Laparoscopic Parastomal Hernia Repair Performed With Two Different Composite Meshes: Report of a Case

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Abstract
A 69-year-old man presented to us with a large peristomal bulge. He had undergone laparoscopic abdominoperineal resection with D3 dissection and sigmoid colostomy for lower rectal cancer and 14 months later began to notice a bulge in the stoma area. Because of an absence of specific symptoms, continued follow-up was decided upon. However, within 9 months, the bulge had grown so large that it had become difficult for the patient to secure the stoma bag in place, so surgery was performed. Abdominal computed tomography revealed the sigmoid colostomy as well as a hernial sac into which intra-abdominal fatty tissue had prolapsed. The sac was cranial to the lifted bowel. Laparoscopic repair was performed. Exploration of the abdominal cavity showed adhesion of the greater omentum, sigmoid mesocolon, and fatty appendages to the abdominal wall around the lifted bowel. Upon adhesiolysis, a 3×3-cm hernial orifice cranial to the lifted sigmoid colon was seen. The orifice was closed with three sutures of 2–0 absorbable material and repaired with two different Parietex Parastomal meshes (keyhole style and central band style meshes). The two meshes were fixed so that they overlapped each other. Three cicatricial hernias observed along the midline of the lower abdomen were simultaneously repaired. The operation time was 170 minutes, and the blood loss volume was small. The postoperative course was uneventful. The patient began oral intake on postoperative day 1 and was discharged on postoperative day 4. One year and 6 months have passed since the surgery, and there is no evidence of recurrence. The laparoscopic two-mesh repair is described in detail along with a review of the literature.

Key Words
Parastomal hernia, laparoscopic surgery, sandwich technique

Introduction
Parastomal hernia is a common late complication of gastrointestinal stoma for which there are various repair methods. A procedure for parastomal hernia repair with mesh products designed for use in the peritoneal cavity was recently reported¹–⁴. Herein, we report a case of parastomal hernia for which we performed laparoscopic repair using two different Parietex Composite meshes. In addition, we review our technique in light of the literature.

Case
The patient was a 69-year-old man who presented to us in December 2012 with a peristomal bulge. He was 177 cm tall, weighed 79 kg, and had a body mass index of 25.2 kg/m². His medical history included an unrelated surgery for appendicitis, which had left him with a lower midline surgical scar. In October 2011, however, he had undergone laparoscopic abdominoperineal resection with D3 lymph node dissection and sigmoid colostomy for lower rectal can-

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cer. The final diagnosis was Stage IIIa rectal cancer (MP, N1, H0, P0, M0). He had been given adjuvant chemotherapy for 6 months and was subsequently followed up as an outpatient. In December 2012, he noticed that the area around the stoma was bulging slightly, but because there were no specific symptoms, the regular follow-up was simply continued. However, the bulge gradually grew so large that it became difficult for him to secure the stoma bag in place. Abdominal computed tomography (CT) was performed in July 2013. In addition to the sigmoid colostomy, a hernial sac was seen cranial to the lifted bowel, and it was evident that intra-abdominal fatty tissue had prolapsed into the sac.

We performed surgery with the patient under general anesthesia and in the supine position. Two 5-mm ports and an 11-mm port were placed in the lateral abdominal wall on the side opposite the colostomy to facilitate surgical manipulation (Fig. 1). Exploration of the abdominal cavity revealed adherence of the greater omentum, sigmoid mesocolon, and fatty appendages to the abdominal wall around the lifted sigmoid colon. Upon adhesiolysis, we found a 3×3-cm hernial orifice cranial to the lifted bowel (Fig. 2A). The hernial orifice was closed with three 2–0 absorbable sutures and repaired with a ring-shaped Parietex Parastomal Mesh (Covidien, Minneapolis, MN, USA) (15-cm-diameter hole with a 35-mm-diameter central orifice). We rolled the mesh with the collagen-based film facing inward to avoid damaging it. The mesh was inserted through the 11-mm port into the abdominal cavity (Fig. 2B, C). The mesh was fixed so that it extended at least 5 cm beyond the edges of the hernial defect. The sigmoid colon was then fixed to the abdominal wall with a Parietex Parastomal Mesh (20-cm diameter with a central band) according to the Sugarbaker technique. Sufficient care was taken to avoid either compression or obstruction of the colon. The two meshes were positioned to overlap each other. Three incisional hernias found along the midline of the lower abdomen (with orifices of 1.5 cm, 1 cm, and 0.8 cm in diameter) were simultaneously repaired. Fixation of the meshes was achieved with an AbsorbaTack (Covidien); the tacks were applied at 1-cm intervals to prevent the bowel from herniating between the abdominal wall and mesh (Fig. 2D). The operation time was 170 min, and the blood loss volume was small.

The postoperative course was uneventful. The patient began oral intake on postoperative day 1 and was discharged on postoperative day 4. One year and 6 months have passed since the surgery, and there is no evidence of recurrence.

Discussion

Parastomal hernia is a frequent complication of an intestinal stoma. It is known to develop in 1.8–28.3% of patients with an end ileostomy and in 4.0–48.1% with a colostomy. Both patient-related and technical factors can explain the development of a parastomal hernia. Patient-related factors include obesity, malnutrition, chronic obstructive pulmonary disease, constipation, increased intraperitoneal pressure due to ascites or other causes, steroid use, malignant disease, advanced age, and postoperative wound infection. Technical factors include the size of the trephine, the location of the stoma, and the route of stoma construction (whether intraperitoneal or extraperitoneal). The explanatory factor in our case was the intraperitoneal route. Use of this route is considered the main cause of parastomal hernia.

