

The Management of Enterocutaneous Fistulas Involving Mesh Placed for Ventral Hernia Repair

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The majority of mesh fistulas occur with heavy weight polypropylene mesh, but fistulas associated with various composite meshes may also occur.

When bowel comes in contact with synthetic mesh material, an enterocutaneous fistula may occur. Enterocutaneous fistula through a piece of synthetic mesh placed during a previous ventral hernia repair is an infrequent but devastating complication. This is the reason for keeping the mesh extraperitoneal when possible by developing a plane in the retro-rectus fascia. When this is not possible, a composite mesh should be used to ensure the layer facing and in direct contact with the bowel is a material that does not get incorporated into the tissues (eg, Goretex). Even composite meshes need to be carefully placed as edges may have a tendency to roll, allowing the bowel to make contact with the surface designed for tissue ingrowth and possibly fostering fistula formation.

Our institution is a quaternary referral center dealing with complex recurrent hernias. We have evaluated our experience with 25 patients referred for enterocutaneous fistulas involving mesh. Our management strategy and operative technique has resulted in less than a 10% fistula recurrence rate and a ventral hernia recurrence rate of 40%, with mean follow up of 33 months. Most of these patients underwent a trial of nonoperative management with no oral intake and total parenteral nutrition for a variable period of time allowing the patients' nutrition to be assessed and maximized, and any source of infection to be treated. None of the fistulas closed, however, and all patients required operative interven-

tion, removal of the mesh, and bowel resection or repair. Occasionally, a portion of a well incorporated mesh is salvaged, but the mesh is most often entirely removed.

This article discusses the management techniques utilized for patients with enterocutaneous fistulas involving mesh from ventral hernia repair.

Preoperative Preparation

The preoperative management of patients with enterocutaneous fistulas through their mesh prostheses is as important as the actual operative procedure. The only circumstance that requires emergent intervention is overt sepsis from infected mesh. This is uncommon, as most mesh infections are chronic and can usually be managed initially with drainage of any infected collections and antibiotic coverage without developing hemodynamic instability or sepsis. Therefore, time should be taken to optimize the patient's comorbid medical conditions and nutritional status before definitive operation. We recommend optimizing preoperative protein stores, which frequently are depleted from the chronic enteral losses from the draining fistula tract and the lack of oral intake. Such patients require total parenteral nutrition for a few weeks preoperatively to improve their nutritional status.

Patients need to be fully informed about the extent of surgery and to be made aware of the potential need for additional surgeries in the future. As the operation is performed in a contaminated field, definitive repair of the abdominal wall can not be performed with synthetic mesh. Thus, we typically close the hernia defect either primarily or with the aid of a biologic mesh; both options are associated with high recurrence rates. When the hernia recurs, however, it does so long after resolution of the contamination associated with the first reconstruction, and definitive mesh repair can then be performed.

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Operative Technique

The patient is placed supine on the operating room table and undergoes endotracheal intubation and general anesthesia (Fig 1). A Foley catheter is placed to decompress the urinary bladder. If the fistula opening is large, a silk suture can be used to close the orifice to minimize soilage during the case. The abdomen is prepped and widely draped. A laparotomy incision is made with an incisional ellipse incorporating the fistula; in the case of a large cicatrix the entire scar can be excised (Fig 2). The subcutaneous tissue is incised with electrocautery to expose the fascia. The incision is extended cephalad or caudad to enter the peritoneal cavity in an area remote from the fistula in hopes of encountering fewer adhesions. On entering the peritoneal cavity, adhesions are sharply taken down and the area of the fistulized segment of bowel is approached (Fig 3). Gently placing a probe through the fistula tract may be helpful in identifying the involved segment of bowel when there are dense adhesions of multiple loops of bowel to the mesh (Fig 4). Once the mesh is identified, one often encounters a pocket of infected fluid surrounding the mesh and involved loop of bowel. The adhesiolysis is continued circumferentially around the mesh and the involved portion of small bowel until all uninvolved but adherent loops of intestine are dissected free of the prosthetic and involved bowel. The bowel should carefully be evaluated for injury after adhesiolysis. Damaged bowel involved with the enterocutaneous fistula

and bowel in continuity or densely adherent to the mesh is resected using linear staplers (Fig 5). The mesentery of resected bowel segments is transected using either a clamp and suture technique or an appropriate electro-surgical vessel-sealing device. Primary anastomosis is then performed using a linear stapling device along the antimesenteric side of the two bowel segments (Fig 6), and the mesenteric defect is closed with silk sutures. In the event that the fistula tract is well defined and does not involve a length of bowel adherent to the mesh, the fistula tract can be resected and its origin repaired primarily.

