected in 6 (6.1%), including 5 of 44 (11.4%) in the comparison group and 1 of 54 (1.8%) in the main group (Table 2).

Table 4.4

Ventral hernia recurrence rate

Study groups		Type of operation					
		Implantation of an “onlay” endoprosthesis without suturing the defect		Implantation of an onlay endoprosthesis without suturing the defect with mobilization of the rectus abdominis muscle sheaths according to Ramirez		Implantation of an onlay endoprosthesis without suturing the defect with mobilization of the rectus abdominis muscle sheaths according to Ramirez + Mobilization of the aponeurosis along the perimeter of the hernial defect	
Comparison group (n=44)	Traced	37		7		-	
	Relapse	5	13.5	0	0.0	-	-
Main group (n=54)	Tracked	-		29		25	
	Relapse	-	-	1	3.4	0	0.0

Total (n=98)	Tracked	37		36		25	
	Relapse	5	13.5	1	2.8	0	0.0

Conclusions. The use of a modified method of tension-free hernioalloplasty in patients with large and giant ventral hernias, based on a combination of component separation according to Ramirez with the formation of aponeurotic flaps on a feeding pedicle and the creation of a barrier aponeurotic layer between the implant and visceral structures, ensured a reliable improvement in both immediate and long-term treatment results: the overall incidence of early postoperative complications decreased from 18.9% in the comparison group to 8.9% in the main group ($\chi^2=4.043$; $p=0.045$), including a decrease in wound complications from 10.3% to 5.1% and extra-abdominal complications from 8.6% to 3.8%, while cases of compartment syndrome were noted only in the comparison group (1.7%) and were absent in the main group. In the long-term period (1–5 years), the relapse rate decreased from 11.4% (5 of 44) to 1.8% (1 of 54)..

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