Clinical research

SURGICAL TREATMENT OF GIANT, COMPLEX VENTRAL HERNIAS

Component Separation Technique (CST) of large, giant postoperative hernias of the anterior abdominal wall. 5 years of experience of Gidmed LLC

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Objective: To evaluate the effectiveness and implementation of a new surgical method for the treatment of large, recurrent, and complex ventral hernias (hernia defect horizontal diameter >8–10 cm)—namely, anterior abdominal wall component separation reconstructive plasty (anterior, posterior, and hybrid approaches)—at "Guidmed" Clinic.

Materials and Methods: The essence of the method consists of the elimination of giant and complex hernias through separation of the anatomical components of the anterior abdominal wall, followed by reconstructive component separation with mesh reinforcement. Over the past five years, 54 patients underwent surgical treatment using anterior component separation technique (ACST), posterior component separation technique (PCST), or a hybrid approach.

The study evaluated the necessary conditions for surgical management of complex hernias (as surgery is not indicated in all cases), the essential factors contributing to hernia development, and the required technical aspects of anterior, posterior, and hybrid component separation reconstruction. The clinic developed its own hybrid component separation reconstructive technique. Between 2019 and 2025, 54 operations were performed at "Guidmed" Clinic for large, complex, and postoperative ventral hernias (w >8–10 cm). Of these, 32 were performed using anterior component separation (ACST); 10 using posterior component separation reconstruction (GCST), including 6 according to the Carbonell method and 4 according to the Novitsky method; and 12 using a hybrid approach (sublay technique combined with fasciotomy). Recurrence occurred in 3 cases.

Conclusion: Anterior, posterior, and hybrid component separation reconstructive techniques are all acceptable, modern, and reliable methods for the surgical treatment of large and complex ventral hernias (w >8–10 cm). However, the choice of technique should be individualized based on the patient's general condition, comorbidities, age, disease duration, surgeon's expertise, and optimal timing of surgery. In cases of recurrence, regardless of the method used in the initial operation, posterior component separation—particularly GCST and TAR techniques—should be preferred for reoperation.

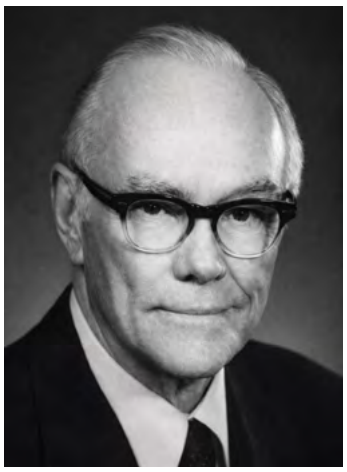
Key words: hernia, giant hernia, complex ventral hernia, CST (component separation technique)

INTRODUCTION:

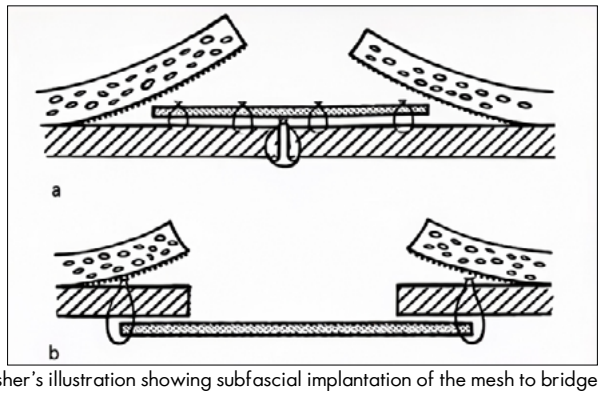
Surgical treatment of hernias spans more than a century. However, despite this, it remains problematic today, especially the surgical treatment of large and postoperative ventral hernias, because it is often associated with a sharp reduction in the total volume of the abdominal cavity, which in turn leads to a disruption in the normal functioning of vital systems and, no less importantly, difficulties in operating. In the USA, on average, 1 million surgeries are done per year due to hernias of the anterior abdominal wall. The increase in quantity was caused by the generally higher number of laparotomies, which was driven by advances in diagnostic technologies, anesthesiology, and postoperative intensive care. In the same USA, according to registry data, 11-19% of hernias develop after laparotomy per year, which is an average of 350,000 operations. For comparison, 400,000 cholecystectomies are performed each year. (According to registry data, 15% of the population on our planet develops a hernia, and 13% develops calculous cholecystitis) [1, 2, 3].

A big part of the operations is done with the diagnosis of postoperative and recurrent hernias. According to many authors' data, the rate is 10-60%, and the majority of recurrences occur during the first year after surgery. The recurrence rate after surgery for large giant hernias is 53%. Therefore, great importance is attached to modern tactics [4] and the mastery of complex surgical techniques to meet the main requirement: reducing postoperative recurrence and improving quality of life [5, 6].

