

Composite Mesh in Incisional Hernia Repair: Unprecedented Gastric Penetration and Gastrocutaneous Fistula Formation

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ABSTRACT

Hernia repair frequently employs surgical mesh. However, potential complications exist, including mesh migration into adjacent organs, leading to serious outcomes such as enteric fistulas. We report an unprecedented case of composite mesh leading to gastric penetration and subsequent gastrocutaneous fistula formation, identified during endoscopic investigation as a foreign body. A 70-year-old man who underwent right hemicolectomy and incisional hernia repair using composite mesh presented in with symptoms of intestinal obstruction and a small bowel content leak. Following these complications, a small bowel resection was performed, and an ileostomy was created. During an endoscopic investigation, the composite mesh used in the hernia repair during the ileostomy creation was found as a foreign body penetrating the gastric antral area, causing a gastrocutaneous fistula. An exploratory laparotomy was successfully carried out. This case highlights the need to consider mesh-related complications and advocates for research into prevention and management of such adverse outcomes.

KEYWORDS: composite mesh; gastric penetration; gastrocutaneous fistula; mesh migration; endoscopy

INTRODUCTION

Inguinal hernia repair is one of the most frequently performed surgical procedures worldwide, and the use of surgical mesh in these operations has become standard practice.¹ Surgical mesh, especially composite mesh, has revolutionized the field of hernia repair due to its unique characteristics. The dual-layer design of the composite mesh encourages tissue ingrowth on one side while minimizing adhesions to the viscera on the other side, thereby reducing the risk of hernia recurrence.²

Despite the widespread use and benefits of surgical mesh, the associated complications cannot be overlooked. Known complications of mesh usage in hernia repair include infection, chronic pain, and mesh rejection.³ More rarely, instances of mesh migration and erosion into adjacent organs have been reported.^{4,5} The gastrointestinal tract is the most commonly involved organ system in mesh migration, potentially leading to serious complications including enteric fistulas.⁶ Enteric fistulas are abnormal connections between the gastrointestinal tract and another organ or the skin. While they can result from various conditions, including Crohn's disease, malignancy, and surgical complications, the occurrence of a fistula due to composite mesh erosion is exceptionally rare.⁷

This report presents the first documented case of a composite mesh causing gastric penetration resulting in fistula formation. This case underscores the necessity of a diligent postoperative follow-up protocol for patients who have undergone hernia repair with mesh implantation and expands our understanding of the potential complications associated with the use of composite mesh.

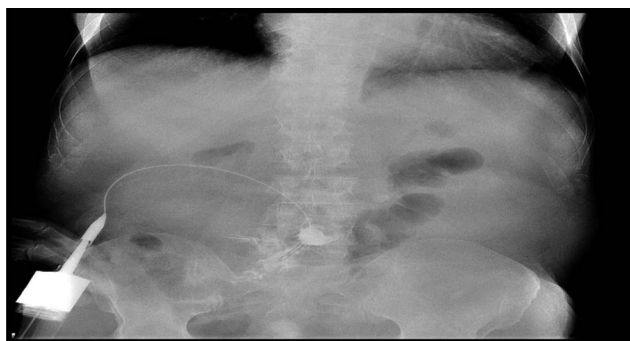


Figure 1. Fistulogram shows no frank connection to the stomach or small bowel.

CASE REPORT

A 70-year-old man, previously diagnosed with atrial fibrillation, presented with a surgical history that includes a right hemicolectomy with ileocolic anastomosis and subsequent chemotherapy for colon cancer in 2008, as well as an incisional hernia repair using a composite mesh in 2010.

The patient first presented in Iraq with symptoms suggestive of intestinal obstruction in June 2022. An exploratory laparotomy was performed, which included adhesiolysis and a segmental ileal resection with end-to-end anastomosis. A month later, the patient developed a discharge from the incision site, which was diagnosed as a leak of small bowel content, prompting a surgical intervention to create an ileostomy, with the placement of composite mesh for abdominal repair.

In February 2023, the patient returned with a complaint of yellowish discharge from the surgical wound, which appeared to increase following meals. An inconclusive fistulogram was conducted, showing an irregular contrast area but no apparent connection to the stomach or small bowel. Further investigation through a Gastrografin meal unveiled a conduit between the gastric antrum's anterior aspect and the abdominal wall's subcutaneous tissue (Figure 1). The duodenum and proximal

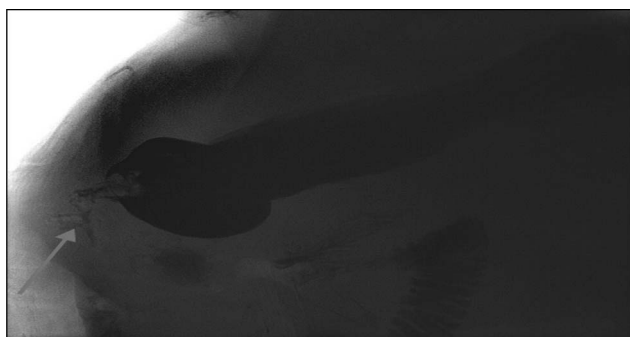


Figure 2. Gastrografin barium meal showed a connection between the anterior aspect of gastric antrum and the subcutaneous tissue of the abdominal wall.