The portion of mesh involved with the fistula and any area of mesh that appears infected is then resected. If the contaminated area is large, the entire mesh may need to be removed. The mesh and resected bowel is sent to pathology, and the abdomen is copiously irrigated with warm saline solution. Depending on the amount of mesh removed and the size of the remaining defect, the defect is either closed primarily with a running suture and interrupted retention sutures for reinforcement, or a piece of biologic mesh is sewn to the fascial edges with permanent suture to close the fascia (Fig 7). It should be noted that the risk of hernia recurrence is high, or expected, when synthetic mesh is not used; however, synthetic mesh should not be introduced given the infected nature of the operation. In fact, the subcutaneous tissue is left open in many cases and a vacuum assisted sponge dressing is applied to the subcutaneous tissue (Fig 8).

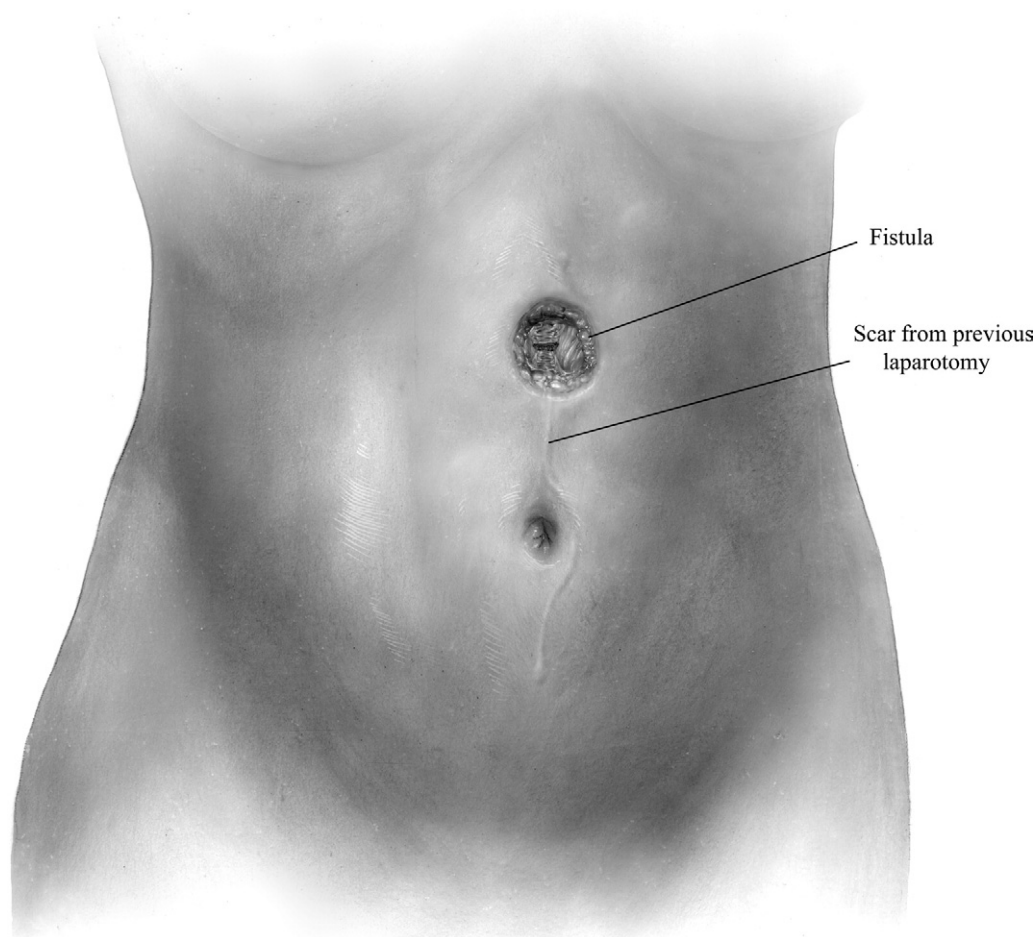


Figure 1 Enterocutaneous fistula involving previously placed mesh.

