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Integrating Aesthetic and Reconstructive Surgery: A Case Report on Abdominoplasty with Polypropylene Mesh for Rectus Diastasis and Ventral Hernia Repair

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ABSTRACT

Background: Rectus abdominis diastasis (RAD) is the excessive widening of the midline separation between rectus abdominis muscles, commonly seen in postpartum women and middle-aged men with central obesity. Severe cases can cause abdominal wall dysfunction and ventral hernias, necessitating surgical intervention. This report highlights a collaborative approach integrating aesthetic and functional reconstruction.

Case Report: A 41-year-old woman presented with persistent abdominal bulging after her third vaginal delivery. A CT scan confirmed a 7 cm RAD with a ventral hernia. Given the need for both functional repair and cosmetic enhancement, a multidisciplinary team performed the surgery. The plastic surgery team began with an abdominoplasty incision, followed by the digestive surgeon's laparotomy for abdominal wall reconstruction with polypropylene mesh. The procedure concluded with aesthetic refinement by the plastic surgeon. The patient recovered well, with significant symptomatic improvement and no complications.

Discussion: This case emphasizes the value of an interdisciplinary approach in managing RAD with ventral hernias. Combining abdominoplasty with mesh-reinforced repair offers both functional and aesthetic benefits. Mesh reinforcement ensures durability and prevents recurrence, making it superior to suture plication alone. Collaboration between plastic and digestive surgeons enables comprehensive restoration of abdominal wall integrity while achieving optimal cosmetic outcomes.

Conclusion: A combined surgical approach using abdominoplasty and polypropylene mesh reinforcement effectively addresses both functional and aesthetic concerns in RAD with ventral hernia, ensuring long-term structural integrity and enhanced patient satisfaction.

KEYWORDS: Diastasis recti, Ventral Hernia, Abdominoplasty, Polypropylene Mesh.

INTRODUCTION

Abdominal wall weakness can result from various factors, including trauma, tumor resection, recurrent or incisional hernias, and prolonged intra-abdominal pressure. These conditions may lead to the development of ventral hernias or rectus abdominis diastasis (RAD), a separation of the rectus abdominis muscles due to the widening of the linea alba[1]. RAD is defined as an excessive midline separation exceeding 2 cm and is commonly observed in middle-aged and older males with central obesity, as well as in women during and after pregnancy [2,3]. The prevalence of rectus diastasis is significant, reaching up to 66% in women during the third trimester of pregnancy, with a postpartum persistence rate ranging from 30% to 60% [4].

The severity of RAD varies, and in more advanced cases, it can lead to functional impairments, core instability, aesthetic concerns and complications, such as abdominal organ herniation. One common complication is the development of umbilical or periumbilical hernia, a type of ventral hernia that develops at or near the umbilicus. Unlike pediatric umbilical hernias, which often resolve spontaneously, umbilical hernias in adults tend to enlarge over time and carry a higher risk of strangulation, where compromised blood supply to the herniated tissue can lead to necrosis. In postpartum women, severe rectus diastasis may contribute to the formation of umbilical hernias, underscoring the need for timely surgical intervention [5].

The presence of ventral hernias in patients with specific comorbidities further complicates surgical decision-making. Patients with conditions such as cirrhosis, those undergoing renal dialysis, and women of reproductive age present unique challenges when

formulating an appropriate treatment plan. In particular, individuals with concurrent rectus diastasis and ventral hernia require a tailored surgical approach that addresses both functional and structural abdominal wall deficits [6]. Surgical management of rectus diastasis primarily involves two techniques: plication, in which the separated muscles are sutured together, and mesh reinforcement, which provides additional structural support. Both approaches can be performed via traditional open surgery or minimally invasive techniques, with the optimal choice depending on the severity of the diastasis and patient-specific factors. Given that rectus diastasis has been identified as a potential risk factor for recurrent herniation, mesh reinforcement is increasingly recommended for long-term durability [7]. This case report presents a comprehensive surgical approach integrating abdominoplasty with laparotomy-assisted polypropylene mesh reinforcement for rectus diastasis repair associated with ventral hernia. This combined technique not only restores abdominal wall integrity but also optimizes aesthetic outcomes, offering both functional and cosmetic benefits to the patient.