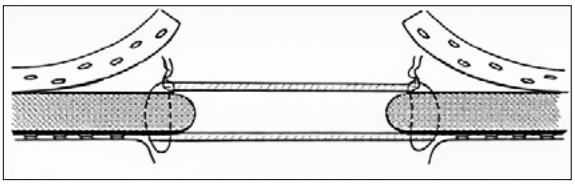
The history of surgical treatment of hernias includes several stages. In the first stage, plastic surgery was performed using the patient's own tissues, based on the mandatory tightening of the latter. This latter was proportional to the size of the hernial orifice, of course, plastic surgery of large hernias using only local tissues was often impossible, because internal pressure of abdomen was sharply increased by such plastic surgery, which used to end up with the possible development of abdominal compartment syndrome and fatal complications (respiratory failure, distress, cardiovascular failure, thromboembolism, obstruction, etc.). That is why managing the operation of so-called



Francis Usher (1908–1988), a pioneer in the development of polypropylene prosthetic mesh and its use in difficult hernia operations. Courtesy of Drs. Rosenberg, Shul, and Jordan, Houston, Texas.



Usher's illustration showing subfascial implantation of the mesh to bridge a muscle defect. (a) is similar to the previous, noted early retraction of suture closure from the external oblique. Reprinted from Arch Surg. 1961;83:8, by permission from Excerpta Medica Inc.



Reprinted from Arch Surg, 1961;82:87, by permission (Copyrighted 1961, American Medical Association). Usher's illustration of bilateral Marlex mesh bridging of a muscular defect. Again, he pioneered a technique which is same as that employed today.

Figure 1. Usher F. (Hernia repair with Marlex mesh Usher, Francis C. et al. Surgery, Volume 46, Issue 4, 718 - 724)

big, giant, mainly post-surgical recurrent hernias was frequently impossible [7, 8].

Second stage, in other words, a new era in plastic surgery of Hernia began in 1950 (non-massive), when Francis Usher first used an organic prosthesis to close a ventral hernia defect. After this, with the development of prosthetic material production and improvements in its quality, its use began in USA and then in Europe in the 1970s. Today, up to 4 million meshes are used worldwide each year for this purpose [9] (Figure 1).

Lichtenstein and his clinic have made great contributions to improving the tactics and procedures for the surgical treatment of hernias. They distinguish the following forms of ventral hernia mesh repair (Figure 2):

Onlay - The mesh is sutured to the external surface of the rectus muscle aponeurosis.

Inlay - The mesh is sutured to the inner surface of the aponeurosis, between the rectus muscle and the aponeurosis.

Underlay - The mesh is sutured beneath the rectus muscle, between the muscle and the posterior layer of the aponeurosis (which is often inseparable from the parietal peritoneum and therefore referred to as the "sublay").

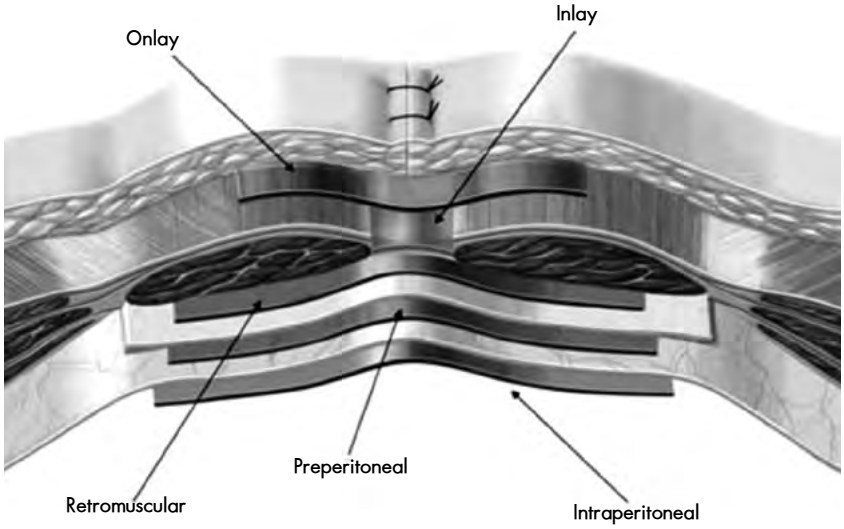


Figure 2. EuraHS terminology of mesh positions during ventral hernia (F.E. Muysoms et al., 2012)

Sublay - The mesh is sutured beneath the posterior aponeurotic layer of the rectus muscle, between it and the parietal peritoneum.

Interperitoneal - The mesh is sutured on the inner side of the parietal peritoneum.