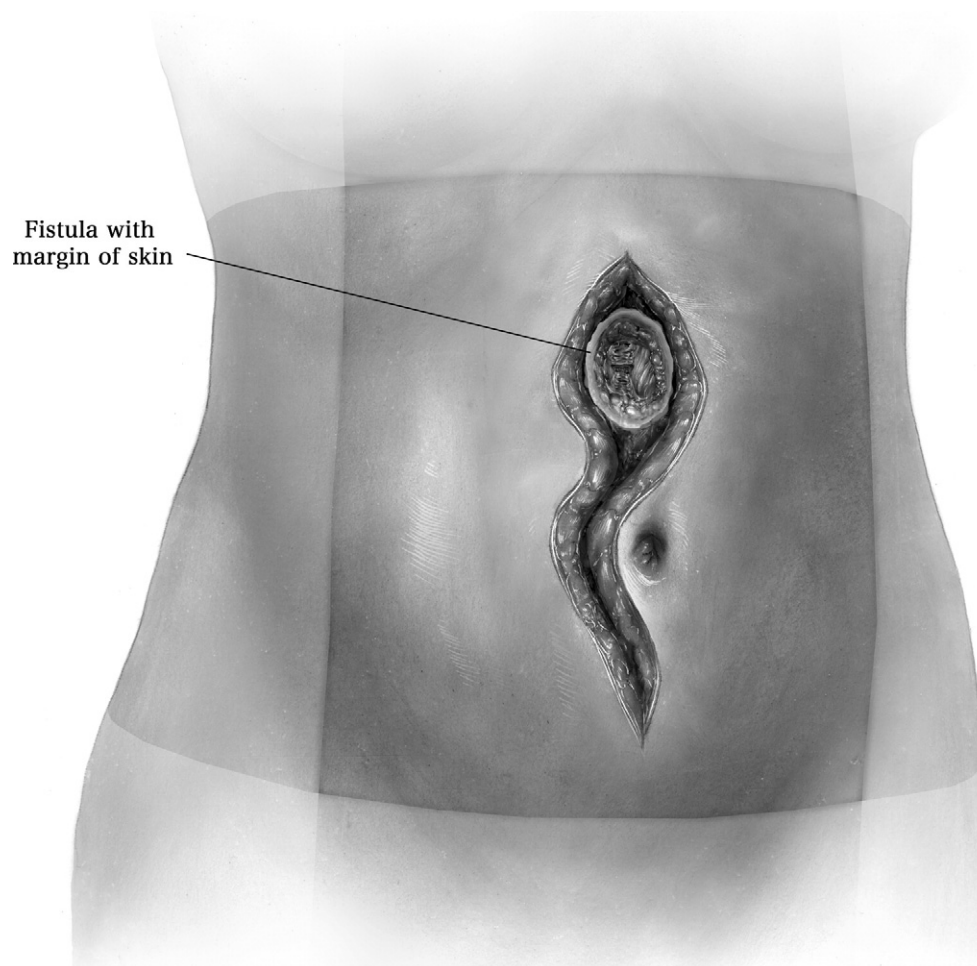


Figure 2 A laparotomy incision is made with an incisional ellipse incorporating the fistula and a thin margin of the surrounding skin.