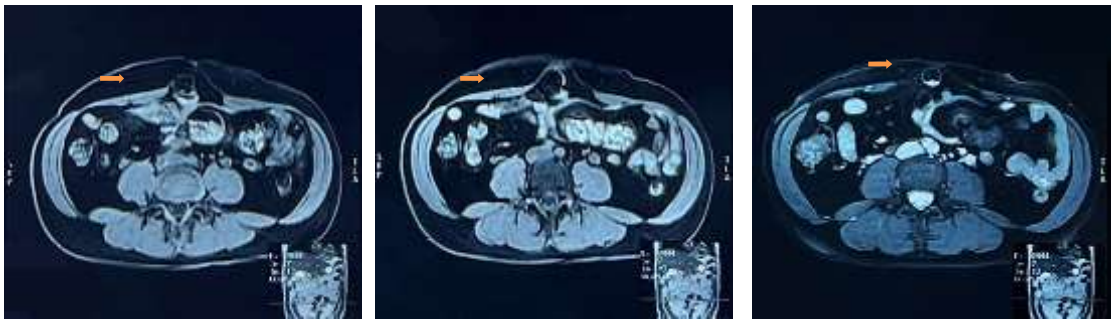
CASE PRESENTATION

A 41-year-old woman presented with persistent abdominal bulging following multiple pregnancies. Despite postpartum weight reduction, she experienced ongoing abdominal wall protrusion (**Figure 1**). Physical examination revealed a midline abdominal wall defect, and computed tomography (CT) imaging demonstrated thinning and stretching of the linea alba with an inter-recti distance of 7 cm, confirming rectus abdominis diastasis with ventral hernia (**Figure 2**). The patient had no significant past medical history.

(a) (b) (c)

Figure 1. Preoperative clinical presentation demonstrating significant abdomin al wall bulging in the patient.

Preoperative clinical images reveal a noticeable midline abdominal protrusion, indicative of rectus diastasis and potential fascial weakness. The bulging is most prominent in the central abdominal region, which corresponds to the separation of the rectus abdominis muscles. These images serve as a reference for the patient's baseline presentation prior to surgical correction.



(a) (b) (c)

Figure 2. Preoperative computed tomography (CT) imaging of the abdomen, highlighting three specific regions: (a) superior to the umbilicus, (b) at the level of the umbilicus, and (c) 2 cm inferior to the umbilicus.

Preoperative CT imaging provides a cross-sectional view of the abdominal wall, clearly demonstrating the separation of the rectus abdominis muscles and widening of the linea alba at different anatomical levels

Surgical Procedure

The surgery was performed under general anaesthesia with the patient positioned in supine position. Prophylactic antibiotics were administered, and an urinary catheter was placed before the procedure.

The plastic surgery team began by designing an abdominoplasty incision. To minimize intraoperative bleeding, a local anaesthetic solution containing lidocaine and epinephrine was injected at the incision site. The incision was then made down to Scarpa's fascia, exposing the underlying tissue layers. The abdominal skin flap was carefully elevated toward the xiphoid process while ensuring preservation of the umbilicus. Afterwards, the digestive surgery team proceeded with a midline laparotomy, carefully dissecting down to the peritoneum. A polypropylene mesh was inserted to reinforce the weakened abdominal wall and secured in place using a surgical stapler. Following mesh placement, the fascia and muscle layers were meticulously sutured using 1-0 nylon sutures to restore structural integrity.

After completing the abdominal wall reconstruction, the procedure was handed back to the plastic surgery team. A two-layer plication of the rectus abdominis muscles along the linea alba was performed using 1-0 nylon sutures to reinforce midline integrity. To optimize skin re-draping, the patient was positioned in a slight "beach chair" tilt. Excess skin and subcutaneous fat were excised, and a neo-umbilicus was reconstructed and secured using 5-0 nylon sutures for a natural appearance. To facilitate postoperative drainage and reduce the risk of seroma, two Redon drains were placed near the pubic symphysis. Finally, the abdominal skin was closed in two layers: the deeper layer was sutured with absorbable 4-0 PDS sutures, while the superficial closure was achieved with 5-0 nylon sutures. An elastic bandage was applied to provide postoperative support and compression to the abdominal wall (**Figure 3**).