Our work concerns large (giant), postoperative hernias - the so-called "complex hernias". The classification proposed by Chevrelle and Rath in 2000 was recognized and adopted by the EHS Incisional Hernia Classification. According to this classification, the characteristic parameter of the hernia size was the transverse, horizontal, and not the longitudinal (vertical) size of the hernial orifice. According to this classification (according to transversal size of the hernias after surgery), W1- 4-5 cm – small and average size, W2 – 4-8 cm average and big; W3 – more than 10 cm - big (giant); Hernias according to localization - Middle (M), Lateral (L), Merged (Combined ML); Also, the increase in the number of laparoscopic surgeries in the 20th century led to the addition of so-called trocar site hernias, and if they are multiple, they are classified as complex hernias. In 2009, the XXXVI Conference of the European Association of Herniologists included multiple hernias of the anterior abdominal wall in the group of complex hernias [10, 11, 12] (picture 3 - A,B,C and picture 4).

Later, the study of the frequency and clinical course of operations has allowed us to explain the mechanisms of complications with postoperative hernias (hernia disease is caused by a violation of the complex muscle-fascia-muscle synergism, resulting from inhibition of collagen metabolism combined with mechanical impact). As a result, the development of a hernia occurs due to damage to the fascia. [14.] Today, it is no longer controversial thatfor the operation of large, postoperative hernias, it is not enough to know only the transverse size of the hernial orifice; in addition, the degree of abdominal reduction (displacement of visceral organs into the hernia sac), genetic predisposition, immunodepression, duration of the disease, concomitant diseases, and increased intra-abdominal pressure (IAP) 1 are of great importance. Therefore, most surgeons believe that a combination of factors causes hernia development, and it is now called hernia disease. Classical methods of operation for a giant hernia

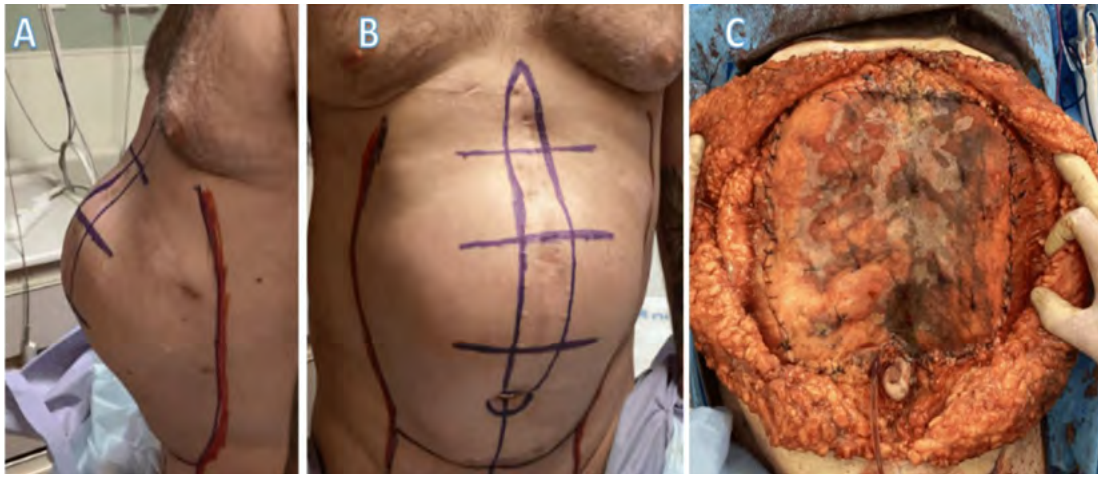


Figure 3.

Figure 4.

include the sublay and onlay techniques. In such a case, plastic surgery with tightening does not yield the desired result because the return of the protruding organs into the abdominal cavity increases intra-abdominal pressure, or, in other words, intra-abdominal hypertension, which leads to the development of compartment syndrome and organ dysfunction [15,16]. In this regard, the inlay method of surgery, as a non-stretching plastic of the anterior abdominal wall, was considered a relatively better method, although the intra-abdominal pressure (IAP) with this method cannot always remain within the desired limits (its optimal values are 8-13 mm.Hg; However, some surgeons believe that the operation can be completed with a thickness of 18 mmHg (this corresponds to 30 mm of water column).

The third stage of ventral hernia repair has arrived. Previous surgeries failed to restore the anatomical and functional integrity of the anterior abdominal wall muscles. The rectus muscles remain laterally stretched and immobile, and, as a result, atrophy and lose function. Over time, the structure and metabolism of the muscles and connective tissue change. Unfortunately, chronic inflammation develops at the site of implant-tissue contact, preventing the formation of connective tissue and leaving the muscle tissue incomplete. Therefore, in cases of large and postoperative hernias, it is very difficult to achieve the desired results with the generally accepted hernioplasty techniques (Onlay and Inlay) [17] (Figure 5).