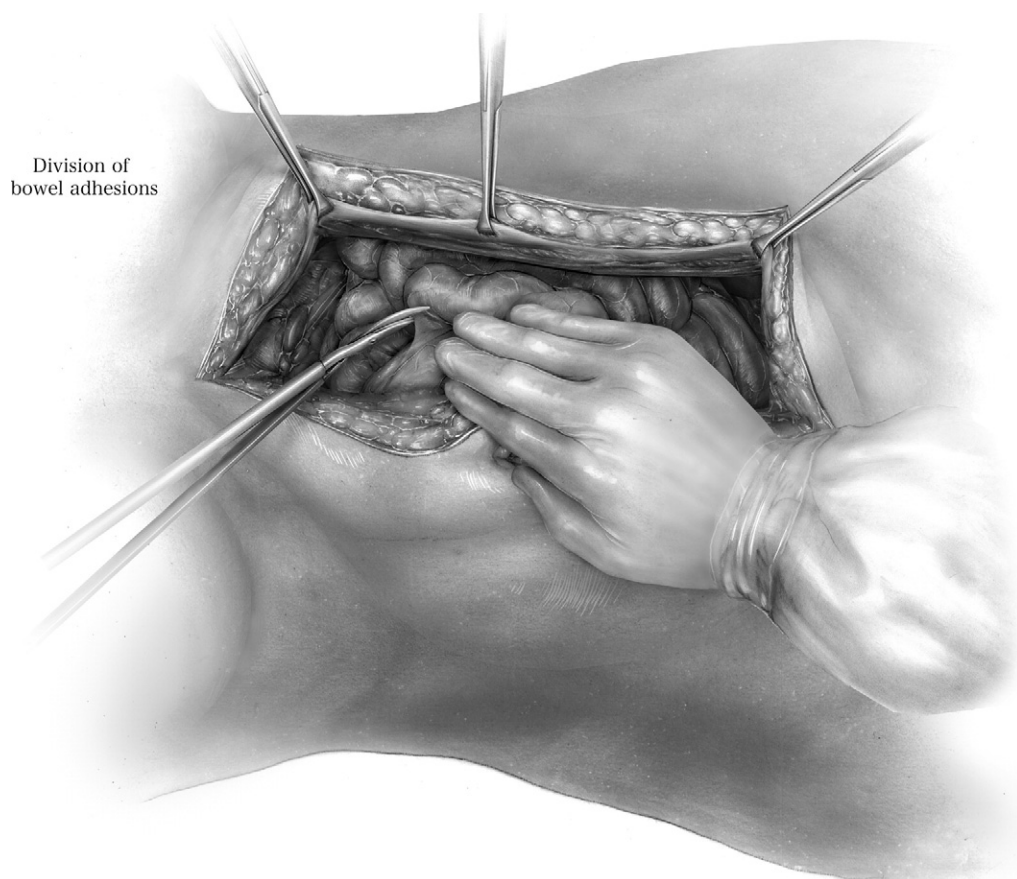


Figure 3 Sharp adhesiolysis is performed exposing the full surface of the mesh.