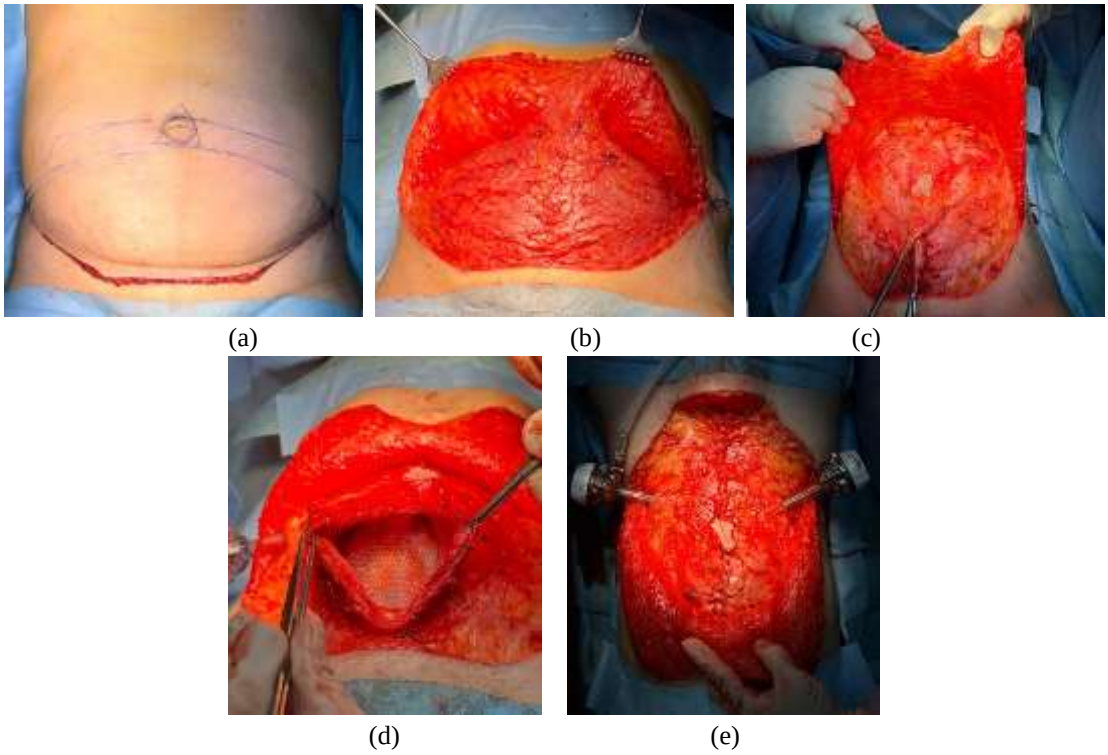


Figure 3. Intraoperative findings illustrating key surgical steps: (a) incision design, (b) elevation of the abdominal skin flap, (c) identification of rectus diastasis, (d) placement of polypropylene mesh for reinforcement, and (e) superior portion of the diastasis following surgical repair.

Step-by-step intraoperative photographs illustrating the surgical correction of rectus diastasis. These intraoperative steps highlight the technical approach to correcting the abdominal wall defect.