The absolute surgical indications for parastomal hernia surgery are hernia incarceration and associated bowel necrosis or perforation, whereas the relative indications include difficulty in stoma management, pain, a defecation disorder such as constipation, intestinal obstruction, and cosmetic dissatisfaction. In case of our patient, his peristomal bulge grew so large that it became difficult for him to secure the stoma bag in place, and thus surgery was necessary.

Various surgical procedures for parastomal her-
Laparoscopic parastomal hernia repair

Figure 2. Intraoperative photographs.

(A) A 3×3-cm fascial defect was revealed after reduction of the stomal prolapse.
(B) The hernial orifice fascia was closed with three sutures of 2–0 absorbable material.
(C) A keyhole style mesh was secured with sutures and tacks.
(D) A center band style mesh was secured with sutures and tacks, and this allowed for lateralization of the colon going to the stoma.

nia repair have been reported, and the widespread acceptance and application of laparoscopic surgery in recent years has resulted in an increasing number of reports of laparoscopic surgery for repair of this clinical entity. The advantages of laparoscopic surgery are as follows: (1) the hernia can be closely examined, and collateral lesions can also be detected; (2) fascial exposure for mesh placement is unnecessary; (3) the hernial orifice can be fully covered with a mesh; (4) the risk of postoperative infection is reduced; (5) clean surgery can be performed; and (6) because of the small incisions, the procedure is applicable even in obese patients. Disadvantages are reported, however, and these include (1) the fact that the procedure is very expensive, (2) the fact that the procedure is somewhat complicated in comparison to open surgery, and (3) the fact that the procedure is difficult in patients with severe adhesions. A comparative study of laparotomy and laparoscopy for parastomal hernia repair showed that the latter results in a shorter hospital stay, a lower incidence of surgical site infection, and a lower overall risk of morbidity. At our hospital, we have aggressively introduced laparoscopic surgery for the treatment of parastomal hernia, and we chose the laparoscopic procedure for the patient described herein in an effort to achieve a minimally invasive surgery and few or no complications.

Surgical techniques for parastomal hernia repair include direct hernia orifice closure with sutures, stoma relocation, and prosthetic mesh placement. Direct hernia orifice closure is the simplest procedure because it does not involve stoma relocation, but the subsequent recurrence rate of 46–100% is significantly higher than that following mesh repair. Placement of a prosthetic mesh varies somewhat, depending on the level of the abdominal wall at which the mesh will be placed. Although recurrence rates have not been shown to differ significantly, the rate is higher with the onlay method than when the mesh is placed in the preperitoneal position. Intraperitoneal mesh repair can be performed either as laparoscopic or open surgery and by any of three techniques: the Sugarbaker technique, the keyhole technique, or the sandwich technique (which combines the former two). Results of the keyhole method have been somewhat disappointing. The reported recurrence rate for the laparoscopic keyhole technique is 44.4% within 6 months of the initial operation. Muysoms
also reported a disappointing experience and high recurrence rate with the keyhole technique\(^\text{14}\).

Results of the Sugarbaker technique have been more acceptable. For example, Hansson et al reported a 6.6% recurrence rate among patients who were followed up for a mean of 2 years after laparoscopic Sugarbaker technique\(^\text{3}\), and Mancini et al reported a 4% recurrence rate after laparoscopic Sugarbaker repair among patients who were followed up for a median 19 months (range, 2–38 months)\(^\text{15}\). Although the reported recurrence rate for the laparoscopic keyhole technique is high, that for the laparoscopic sandwich technique is low at 2.1%\(^\text{9}\).

The laparoscopic Sugarbaker technique and the modified Sugarbaker technique are reported to be safe and useful for parastomal hernia repair\(^\text{2,3}\). The sandwich technique compensates for the weakness of the keyhole technique, and the recurrence rate is lower than that seen with the Sugarbaker technique alone\(^\text{4}\). Therefore, we chose the Sandwich technique in the hope of preventing recurrence.

When the sandwich technique was first devised, the meshes used had no an anti-adhesion barrier. This is a major drawback because the bowel, in cases of parastomal hernia repair, will come into contact with the mesh. The two meshes we used in our patient were both designed for parastomal hernia repair, and both are covered by an absorbable, anti-adhesion film. The first one is particularly suited to Sugarbaker technique, and the second to keyhole technique.

It was for these reasons that we chose to apply a minimally invasive laparoscopic sandwich technique using two different Parietex Composite meshes. The Parietex Composite parastomal meshes we used are prosthetic materials intended specifically for parastomal hernia repair. They are very useful products because one surface or portion is covered with collagen film aimed at reducing adherence to abdominal organs such as the bowel. However, when we use two differently styled meshes made of the same composite material, the collagen film surface of the keyhole mesh can disturb attachment of the central band style mesh. There are two important precautions that must be taken to prevent herniation between the first mesh and second mesh: The second mesh (central band style) must cover the first mesh (keyhole style) in its entirety as well as the abdominal wall\(^\text{10}\), and the second mesh should be fixed with tacks spaced 1 cm apart around its circumference.

A substantial amount of time has passed since our patient’s surgery without any evidence of recurrence, and there were no complications resulting from the mesh placement. Our experience in this case leads us to consider application of the laparoscopic sandwich technique with two different Parietex Composite meshes useful for parastomal hernia repair. We hope to conduct studies involving a substantial number of patients to evaluate the safety and utility of this technique for parastomal hernia repair. And it will be expected the development of new mesh for sandwich technique in the future.

**Conclusion**

We describe a laparoscopic parastomal hernia repair performed with two different Parietex Composite meshes. The good short and long-term outcomes in this case lead us to consider the technique useful for parastomal hernia repair.

**References**