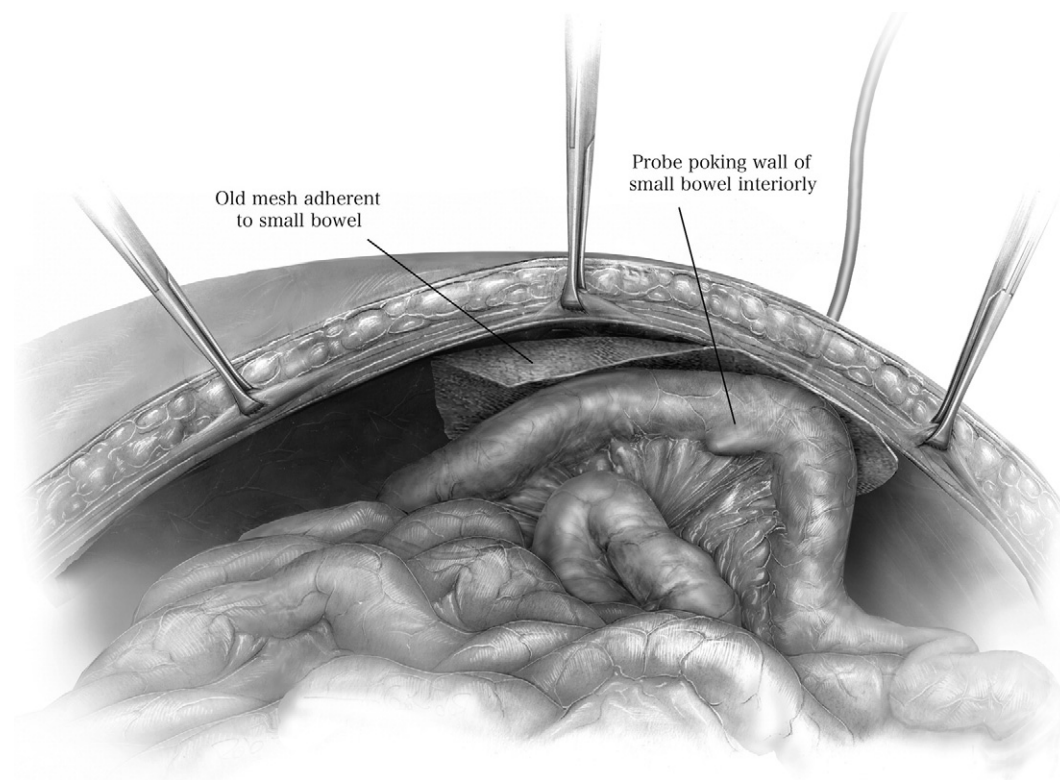


Figure 4 The adhesiolysis is continued circumferentially around the mesh and the involved portion of small bowel until all uninvolved but adherent loops of intestine are dissected free of the prosthetic and involved bowel. It is often useful to gently place a probe through the fistula tract to help identify the involved segment of bowel.

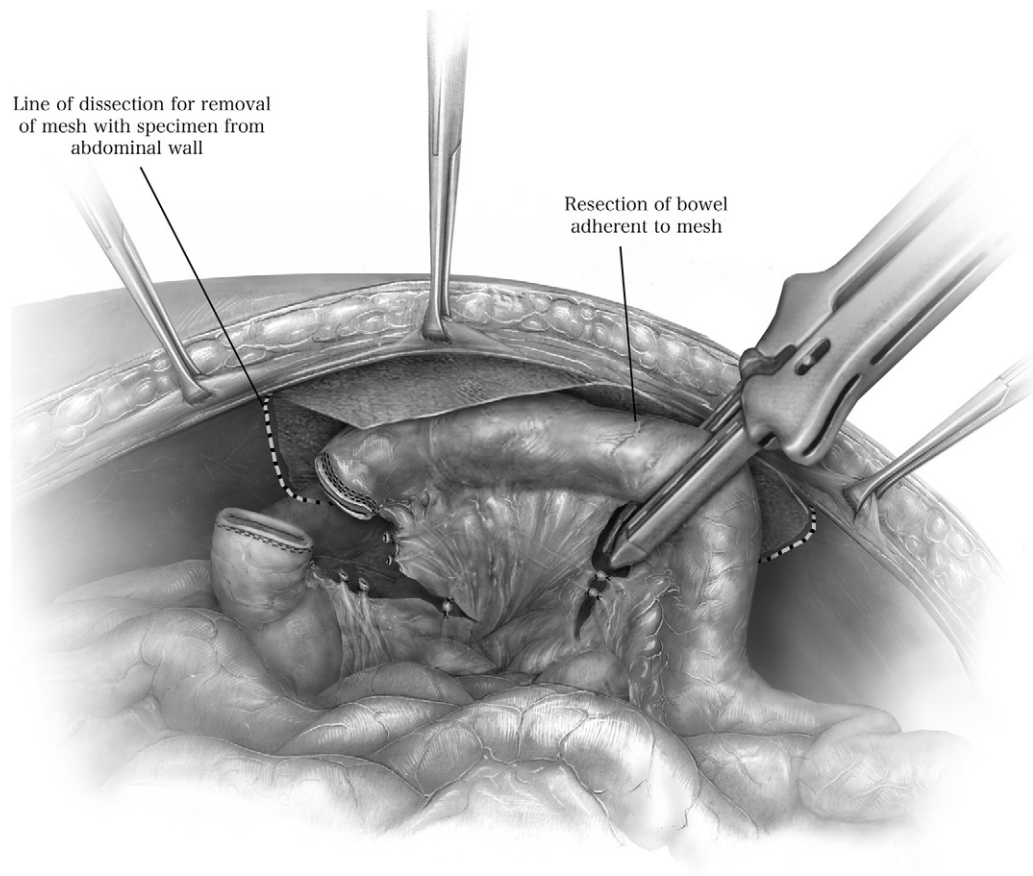


Figure 5 Damaged bowel involved with the enterocutaneous fistula and bowel in continuity or densely adherent to the mesh is resected using linear staplers.