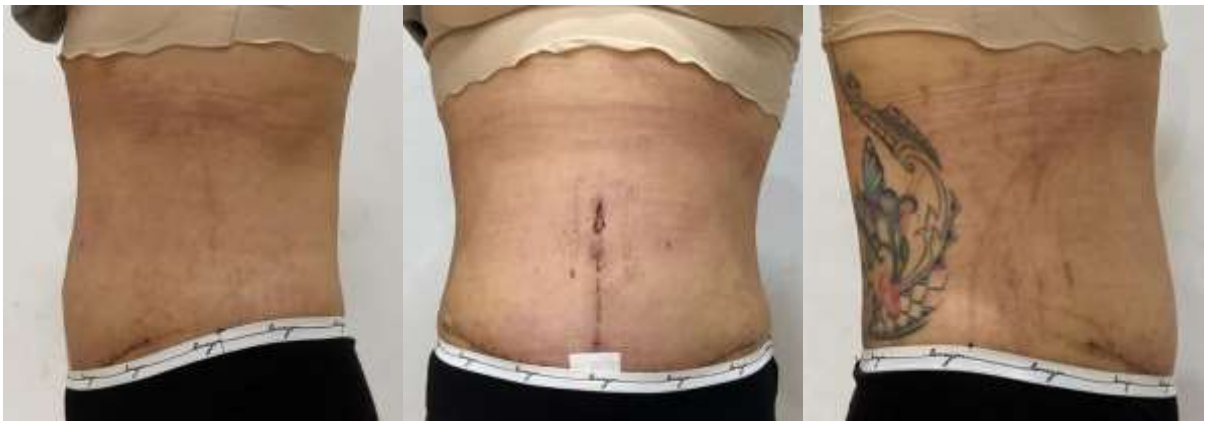
Postoperative Outcomes

The patient had an uneventful postoperative recovery, with no signs of infection, seroma, or hematoma. She was discharged in stable condition and reported a significant improvement in both abdominal contour and symptoms (**Figure 4** and **Figure 5**).

(a) (b) (c)

Figure 4. Post-operative clinical assessment demonstrating the resolution of abdominal wall bulging following rectus diastasis repair.

Postoperative images show a marked improvement in abdominal wall contour, with restoration of the midline support following surgical correction. Compared to the preoperative presentation, the abdominal bulging has been effectively resolved, indicating a successful repair. The patient exhibits a more natural abdominal profile, reflecting the structural restoration of the rectus muscles.



(a) (b) (c)

Figure 5. One month follow up of post-operative clinical assessment demonstrating the resolution of abdominal wall bulging following rectus diastasis repair.

This figure presents a clinical follow-up one month after rectus diastasis repair, demonstrating the successful correction of abdominal wall bulging. The assessment confirms the improved structural integrity and contour of the abdominal region post-surgery.

DISCUSSION

Rectus abdominis diastasis (RAD) is characterized by an abnormal widening of the midline separation between the rectus abdominis muscles due to attenuation of the linea alba. While RAD can be congenital, it is predominantly an acquired condition resulting from increased intra-abdominal pressure and progressive weakening of the connective tissue. The most well-established risk factors include pregnancy and central obesity, leading to two primary patient demographics: males with central obesity and normoweight parous women who have delivered macrosomic infants or multiples [3,8].

During pregnancy, the abdominal wall undergoes significant physiological adaptations to accommodate the growing uterus. This includes progressive distention and remodeling of the musculature, particularly the rectus abdominis, leading to increased lumbar lordosis and a widening of the inter-aponeurotic distance. The stretching of the linea alba results in a loss of its tensile strength, diminishing the ability of the rectus muscles to maintain midline integrity [6,9]. Consequently, RAD may develop, manifesting as an increased intermuscular distance and a compromised straight-line orientation of the rectus muscles. In addition to the structural impact, patients with diastasis recti often experience functional impairments, including lumbopelvic instability, core muscle weakness, and urogynecological symptoms such as stress urinary incontinence and pelvic organ prolapse [10]. From an aesthetic standpoint, RAD can result in a protruding abdominal contour that is accentuated during muscle contraction, significantly affecting patient satisfaction and quality of life [11,12].

When RAD is associated with concurrent ventral hernias, a reconstructive approach is required to address both functional impairments and structural defects. In such cases, surgical correction should restore abdominal wall integrity while ensuring long-term durability. Two primary techniques are available for rectus muscle approximation: suture plication and mesh reinforcement [13]. While suture plication may be sufficient in mild to moderate cases, mesh augmentation has been shown to provide superior structural support, particularly in cases involving significant diastasis or concurrent hernias. Moreover, previous studies suggest that mesh reinforcement reduces the risk of recurrence by providing additional stability to the weakened fascia, making it an increasingly preferred approach for extensive RAD repair. [4,14].