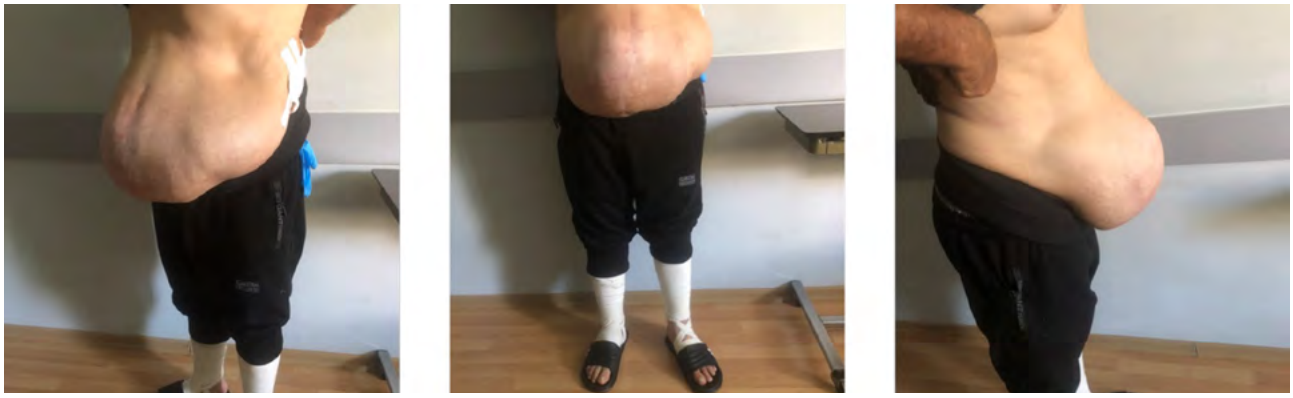


Figure 5.

Considering reliability and anatomical and functional properties, an intervention is acceptable when we restore the muscular-aponeurotic apparatus of the anterior abdominal wall, close to the true anatomical structure, by implanting a mesh of appropriate size while maintaining the normal volume of intra-abdominal pressure. This approach is now called separation reconstruction of the anterior abdominal wall (Abdominal wall reconstruction - VWR). This method is based on the separation of the anatomical components of the anterior wall and the surgical technique (components separation technique – CSI) [18]. A distinction is made between anterior (anterior components separation technique – ACST) and posterior (posterior components separation technique – PCST) separation [19, 20, 21]. A Mexican plastic surgeon proposed the first one – Ramirez [22, 23] with a mesh and without a mesh (Figure 6).

Moreover, the second one, posterior wall separation, is relatively new. It was proposed in 2008 that Carbonell A and a group of authors were the first to publish their work in the journal Hernia, where, along with the division of the anterior abdominal wall components, dissection of the deep layers was provided, and it was called the posterior separation method as a whole [24]. Unlike standard dissection of the retromuscular space, here, regardless of the size and number of hernial orifices, the muscles are completely dissected, the space between the internal oblique and transverse muscles is precisely identified and entered smoothly, with maximum preservation of the epigastric perforant nerves and blood vessels.

In 2012–2013, the group of USA surgeons under the leadership of Novitsky Y.W. developed and put into practice a relatively modernized surgical method called transversus abdominis release (TAR) [25]. Unlike the Carbonell method, it requires a vertical dissection of the lateral edge of the posterior rectus sheath and the transverse muscle, thereby achieving maximum mobility of the rectus, transverse, and aponeurotic-fascial plate (Figure 7).

Nowadays, this method is considered a leading approach for prosthetic repair of large ventral hernias. Most authors agree that posterior abdominoplasty reduces the number of recurrences and other complications and maintains functional integrity [26]. However, over time, the transverse muscle atrophies, while the internal oblique and rectus muscles hypertrophy (in a compensatory manner). When comparing anterior and posterior separations, wound complications, bleeding, hematoma, and seroma are of particular concern during ACST. However, according to data from some surgeons, there is no significant difference in recurrence rates between ACST and PCST [27] (Figure 8, 9).

Therefore, it remains unequivocal that treating giant and postoperative hernias only with the TAR method, due to the complex surgical intervention and large volume of the operation, will probably not be correct.

