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A case report: Can a titanised polypropylene mesh (TiMesh) obviate a dual mesh for sandwich technique for parastomal hernias?

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Abstract

The three main surgical techniques for PSH are primary fascial repair, stoma reconstruction, and mesh reconstruction. Both open and laparoscopic repair can be done for PSH, and currently, mesh reinforcement is widely accepted. Polypropylene mesh facilitates the ingrowth of adjacent fascia and potentially adhering onto adjacent organs, including the viscera, leading to mesh erosion and enteric fistula. Polytetrafluoroethylene (PTFE) mesh shrinks significantly in the tissue and thereby increases the chances of PSH recurrence rate. TiMesh (Healthium Medtech, Bengaluru, India) is a titanium-coated polypropylene composite mesh and is included in the guidelines for laparoscopic treatment of ventral and incisional abdominal wall hernias by International Endo hernia Society (IEHS). TiMesh can be used to repair PSH and may be a useful alternative to dual mesh. We present a case report of a 64-year-old woman who presented with a parastomal hernia after an abdominoperineal resection and an end sigmoid colostomy. The parastomal hernia was repaired using a laparoscopic meshplasty using TiMesh. With a dual mesh, the polypropylene side may come in contact with the bowel with a possibility of mesh erosion and fistulation. TiMesh being a coated mesh on both sides reduces these possibilities.

Keywords: Stoma; Parastomal hernia; Recurrent; Mesh; Hernia

1. Introduction

One of the most prevalent complications after the creation of a stoma is parastomal hernia (PSH), and the prevalence is likely to increase.[1] The patient's quality of life is significantly reduced, and medical expenses are greatly impacted by pain, discomfort, ostomy device leakage, and skin irritation around the stoma.[1] The likelihood of PSH is inevitable because of the long follow-up and around 40% to 60% of patients with an ostomy will never undergo a reversal procedure.[2]

In recent years, the surgical procedures for the repair of PSH have advanced greatly with the development of new meshes and laparoscopic techniques. Three types of mesh repair can be done by placing the mesh intraperitoneally: (a) Keyhole repair, (b) Sugarbaker repair, and (c) Sandwich technique. The sandwich method combines both Keyhole and Sugarbaker methods. The PSH recurrence rate can be minimized by appropriate mesh selection and its application technique.[3]

Polypropylene mesh was the first mesh used in PSH repair. Polypropylene mesh facilitates the ingrowth of adjacent fascia and potentially adhering onto adjacent organs, including the viscera, leading to mesh erosion and enteric fistula.[1] PTFE mesh is a soft and inert material that does not tend to form adhesions with the intestines. However, PTFE mesh shrinks significantly in the tissue and thereby increases the chances of PSH recurrence rate.[4] Even with technological advancements in mesh types, wound complications do occur in about 25% PSH repairs.[3] TiMesh is a titanium-coated polypropylene mesh and is included in the guidelines for laparoscopic treatment of ventral and incisional abdominal wall hernias by International Endo hernia Society (IEHS).[5] Many published studies have used a variety of meshes for PSH repair. However, there is no sufficient evidence on specific mesh types for the management of PSH. We used TiMesh in the PSH repair, which is a type of composite mesh, and either side can be used to face the bowel, hence reducing possibilities of mesh erosion and fistulation into the bowel, as there is no polypropylene contact with the stoma loop.

2. Case Report

We present the case of a 64-year-old woman, who was operated on for an abdominoperineal resection with an end sigmoid colostomy, 5 years ago. She developed a bulge in the parastomal region, progressively increasing in size. There were no symptoms of obstruction. She is a well-controlled diabetic and hypertensive patient. CECT abdomen and pelvis with contrast was suggestive of a 5 cm by 4 cm parastomal defect with herniation of small bowel loops and mesentery. It was classified as primary type I parastomal hernia as per European Hernia Society (EHS) classification of parastomal hernias.[6] After appropriate pre-anesthesia fitness, she was posted for a laparoscopic modified Sugarbaker's technique for the repair of the hernia.