The integration of aesthetic and reconstructive surgical techniques is particularly beneficial in cases requiring both functional repair and cosmetic enhancement. Traditionally, abdominoplasty has been performed primarily for aesthetic purposes; however, in cases involving severe RAD and ventral hernias, its role extends beyond cosmetic improvement to a functional necessity. The involvement of multiple specialties in the surgical management of RAD with ventral hernia allows for a more comprehensive treatment strategy. Plastic surgeons contribute their expertise in soft tissue manipulation and aesthetic refinement, while digestive surgeons focus on abdominal wall reconstruction, ensuring structural integrity and functional restoration. This collaborative effort optimizes both the durability of the repair and the cosmetic outcome, leading to improved patient satisfaction [15]. Furthermore, the combination of abdominoplasty with mesh reinforcement provides a synergistic effect—while mesh enhances the mechanical strength of the repair, the abdominoplasty component allows for tension-free skin redraping, minimizing contour irregularities and excess skin laxity. The decision to incorporate mesh reinforcement is supported by evidence indicating lower recurrence rates and improved long-term outcomes compared to suture-based techniques alone [2,16].

Despite its advantages, open surgical repair of RAD is not without potential complications. These may include seroma formation, hematoma, localized skin necrosis, wound infection, and postoperative pain. However, studies have demonstrated that the incorporation of mesh in abdominoplasty procedures does not significantly increase complication rates [17]. In fact, when used appropriately, mesh may contribute to a more uniform tension distribution across the repaired fascia, reducing localized stress points that could otherwise lead to recurrence. Patients with severe rectus diastasis and weakened abdominal walls have shown comparable or even lower rates of postoperative complications when mesh is used [18]. This suggests that mesh reinforcement should be considered a viable option, particularly in cases involving concurrent ventral hernias or extensive muscle laxity. Additionally, emerging techniques, such as the use of biosynthetic meshes and minimally invasive laparoscopic-assisted approaches, are being explored to further improve outcomes and reduce complications [7,19].

In this case, a unique joint surgical approach was employed, emphasizing the necessity of interdisciplinary collaboration between plastic and digestive surgeons. The procedure began with an abdominoplasty incision, followed by a midline laparotomy performed by the digestive surgeon for mesh placement and reinforcement of the abdominal wall. The plastic surgeon then completed the abdominoplasty, ensuring optimal aesthetic outcomes. By integrating these specialties, the surgical team was able to simultaneously address structural deficiencies and aesthetic concerns, demonstrating the effectiveness of a holistic, interdisciplinary approach. The patient experienced a smooth postoperative recovery, with resolution of abdominal bulging and significant symptom improvement [20].

This case underscores the critical role of interdisciplinary collaboration in complex abdominal wall reconstructions. A coordinated effort between reconstructive and digestive surgeons allows for a more effective and durable surgical repair, improving both functionality and appearance. The integration of reconstructive and aesthetic techniques not only enhances patient satisfaction but also contributes to better long-term outcomes by minimizing recurrence risks.

CONCLUSION

The integration of abdominoplasty with polypropylene mesh reinforcement for rectus abdominis diastasis and ventral hernia repair demonstrates a comprehensive approach that restores abdominal wall integrity, enhances core function, and improves aesthetic outcomes. Mesh reinforcement provides superior mechanical support, reducing tension on the midline closure and minimizing recurrence risk compared to suture-based plication alone. The collaboration between plastic and digestive surgeons ensures a multidisciplinary strategy that effectively addresses both functional and cosmetic concerns, leading to optimal patient satisfaction. Individualized surgical planning, considering anatomical and patient-specific factors, is crucial for long-term success. As evidence continues to support the benefits of mesh augmentation, further research should focus on refining techniques, optimizing mesh selection, and assessing long-term patient-reported outcomes to enhance functional and aesthetic results.