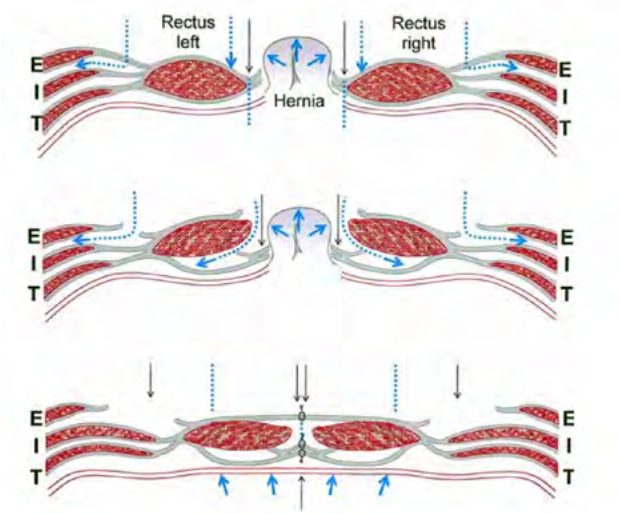


Figure 6. Components of anatomic separation technique by Ramirez modified after "Reoperative Aesthetic and Reconstructive Plastic Surgery" by James C. Grotting, Vol. II, 1995. Transversal view. E - external oblique muscle, I - internal oblique muscle, T - transversus abdominis muscle.

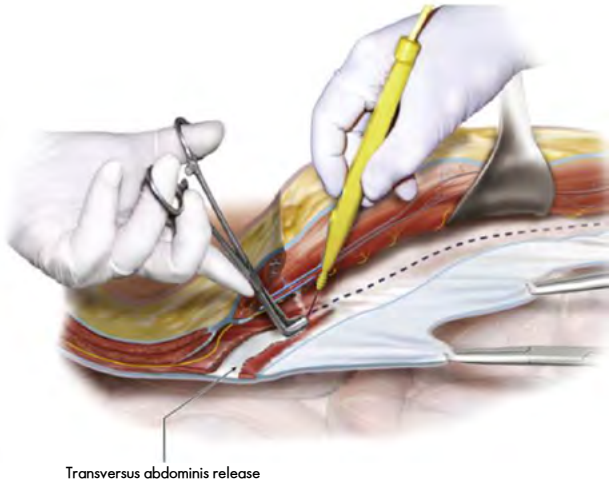


Figure 7. The transversus abdominis muscle is divided (Reprinted with permission from Novitsky Y.W.).

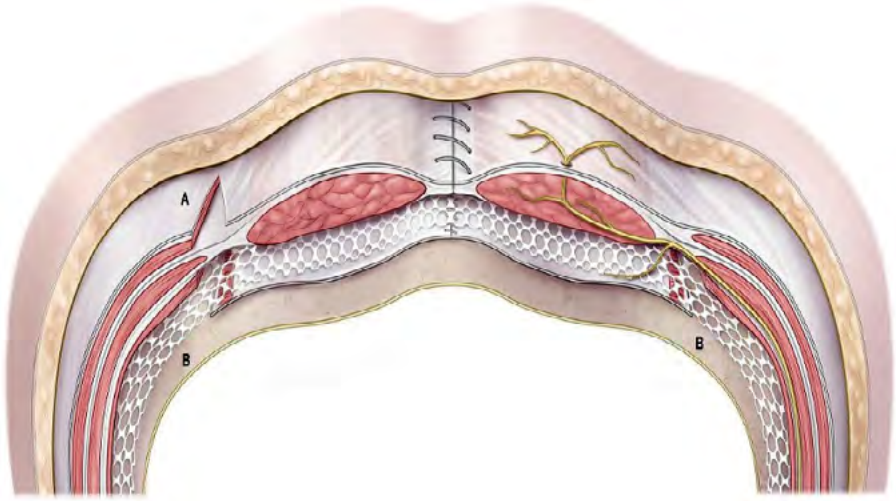


Figure 8. Schematic drawing of endoscopic component separation technique (A) and transversus abdominis release (B) (Scheuerlein, Hubert & Thiessen, Andreas & Schug-Paß, Christine & Köckerling, Ferdinand. (2018). What Do We Know About Component Separation Techniques for Abdominal Wall Hernia Repair?. Frontiers in Surgery. 5. 24. 10.3389/fsurg.2018.00024)