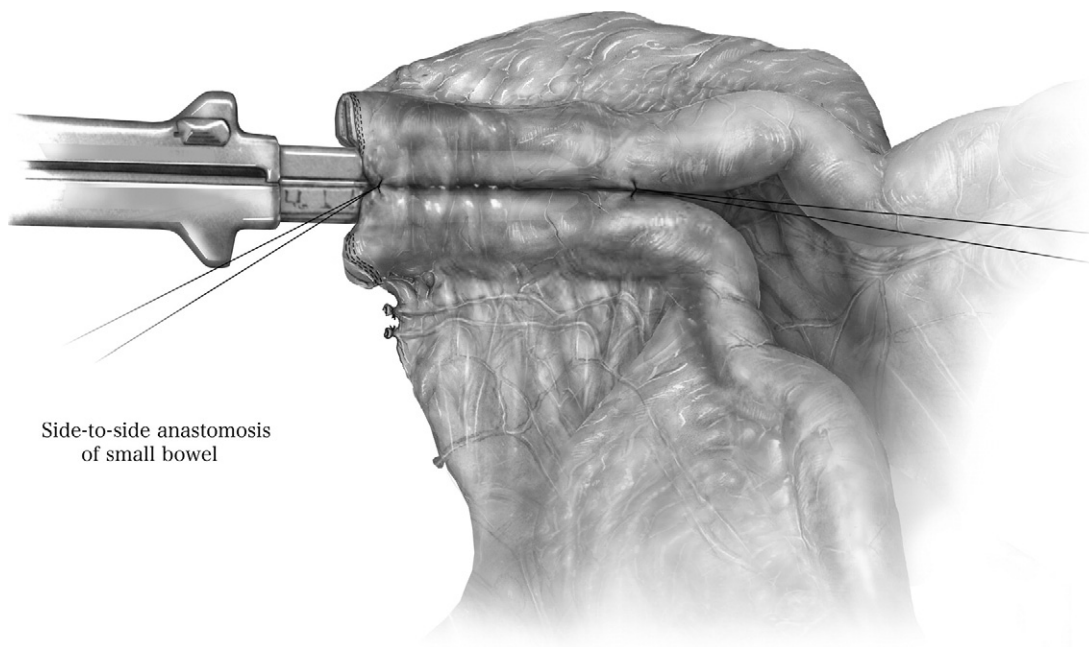


Figure 6 Primary anastomosis is then performed using a linear stapling device along the antimesenteric side of the two bowel segments.

