

TREATMENT OF VENTRAL HERNIA WITH COMPOSITE MESH: A CASE REPORT

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Abstract

After each abdominal surgical intervention, there is a risk of developing a hernia in the anterior abdominal wall. This type of hernia are also known as incisional hernia. Such hernias can happen regardless of the type of abdominal incision, but they are more common with midline and transverse incisions. The use of synthetic mesh has become a common practice nowadays as it has lower risks of complications during surgery and lower rates of hernia recurrence compared to non-mesh repairs.

In this case, a 31-year-old female patient with a large ventral hernia was scheduled for planned surgical intervention with the placement of a composite mesh for correction of the defect. The use of the composite mesh proved to be an excellent surgical solution for hernia correction in this particular case.

Keywords: hernia, treatment, composite mesh

Introduction

Following abdominal surgery, there is a chance of developing a hernia in the front part of the abdominal wall, known as an incisional hernia. This occurs when the layers of tissue do not properly heal and close after surgery. Such hernias can happen regardless of the type of abdominal incision, but they are more common with midline and transverse incisions^[1]. Even subcostal, paramedian, Pfannenstiel, and McBurney incisions can lead to postoperative hernias, as well as laparoscopic port sites. These hernias have been observed in up to 20% of patients who have had abdominal surgery, though modern rates are lower, ranging from 2% to 11%^[1,2].

Sometimes, these hernias can grow quite large, even containing parts of the bowel. In severe cases, the hernia can become giant, causing a loss of the abdominal area, where the contents of the abdomen cannot remain within the cavity anymore. To address these hernias, there are three main approaches to surgery. One involves stitching the hernia closed directly, another involves an open surgery using a synthetic mesh to reinforce the abdominal wall, and the third approach is laparoscopic surgery, specifically for incisional hernias^[3-5]. The use of synthetic mesh has become a common practice nowadays as it has lower risks of complications during surgery and lower rates of hernia recurrence compared to non-mesh repairs^[6,7]. When hernias are larger than 4 cm, using mesh is especially recommended to reduce the risk of recurrence, which can be as high as 30–50% with non-mesh repairs^[6,8]. In the presented case, it concerns a female patient who had undergone multiple interventions on the anterior

abdominal wall. Due to the presence of a large ventral hernia, a planned surgical intervention was scheduled with the placement of a composite mesh for correction of the defect.

Case report

A 31-year-old female patient presents for elective surgical treatment of a present ventral hernia. Anamnestically, she reports epigastric abdominal pain over the last year, exacerbated upon food intake. Upon examination, the abdomen at the level of the costal margin is palpably soft, tender to touch superficially and deeply, without signs of peritoneal irritation. A biarcuate incision, median laparotomy, and Pfannenstiel incision are noted. A free incisional hernia at the biarcuate incision is observed. Peristaltic is present upon auscultation.

X-ray findings - No convincing signs of free subdiaphragmatic air are observed. Dilated bowel loops in the right hypochondrium as well as umbilical region are noted. Clearly formed air-fluid levels are not observed.

CT findings - Proximal scans depict normal lung bases, without consolidation zones or focal changes. No pleural effusion is noted. Liver with homogeneous structure, without macrofocal changes. Gallbladder and both adrenal glands appear normal on CT. Splenectomy had been performed. Both kidneys show no signs of calculi or obstruction. Normal post-contrast function. Uterus corresponding to age, corpus luteum cyst on the right adnexa measuring 2.5 cm. Solid nodular change of 17 mm para-umbilically left, in contact with the *rectus abdominis* muscle, showing significant post-contrast accumulation. Thickened urinary bladder wall. No free fluid, nor significantly enlarged lymph nodes in the abdomen and pelvis are observed.

Laboratory parameters– RBC – 4.43; Le-11.5; Hgb -141; CRP -0.4; Glyc – 4.6.

Medical history: St. post *plastica* diaphragmalis lat. sin, *plastica parietis abdominis cum MESH graft et splenectomia pp hernia diaphragmatica lat.sin* a.a XXI. St. post *appendectomy* a.a. XX. St. post op pp *ileus strangulationem ex bridam* a.a XII. St. post sec. *Cesareae* N. II St. post op. pp *hernia ventralis incarecata* a.a. II.