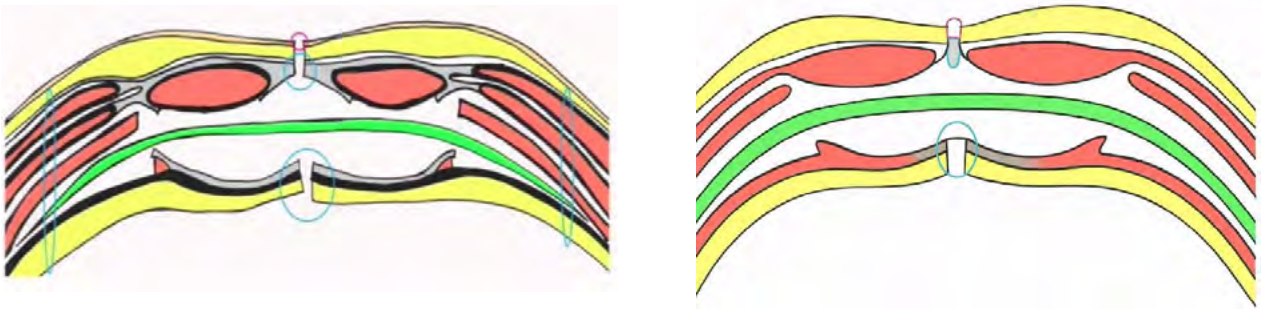


Figure 9. Diagram of TAR separation plastic and mesh arrangement (green) - (a) ACST (Anterior Component Separation Technique); (b) PCST (Posterior Component Separation Technique)

Therefore, today, many surgeons, taking into account the patient's age, comorbidities, and risks, favor hybrid separation reconstruction, which includes elements of both anterior and posterior separation, as well as sublay and inlay. Moreover, recent data indicate that many surgeons believe that operations performed with different CST variants yield approximately the same results when assessing quality-of-life parameters. In this regard, they are approximately equal.

As a result of modern data analysis, the optimal method for large and postoperative hernias has been identified: anterior wall reconstruction with separate prosthetic material, where the prosthesis is placed intramuscularly or, in exceptional cases, intraperitoneally, if an appropriate adhesive-coated mesh is available. TAR plastic surgery, which has been increasingly used recently, is a technically challenging surgical intervention that requires impeccable surgical technique, detailed knowledge of abdominal anatomy and its variants, and meticulous adherence to the sequence of surgical stages. All methods of TAR plastic surgery are effective, but today it is clear that PCST (Pectus Carinatum Surgery Technique) has advantages over ACST (Anterior Wall Ramirez) plastic surgery. PCST has difficulties and challenges for wider use, so many surgeons prefer ACST (Ramirez reconstruction), but in case of hernia recurrence, they definitely prefer PCST. The issue is complex, so further studies are necessary to provide medical evidence for the concept of separating plastic. Especially since during PCST and intraperitoneal mesh placement, the intra-abdominal pressure (IAP) is evenly distributed over every cm2 of the anterior wall and, compared to ACST, the weak areas of the plastic are more protected; however, at present, the consensus is that W1 and W2 can be repaired laparoscopically and with ACST whenever possible, while complex hernias larger than 10 cm, i.e., W3, can only be repaired with GCST [28].

Purpose of work: Introduction of a relatively new surgical procedure, separation reconstruction, for the surgical treatment of large, giant postoperative hernias at the clinic "Gidmedi". Comparative analysis of anterior, posterior, and hybrid abdominal wall separation reconstruction—5-year follow-up of 54 patients after surgery, comparative analysis of results, short-term and long-term outcomes.

Patients and type of surgeries: In 2019-2024, we performed surgery on 54 patients with giant, postoperative, recurrent hernias of the anterior abdominal wall. (w>8-10cm) Age from 30 to 74, men - 32, women - 17.

Types of plastic:

1. Anterior separation reconstruction was performed in 32 patients, 7 of them with the Ramirez method, 25 of them with the Ramirez method added to fasciotomy with our modification;
2. Posterior separation reconstruction -10, 6 of them with the Carbonell method and 4 of them with the Novitsky method;
3. With the hybrid method – 12, by the Sublay or Ramirez method, plus fasciotomy.

All operations were performed according to current requirements, namely:

1. Intra-abdominal pressure was measured before, during, and after the operation with a catheter inserted into the bladder;
2. In all cases, the muscles constituting the anterior wall were repositioned, i.e., returned to their normal anatomical-topographic location, and
3. inea alba was restored.

The postoperative period was satisfactory: In 1 case, the wound was complicated by hematoma, in 3 cases by seroma. In 2 patients, recurrence occurred (the operation was performed with anterior separation). In one, it was caused by a violation of the mesh's integrity along its entire length; in the other, by mesh shrinkage and detachment on one side. In both cases, posterior separation reconstruction was performed, with positive results. We also performed posterior reconstruction separation (TAR) plasty (not the Sabley method plasty performed by us - complicated by intestinal adhesions and microperforations).

Anterior separation

Ramirez's method, or in other words, Spiegel's, which involves incising the skin up to the crescent line and dissecting the subcutaneous fatty tissue and aponeurosis. If intra-abdominal pressure (IAP) does not decrease to 20 mmHg, the aponeuroses of both rectus muscle sheaths are dissected along their entire length. 30 x 30 cm mesh is placed on the line, and it is fixed on the aponeurosis with knotted sutures, with necessary fixation on the edges of the dissected aponeurosis.