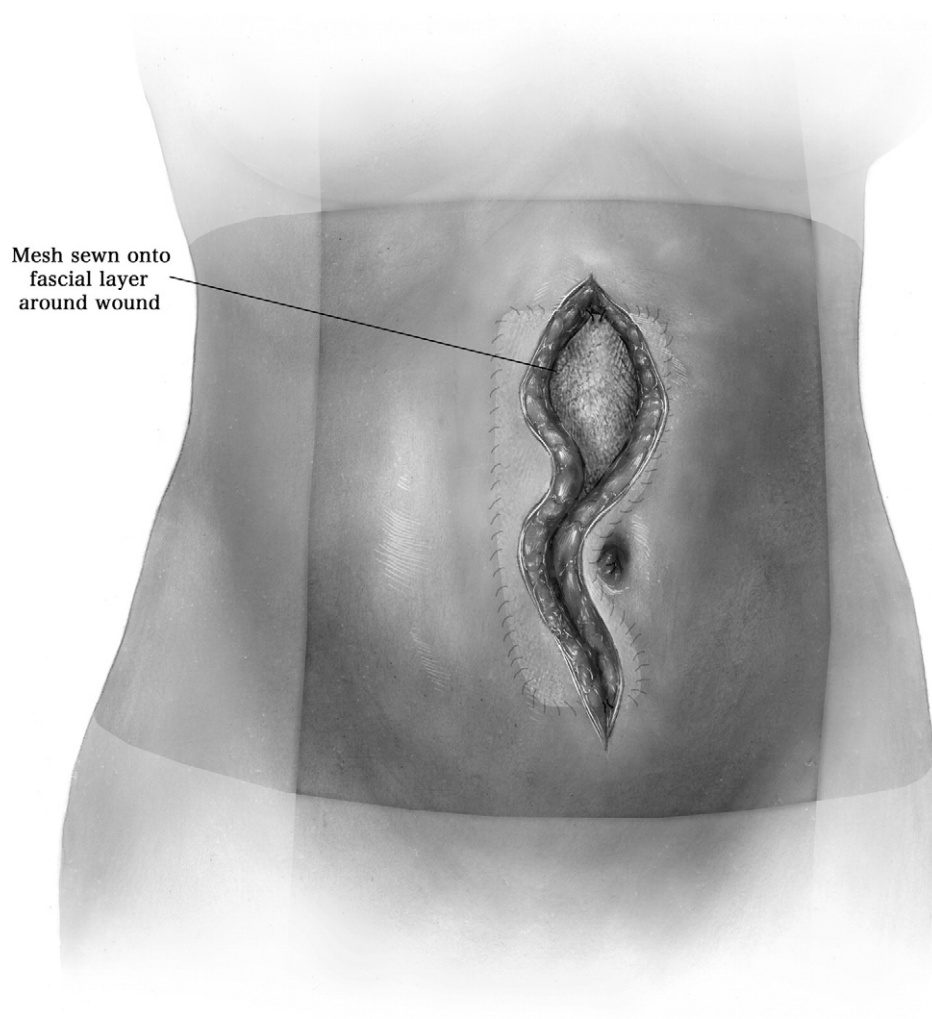


Figure 7 A piece of biologic mesh can be sewn to the fascial edges with permanent suture to close the fascia if the defect, after the infected mesh is removed, is too large to close primarily.

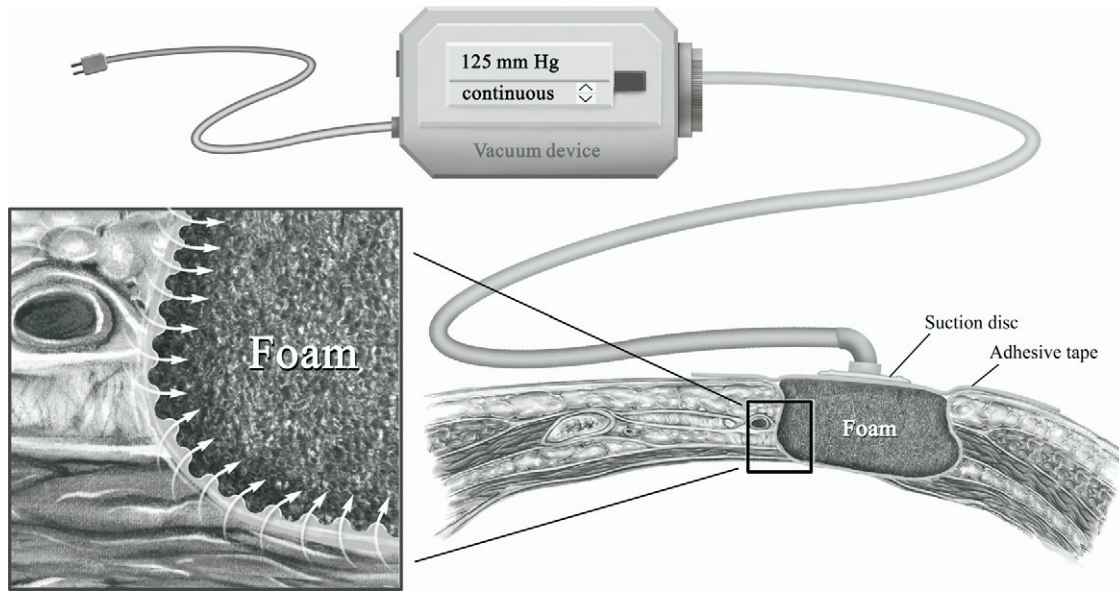


Figure 8 The subcutaneous tissue is left open, because of the contaminated wound, and a vacuum assisted sponge dressing is applied to the subcutaneous tissue.

Conclusion

The development of an enterocutaneous fistula through a piece of synthetic mesh used for ventral hernia repair is uncommon, but devastating. We have found conservative treatment for an enterocutaneous fistula involving mesh to be ineffective. Appropriate management begins with optimizing the patient's nutritional status and medical conditions, fol-

lowed by surgical repair. Part or all of the mesh is removed and the fistula is repaired or resected. The abdominal wall is closed primarily or with a bioprosthesis, understanding that either method is likely to result in a recurrence of the hernia. Definitive repair of a persistent or recurrent hernia utilizing mesh can be performed at a later time, when the hernia recurs and the operative field is no longer contaminated.