On June 17, 2021, the patient was admitted to the Clinic for Digestive Surgery as an urgent case due to an incarcerated ventral hernia. (Operative protocol - Accessed via median laparotomy. Findings of massive intraperitoneal adhesions and ventral hernia at the site of a previous incision from the lower midline. In a previous intervention, a preperitoneal prolene mesh was placed, which migrated intraperitoneally and adhered to the small intestine, colon, and stomach. Adhesiolysis was performed. During the procedure, the stomach was deserosed and reserosed at one site, and the small intestine at three sites. Complete adhesiolysis was performed. Abundant lavage, abdomen closed with individual sutures. Supraumbilically, where the prolene mesh was placed, there was no abdominal wall to securely close the abdomen. One drain was placed in the Douglas pouch).

Current illness

On October 20, 2023, the patient underwent surgery at the OETA. (Operative protocol - Herniolaparotomy was performed at the site of the previous incision. Numerous adhesions were encountered, followed by adhesiolysis. Subsequently, the previously placed mesh was dissected from the surrounding structures and resected. A composite mesh measuring 25 x 20 cm was placed intraperitoneally and secured to the wall with individual polypropylene sutures. A subcutaneous drain was inserted. Closure of the subcutaneous tissue and skin followed with individual sutures).



Fig. 1. Intraoperative photograph showing incorporation of composite mesh on hernia defects in the abdominal wall fascia

The patient was discharged for home treatment in a good general condition and with a well-maintained local condition.

Discussion

The management of large anterior abdominal wall defects continues to pose a significant challenge in abdominal wall surgery, primarily due to the elevated risk of recurrence and postoperative morbidity [6,7]. Tension-free repair using prosthetic mesh has become the cornerstone of treatment, particularly for defects exceeding 4–5 cm, where primary suture repair is associated with unacceptably high recurrence rates, reported to be as high as 30-50% in some series^[8,9].

Composite mesh prostheses have been specifically engineered to address the limitations of conventional synthetic meshes in intraperitoneal applications. Their dual-layer configuration - comprising a macroporous parietal surface that promotes fibrocollagenous ingrowth and a visceral anti-adhesive barrier - minimizes direct contact between the mesh and intra-abdominal viscera. This significantly reduces the incidence of adhesion formation, bowel obstruction, and enterocutaneous fistula, which are well-documented complications associated with uncoated polypropylene meshes^[10,11].

In the presented case, the use of a composite mesh enabled a tension-free repair with adequate overlap, which is widely recognized as a critical determinant in preventing recurrence. Current guidelines recommend a minimum overlap of 5 cm beyond the defect margins for intraperitoneal onlay mesh (IPOM) repair^[3,6]. Furthermore, meticulous adhesiolysis and secure fixation of the mesh - whether by transfascial sutures, tacks, or a combination of both - are essential technical steps that influence both short- and long-term outcomes^[5].

Recent evidence supports the superiority of mesh-based repair over primary closure in large ventral hernias. A systematic review and meta-analysis demonstrated significantly lower recurrence rates with mesh reinforcement, without a proportional increase in surgical site complications^[2,7,8]. Additionally, studies comparing composite meshes to traditional materials

have shown a reduction in adhesion-related morbidity, particularly in laparoscopic and minimally invasive approaches^[4,9].

Despite these advantages, the use of composite mesh is not without limitations. Higher cost remains a relevant consideration, particularly in resource-limited settings. Moreover, technical expertise is required to ensure proper placement and fixation, as inadequate technique may lead to complications such as mesh migration, seroma formation, or chronic postoperative pain^[12,13].

Patient-related factors also play a crucial role in surgical outcomes. Obesity, smoking, diabetes mellitus, and a history of multiple prior abdominal surgeries are well-established risk factors for both recurrence and postoperative complications^[6,14]. Therefore, careful patient selection and preoperative optimization are essential components of successful management.