Posterior separation

1. With the **Carbonell method**. After the hernia sac is isolated and incised, the rectus muscles on both sides are dissected from the posterior layer and the parietal peritoneum (in cases of long-standing or giant hernias, separation of the inferior rectus sheath and the parietal peritoneum is usually impossible). The lateral edge of the sheath is incised laterally and with an upper direction, and the internal oblique and transversus abdominis muscles are bluntly separated (using the fingers). A 30 x 30 cm mesh is placed (after suturing the peritoneum) lower to the rectus muscle and laterally from it, on both sides, between the transverse and internal oblique muscles; the mesh is fixed with several transmuscular sutures.
2. With **Novitsky method** - initially, similar to Carbonell's method, but after dissecting the lateral edges of the rectus muscle in an upward direction, the transverse muscle is very carefully dissected (by cutting small parts with a dissector), which leads to the maximum reduction of tension in the anterior abdominal wall and, as a result, a decrease in intra-abdominal pressure. The mesh is fixed with three strips cut out on both edges of

a 30x30 cm mesh, which protrude over the external aponeurosis and are secured to it with knotted sutures.

Hybrid method

We performed the following procedure: mostly mesh transplantation using the Sabley or Ramirez method, plus fasciotomy; the aponeurosis covering both rectus muscle sheaths was vertically dissected, and additional mesh pieces were placed. This prevented extensive layering of the skin and subcutaneous tissue, thereby protecting the patient from extensive damage to blood vessels and nerve trunks.

The necessary conditions for applying all the rules were the following:

1. Intra-abdominal pressure should not exceed the permissible norm (18-24 mm Hg);
2. Restoration of the linea alba;
3. Return of the muscular-fascial apparatus of the anterior wall to the geographical anatomical boundaries and maximum restoration of elasticity;
4. Maximum sparing of perforating blood vessels and nerve fibers.

CONCLUSIONS AND RECOMMENDATIONS:

1. A modern and reliable method for the surgical treatment of large and postoperative, complex hernias (W > 10 cm) should be considered for the reconstruction of the anterior abdominal wall with separation of the constituent muscles and aponeurosis.
2. The type of separation reconstruction should be determined based on a detailed study of the patients' vital systems (metabolic disorders: obesity-mass index, diabetes, respiratory, cardiovascular, and respiratory system conditions, age).
3. The patient should be aware that the recurrence rate increases after each operation (estimated at 39%-80% for the 3rd operation), and the surgeon should not always offer the patient surgery for a giant hernia (W>10 cm). There are hernias whose plastic surgery is not correct and should not be performed.
4. The main criteria for the surgical treatment of giant hernias, whether anterior, posterior, or hybrid separation, are: 1. Maintaining intra-abdominal pressure (15-30 mmHg) within the normal range; 2. Restoring the linea alba; 3. Restoring the anatomical geography of the muscles and aponeurotic apparatus that make up the anterior abdominal wall, and restoring maximum elasticity.
5. Before, during, and after separation reconstruction surgery, constant monitoring of intra-abdominal pressure is crucial. In our case, 18-24 mmHg (for reference, 18 mmHg corresponds to 30 water column) was the optimal pressure.
6. Separate reconstruction, especially posterior TAR-plasty, is a technically difficult operation and requires meticulous execution of an approved protocol, which is possible with good knowledge of the anatomy and topography of the anterior abdominal wall and reliable experience of the surgeon.
7. Depending on the patient's general condition, concomitant diseases, and the size of the domain (visceral organ reduction), the surgeon chooses the type of separation plastic surgery (anterior, posterior, or hybrid). However, in the case of recurrence, we agree that it is better to perform reconstructive plastic surgery via posterior separation.
8. Anterior abdominal wall reconstruction performed using the posterior separation technique (GCST, TAR) often provides better results in terms of muscle repositioning, linea alba restoration, and aesthetic effect compared to ACST plastic surgery.
9. Anterior abdominal wall plastic surgery with anterior separation plus fasciotomy (the Ramirez and Sabley procedure plus longitudinal incisions of the external aponeurotic plate of the rectus muscle - "Gidmedi" modification) is a justified surgery in aggravating circumstances (age, concomitant diseases), because we achieve the desired result in a relatively short time and with less trauma.
10. Plastic surgery, in addition to fasciotomy, allows us to protect the aponeurosis from extensive tearing, which in itself protects us from extensive damage to perforated blood vessels and nerve fibers.
11. All three methods of separation have complications. Anterior separation has complications more frequently, posterior separation has fewer, but more difficult outcomes (adhesions of the internal organs of the abdominal cavity with the development of erosions, perforations, and fistulas - 1)
12. The involvement of an anesthesiologist along with the surgical team is very important. Complete and continuous anesthesia is necessary for the first three days.
13. The modern method of surgical treatment of giant hernias - separation, reconstructive plastic of the anterior abdominal wall is truly considered the most reliable and acceptable operation today. All its types (anterior, posterior, and hybrid methods) are acceptable, taking into account the patient's general condition and the qualification of the surgical team. In Europe and USA, these operations are classified as category 5 in terms of complexity and are priced at the level of a hemicolectomy. In our country, it is equated with a linea alba hernia, and its meager funding does not correspond to the cost of a 5-hour, technically difficult operation. This is precisely why surgeons are less interested in these operations. Separate Diagnosis-related group (DRG) codes with adequate costing are necessary for such operations.