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REFERENCES

1) Saad HA, El Teliti AM, Fiad AA, Heggy IA. Double-mesh technique abdominal wall reconstruction for severe rectus diastasis and ventral hernia repairs (two for two). Egypt J Surg. 2019;38(2):221–30.
2) Köckerling F, Botsinis MD, Rohde C, Reinpold W. Endoscopic-assisted linea alba reconstruction plus mesh augmentation for treatment of umbilical and/or epigastric hernias and rectus abdominis diastasis–early results. Front Surg. 2016; 3:27.
3) Yuan S, Li Y, Li Q, Fan L, Zhou J. Surgery versus non-surgery interventions on rectus abdominis diastasis with or without hernias: a systematic review. Indian J Surg. 2021;1–14.
4) Jessen ML, Öberg S, Rosenberg J. Surgical techniques for repair of abdominal rectus diastasis: a scoping review. J Plast Surg Hand Surg. 2021;55(4):195–201.
5) Ha W, Song SY, Yoon CS, Kim KN. Severe irreversible diastasis recti abdominis and abdominal hernia in postpartum women: rare case report. Int Surg. 2021;105(1–3):10–3.
6) Henriksen N, Kaufmann R, Simons M, Berrevoet F, East B, Fischer J, Hope W, Klassen D, Lorenz R, Renard Y. EHS and AHS guidelines for treatment of primary ventral hernias in rare locations or special circumstances. BJS Open. 2020;4(2):342–53.
7) Van Kerckhoven L, Nevens T, Van De Winkel N, Miserez M, Vranckx JJ, Segers K. Treatment of rectus diastasis: should the midline always be reinforced with mesh? A systematic review. J Plast Reconstr Aesthet Surg. 2021;74(8):1870–80.
8) Michalska A, Rokita W, Wolder D, Pogorzelska J, Kaczmarczyk K. Diastasis recti abdominis—a review of treatment methods. Ginekol Pol. 2018;89(2):97–101.
9) Carlstedt A, Bringman S, Egberth M, Emanuelsson P, Olsson A, Petersson U, Pålstedt J, Sandblom G, Sjödahl R, Stark B. Management of diastasis of the rectus abdominis muscles: recommendations for Swedish national guidelines. Scand J Surg. 2021;110(3):452–9.
10) Manetti G, Lolli MG, Belloni E, Nigri G. A new minimally invasive technique for the repair of diastasis recti: a pilot study. Surg Endosc. 2021; 35:4028–34.
11) Lee W, Cho JK, Jang JY, Hong SC, Jeong CY. Laparoscopic Repair of Diastasis Recti: A Case Report and Literature Review. J Minim Invasive Surg. 2019;22(3):127.
12) Moga D, Buia F, Oprea V. Laparo-endoscopic repair of ventral hernia and rectus diastasis. JSLS J Soc Laparosc Robot Surg. 2021;25(2).
13) Radhakrishnan M, Ramamurthy K. Efficacy and challenges in the treatment of diastasis recti abdominis—a scoping review on the current trends and future perspectives. Diagnostics. 2022;12(9):2044.
14) Sood R, Janes LE, Shah N, Sasson DC, Ellis MF, Dumanian GA. Mesh repair of rectus diastasis for abdominoplasty is safer than suture plication. Plast Reconstr Surgery–Global Open. 2021;9(8):e3721.
15) ElHawary H, Abdelhamid K, Meng F, Janis JE. A comprehensive, evidence-based literature review of the surgical treatment of rectus diastasis. Plast Reconstr Surg. 2020;146(5):1151–64.
16) Dumanian G, Moradian S. Mesh abdominoplasty for rectus diastasis in women and men. Hernia. 2021;25(4):863–70.
17) Ki HJ, Park JB, Sul JY. Umbilical port site hernia and diastasis recti. J Minim Invasive Surg. 2020;23(2):80.
18) Arafa AS, Osman GM, Saad HA. Double mesh repair in management of abdominal wall reconstruction for rectus diastasis and or ventral hernia repairs. Zagazig Univ Med J. 2024;30(1.2):190–8.
19) Takaya K, Aramaki-Hattori N, Yabuki H, Wada N, Sakai S, Okabe K, Kishi K. Correction of Diastasis Rectus Abdominis with Tacking the Rectus Sheath and Resection of Excess Skin for Cosmesis. Case Rep Med. 2020;2020(1):7635801.
20) Forester E, Sadiq A. Comparative analysis of the efficacy and functionality of abdominoplasty versus minimally invasive techniques in the surgical treatment of diastasis rectus abdominis in postpartum women. Surg Endosc. 2023;37(12):9052–61.