The patient was put under general anesthesia in supine position; a 10-mm viewing port was placed in the right pararectal region, using open insertion. There were two 5-mm working ports, one on the right flank and the right hypochondrium. Omentum and small bowel loops were adhered to anterior abdominal wall. Adhesiolysis was done using sharp dissection with cold scissors to avoid any thermal injury (Fig. 1). The parastomal defect was of size 5 cm × 4 cm,

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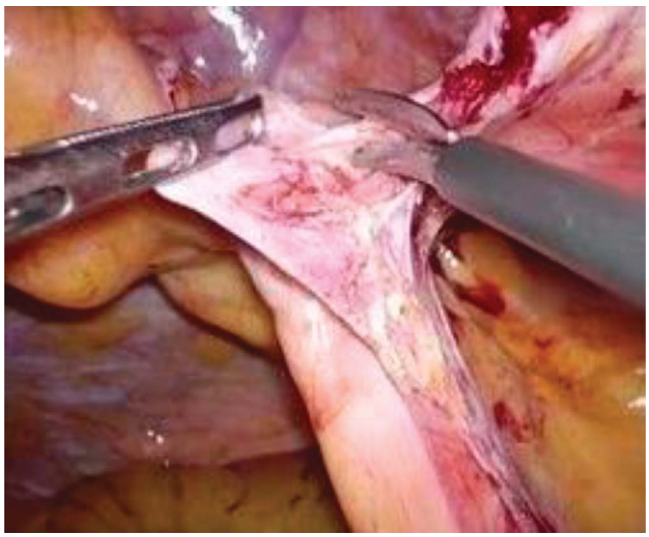

Figure 1. Adhesiolysis of small bowel.

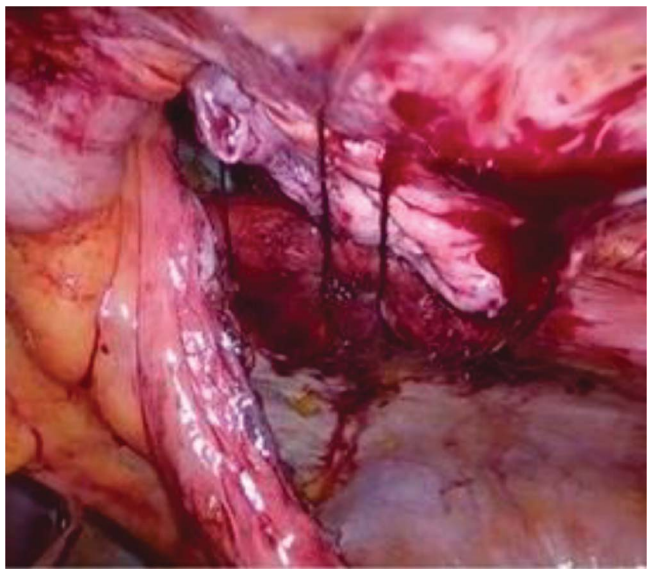

Figure 3. Closure of the defect.

and it was closed using one number trulon (polyamide) transfacially and barb suture with intracorporeal suturing (Figs. 2 and 3). The stoma was then lateralized, and the mesentery was fixed to the lateral wall with 2-0 trusynth (polyglactin 910). A 15 cm × 15 cm TiMesh (Healthium Medtech, Bengaluru, India) was deployed and fixed with nonabsorbable tackers (Fig. 4). Ports were closed with one number trulon (polyamide). The patient started orals after 6 hours and discharged after 72 hours. Postoperative follow-up (1 year), the patient was asymptomatic.

3. Discussion

Our case study is a pilot study, which will need further cases for long-term durability. Sugarbaker and Keyhole techniques have been modified to improve patient outcomes. LeBlanc et al., in a study, mentioned a variation in the Keyhole technique, which involved overlapping of 2 meshes with opening positioned in opposing positions to prevent intestine herniation through the opening in the first mesh.[7] Berger reported the use of a laparoscopic combination of the Keyhole and Sugarbaker techniques, known as the Sandwich technique in 2010, to improve the two-mesh approach. The technique is to pass the bowel through an intraperitoneal mesh (Keyhole technique), and the second mesh is used to lateralize and secure the bowel to the overlying abdominal wall (Sugarbaker technique).[8]

Macroporous polypropylene and polyester meshes have high tensile strength synthetic fibers that promote tissue growth. However, mechanical strength is effective but can also promote considerable complications including adhesions, bowel obstruction, and fistula