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გიგანტური, რთული ვენტრალური თიაქრების ქირურგიული მკურნალობა

მუცლის წინა კედლის დიდი ზომის, გიგანტური პოსტოპერაციული თიაქრების სეპარაციული პლასტიკა (CST). შპს „გიდმედის“ 5 წლიანი გამოცდილება

გივი ჩიქობავა, ამირან ანთაძე, ნინო ჩიქობავა, მალხაზ ჩუბინიძე

საქართველო-ისრაელის ერთობლივი კლინიკა „გიდმედი“

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რეზიუმე

მიზანი: დიდი ზომის, რეციდიული რთული ვენტრალური თიაქრების (თიაქრის კარის ჰორიზონტალური დიამეტრი 8-10სმ-ზე მეტი) ოპერაციული მკურნალობის ახალი მეთოდის - მუცლის წინა კედლის სეპარაციული რეკონსტრუქციული პლასტიკის (წინა, უკანა, ჰიბრიდული) ეფექტურობისა და დანერგვის შესახებ კლინიკა „გიდმედში“.

მასალა და მეთოდები: მეთოდის არსი შემდგომში მდგომარეობს - გიგანტური, რთული თიაქრების ლიკვიდაცია და პლასტიკა მუცლის წინა კედლის შემადგენელი ანატომიური კომპონენტების გამოყოფით და შემდგომი სეპარაციული რეკონსტრუქციული პლასტიკა, ბადის გამოყენებით. ბოლო 5 წლის განმავლობაში 54 პაციენტს ჩაუტარდა წინა ACST (anterior components separation technique), უკანა PCST (posterior components separation technique) და შერეული წესით. შესწავლილი იქნა რთული თიაქრის ოპერაციული მკურნალობის აუცილებელი პირობები (ყველა შემთხვევაში არ შეიძლება ოპერაციის გაკეთება), თიაქრის განვითარების აუცილებელი ფაქტორები, აუცილებელი ტექნიკა წინა, უკანა და ჰიბრიდული წესით სეპარაციული რეკონსტრუქციისა. დამუშავდა კლინიკის საკუთარი მეთოდი შერეული სეპარაციული რეკონსტრუქციისა, 2019 წლიდან 2025 წლამდე კლინიკა „გიდმედში“ წარმოებული იქნა 54 ოპერაცია დიდი ზომის, რთული და პოსტოპერაციული თიაქრების (w>8-10სმ) გამო. აქედან 32 მუცლის წინა სეპარაციული (ACST) პლასტიკის წესით; 10 - უკანა სეპარაციული რეკონსტრუქციით (GCST), 6 – კარბონელის და 4 - ნოვიცკის წესით; 12 - ჰიბრიდული წესით (საბლეის მეთოდი + ფასციოტომია), 3 შემთხვევაში განვითარდა რეციდივი.

დასკვნა: დიდი და რთული თიაქრების (w>8-10სმ) ქირურგიული მკურნალობის თანამედროვე, სწორ და სანდო მეთოდად სამივე წესი - მუცლის წინა კედლის წინა, უკანა და ჰიბრიდული სეპარაციული რეკონსტრუქცია მისაღებია, მაგრამ თვითეული წესი უნდა განისაზღვროს პაციენტის ზოგადი მდგომარეობის, თანმხლები დაავადებების, ასაკის, დაავადების ხანგრძლიობის, ქირურგის კვალიფიკაციის და ოპერაციისათვის საჭირო ოპტიმალური დროის მიხედვით. რეციდივის შემთხვევაში არა აქვს მნიშვნელობა რომელი წესითაა წინა ოპერაცია შესრულებული, განმეორებითი ოპერაციისას უპირატესობა უნდა მიენიჭოს მუცლის წინა კედლის უკანა სეპარაციულ პლასტიკას, GCST და TAR პლასტიკას.

საკვანძო სიტყვები: ვენტრალური თიაქარი, რეციდიული რთული ვენტრალური თიაქარი, მუცლის წინა კედლის სეპარაციული რეკონსტრუქციული პლასტიკა