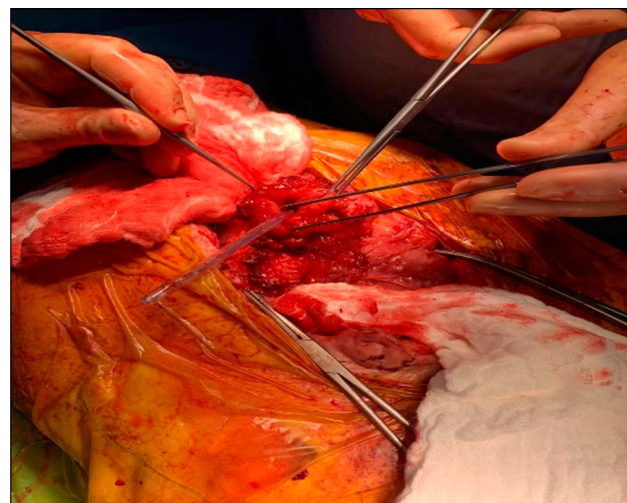


Figure 3. Shows the gastric hole intraoperative.

jejunum were found to be normal. Consequent endoscopic examination of the upper gastrointestinal tract revealed a large gastric fistula caused by a foreign body, identified as the composite mesh, penetrating the stomach's antral area (Figure 2, Video 1). A follow-up colonoscopy revealed mild diversion colitis but no other significant findings.

In response to these findings, an exploratory laparotomy was performed in March 2023, during which severe adhesions and a mesh-induced perforation on the stomach's anterior part were identified. The mesh was successfully dissected and removed (Figure 3). The gastric perforation was addressed using an endoGIA 100 mm stapler to excise the perforation edges, followed by suturing the stapler line with a Monocryl 3/0 in a continuous manner. The patient's postoperative course was stable, with no complications, and he was subsequently transferred to a nonintensive care unit. Histopathological examination of the removed specimen revealed benign gastric mucosa with edema and chronic inflammation, alongside an area of extensive ulceration with granulation tissue.

The patient's postoperative course was marked by a steady and uneventful recovery. There were no complications, and he tolerated his diet well. Regular monitoring and care ensured his condition remained stable. This smooth recovery underlines the success of the surgical intervention in managing this complex case. The patient was subsequently discharged in good general health.

DISCUSSION

The advent of surgical mesh has revolutionized the approach to hernia repair, offering substantial reductions in recurrence rates.¹ However, as with any surgical procedure, the use of mesh is not without potential complications, including infection, chronic pain, and in rare instances, meshes migration and erosion into adjacent organs.^{3,8}

In this case, we report an unprecedented complication of composite mesh used for incisional hernia repair—gastric penetration leading to the formation of a gastric-enterocutaneous fistula. Fistulas secondary to mesh migration are seldom reported, and to our knowledge, this is the first reported case of a fistula due to composite mesh erosion into the stomach.

Mesh erosion into the gastrointestinal tract is a rare but recognized complication, with previous reports describing erosion into the bladder, small intestine, colon, and sigmoid colon.^{4,6} However, mesh erosion leading to gastric penetration is a novel finding. This could be attributed to the particular features of composite mesh, which is designed to encourage tissue ingrowth and minimize visceral adhesions.² Possibly, the combination of these factors with individual patient characteristics and the specifics of the surgical technique led to the unusual complication observed in this case.

The management of mesh-related gastrointestinal complications is challenging and requires a multidisciplinary approach.⁹ In this case, on identifying the gastric fistula, the mesh was successfully removed, and the gastric perforation was closed surgically. A conservative approach, including the use of vacuum dressing and total parenteral nutrition, failed to manage the abdominal wall fistula. This approach aligns with current recommendations for the management of enterocutaneous fistulas.¹⁰

This case underscores the importance of considering mesh-related complications in patients presenting with unusual postoperative symptoms after incisional hernia repair. Further studies are needed to better understand the factors contributing to mesh erosion and fistula formation, and to guide the development of strategies to prevent such complications.

DISCLOSURES

Author contributions: M. Abuassi: study conception and design, analysis and interpretation of results, and draft manuscript preparation. W. Jordan: data collection. E. Sammodi., M.

Eftaiha, and A. Obed: Analysis and interpretation of results, and critically revising the manuscript for important intellectual content. All authors reviewed the results and approved the final version of the manuscript. M. Abuassi is the article guarantor.

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Informed consent was obtained for this case report.

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