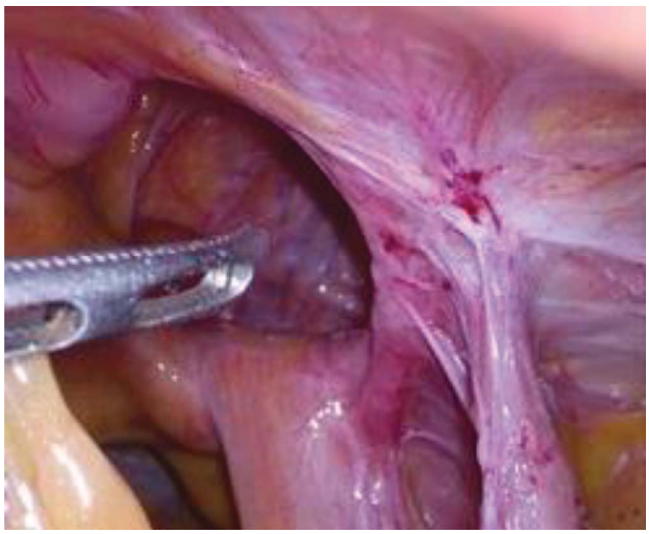

Figure 2. Four cm × 3 cm parastomal defect.

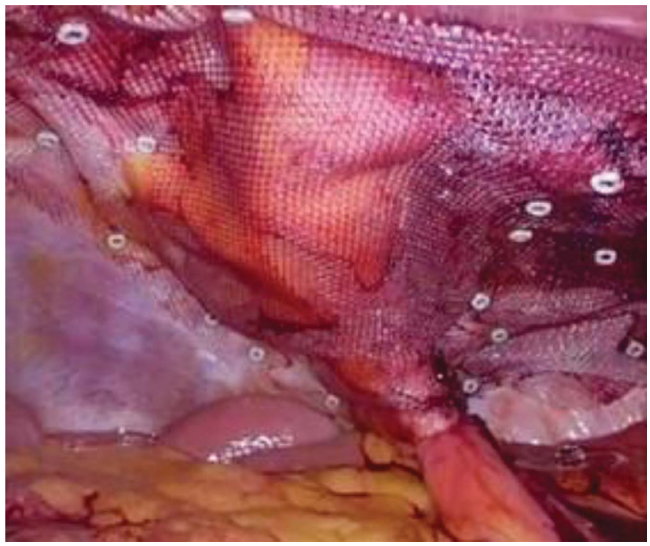

Figure 4. TiMesh deployment.

formation. Microporous meshes (expanded PTFE) prevent tissue excessive ingrowth, but it heals by encapsulation. These meshes have less structural stability and tissue incorporation, leading to increased recurrence rate even though the risk of adhesion and erosion is less.[9] Composite meshes have polypropylene or polyester side facing the abdominal wall and the other side facing intra-abdominally with a barrier material. When Sugarbaker technique is used with a single mesh and then the nonbarrier side; either polypropylene or polyester can encounter the colon, increasing the risk of adhesions.

In a study done by Schug-Paß et al, it was concluded that titanium-coated polypropylene mesh (TiMesh) is suitable for the laparoscopic intraperitoneal repair of abdominal wall and incisional hernias. In this study, the average total adhesion area was only 0.085 for TiMesh, as compared with 0.25 for the expanded PTFE. The expanded PTFE mesh showed an average shrinkage to almost half of the original surface area (median, 0.435) compared to TiMesh (median 0.18) with $p = 0.006$, which was statistically significant.[10] In the present case report, we used TiMesh, which is a type of composite mesh for PSH repair and is approved for ventral and incisional abdominal wall hernias.

In conclusion, PSH presents a surgical challenge due to a high rate of complications. There are a variety of meshes that are being used to repair PSH, but they all have inherent advantages and disadvantages. TiMesh, a composite mesh, is approved by IEHS for ventral and incisional abdominal wall hernias and can be used to repair PSH. Long-term studies are required to see the effectiveness and safety of TiMesh, but this may be a useful alternative to using a dual mesh.

Ethical statement

This study was performed in accordance with and conforming to the Declaration of Helsinki. The authors certify that they have obtained all appropriate patient consent form. In the form, the patient has given her consent for his images and other clinical information to be reported in the journal. The patient understands that name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

Author contributions

Dr Vishakha Kalikar and Roy Patankar have participated in the performance of the research and in the writing or critical revision of the paper. Both authors have read and agreed to the final version of the manuscript.

Data availability statement

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Conflicts of interest statement

The authors declare that they have no conflict of interest with regard to the content of this report.

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