In this case, the selected surgical strategy proved to be appropriate, resulting in an uneventful postoperative course and no evidence of recurrence during follow-up. This outcome aligns with current evidence supporting the use of composite mesh for large ventral hernia repair, particularly in cases requiring intraperitoneal placement^[2,8,15].

Conclusions

Given the significant defect in the anterior abdominal wall due to multiple previous interventions in the patient, the use of a composite mesh was of crucial importance in this specific case. With its characteristics of selectively stimulating and suppressing tissue growth, the composite mesh represents a good solution for strengthening the abdominal wall while minimizing the risk of adhesions. Also, the utilization of composite mesh materials is linked to brief hospital durations, moderate occurrences of complications, minimal instances of infection, and reduced rates of hernia recurrence.

Conflict of interest statement. None declared.

References

1. Zinner MJ, Ashley SW. *Maingot's abdominal operations*. 12th ed. New York: McGraw-Hill; 2012.
2. Bellows CF, et al. Composite mesh prostheses are manufactured for intraperitoneal use and adhesion reduction. *J Surg Res* 2011; PMID: 21563502. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3183537/>.
3. Muysoms FE, Miserez M, Berrevoet F, Campanelli G, Champault GG, Chelala E, et al. Classification of primary and incisional abdominal wall hernias. *Hernia* 2009; 13(4): 407-414. doi: 10.1007/s10029-009-0518-x.
4. Bittner R, Bingener-Casey J, Dietz U, Fabian M, Ferzli GS, Fortelny RH, et al. Guidelines for laparoscopic treatment of ventral and incisional abdominal wall hernias (International Endohernia Society (IEHS)-part 1. *Surg Endosc* 2014; 28(1): 2-29. doi: 10.1007/s00464-013-3170-6.
5. Heniford BT, Park A, Ramshaw BJ, Voeller G. Laparoscopic ventral and incisional hernia repair in 407 patients. *J Am Coll Surg* 2000;190(6): 645-650. doi: 10.1016/s1072-7515(00)00280-5.
6. LeBlanc KA, Booth WV. Laparoscopic incisional hernia repair: complications—how to avoid and handle. *Hernia* 2004; 8(1): 53-58.
7. Deeken CR, Matthews BD. Mechanical properties of abdominal wall repair meshes. *Hernia* 2017; 21: 1-14.
8. Henriksen NA, Montgomery A, Kaufmann R, et al. Guidelines for treatment of ventral hernias. *Br J Surg* 2020; 107(3): 171-190.

9. Deerenberg EB, Timmermans L, Hogerzeil DP, Slieker JC, Eilers PH, Jeekel J, et al. A systematic review of the surgical treatment of large incisional hernia. *Hernia* 2015; 19(1): 89-101. doi: 10.1007/s10029-014-1321-x.
10. Holihan JL, Nguyen DH, Nguyen MT, Mo J, Kao LS, Liang MK. Mesh Location in Open Ventral Hernia Repair: A Systematic Review and Network Meta-analysis. *World J Surg* 2016; 40(1): 89-99. doi: 10.1007/s00268-015-3252-9.
11. Liang MK, Holihan JL, Itani K, Alawadi ZM, Gonzalez JR, Askenasy EP, et al. Ventral Hernia Management: Expert Consensus Guided by Systematic Review. *Ann Surg* 2017; 265(1): 80-89. doi: 10.1097/SLA.0000000000001701.
12. Sosin M, Nahabedian MY, Bhanot P. The use of mesh in abdominal wall reconstruction: a systematic review. *Plast Reconstr Surg* 2018; 142(3 Suppl): 154S-161S.
13. Atema JJ, Furnée EJ, Maeda Y, et al. Major complications after abdominal wall reconstruction. *Ann Surg* 2020; 271(1): e1-e8.
14. Petro CC, Haskins IN, Perez AJ, et al. Achieving durable outcomes in ventral hernia repair. *Surg Clin North Am* 2021; 101(2): 237-252.
15. Bellows CF, et al. Composite mesh prostheses for intraperitoneal use and adhesion prevention. *J Surg Res*. 2011.
Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3183537/>.