Surgical Management of Enterocutaneous Fistula in a Patient with a Giant Incisional Hernia: A Case Report

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Abstract

Background: Incisional hernias occur in 3.8–11.5% of patients following abdominal surgery, representing a common postoperative complication. Enterocutaneous fistula (ECF) formation within this patient subset is infrequent yet poses a significant risk, associated with heightened morbidity and mortality rates. The management of giant incisional hernias (GIH) accompanied by loss of abdominal domain and ECF presents a formidable surgical challenge, often characterized by a high recurrence rate.
Aim: to find out how common Enterocutaneous Fistula is in a Patient with a Giant Incisional Hernia. And what are the optimal treatment options for it.
Methods: The case under consideration involves an obese woman presenting to our emergency department with a 24-year history of incisional hernia. She manifested GIH with loss of domain (LOD) and concomitant ECF, stemming from a prior exploratory laparotomy for peritonitis two decades prior, which was followed by the development of an incisional hernia. Notably, the ECF was characterized by substantial chyme discharge.
Results: The patient underwent a herniotomy and small intestine resection as the initial intervention, with subsequent closure limited to the skin. Six months later, a hernia repair incorporating mesh implantation was performed. However, this procedure was complicated by the development of extensive skin flap necrosis, necessitating management with vacuum therapy.
Conclusions: The single-stage surgical treatment of giant ventral hernia complicated by enterocutaneous fistula is associated with an increased risk of morbidity and mortality. VAC therapy is a viable option for the conservative treatment of abdominal wall wounds with mesh exposure. This approach facilitates successful recovery with fewer complications, a reduced number of surgeries, and a shorter recovery time, while preserving the implant. Additionally, these benefits contribute to reduced costs for the healthcare system. (**TCM-GMJ December 2024; 9 (2): P74-P78)**

Introduction

Incisional (ventral) hernias are a common postoperative complication that impacts 3.8–11.5% of patients **[1]**. Incisional hernias can be complicated by the development of an enterocutaneous fistula which can worsen the patient's clinical course and increase the morbidity and mortality of patients.

A giant incisional hernia (GIH) is marked by a width greater than 10 cm minimum and is more frequently associated with loss of domain (LOD) where the abdominal contents protrude through the hernia sac. **[2][3]**.

Incisional hernias more commonly occur in the midline than in other sites **[4]**. Enterocutaneous fistula (ECF) is an atypical interconnection between the intra-abdominal gastrointestinal (GI) tract and the skin or the post-surgical wound **[5]**.

Enterocutaneous fistulas can arise as a late consequence of gastrointestinal surgery, the most common cause of enterocutaneous fistula development is unintentional enterotomy during surgical treatment of small bowel obstruction **[6, 7]**.

According to Quinn M et al 89% of intestinal cutaneous fistulas are formed after abdominal surgery, 6.8% spontaneously, and 3.9% following endoscopic treatment **[8, 9, 10]**.

Here we present and discuss the staging surgical management of enterocutaneous fistula in a patient with a giant incisional hernia.

Case Presentation

Our patient is a 56-year-old obese woman (BMI= 35.1kg/m^2) who has a 24-year history of incisional hernia and is presenting in the emergency department with a huge, protruding abdominal mass and a substantial amount of chyme discharge from the active fistula site.

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The patient's current condition is a result of a previous umbilical hernia repair without a mesh performed 29 years ago. Because of the recurrence of the ventral hernia she was operated 24 years ago also, soon after the second surgery she developed incisional hernia recurrence.

The hernia expanded over time to become a GIH with loss of domain (LOD) which was then superimposed by the development of an ECF.

Upon initial examination, the patient exhibited a large, irreducible abdominal hernia with noticeable skin changes and active chyme outflow from the fistula **(Figure 1).**

We first attempted to treat the patient with a herniotomy, in which the hernia sac was dissected and removed, and the portion of the small intestine connected to the ECF was excised **(Figure 2).** Second surgery to repair the hernia was planned after 6 months.

The patient's BMI has reduced from 35.1kg/m^2 to 30.9kg/m^2.

On pre-procedural CT scan **(Figures 3 and 4),** the hernia was measured to be 30 cm in vertical length, 10 cm in height and 30 cm in transverse width. The hernia sac volume was calculated to be around 9000 mL, the abdominal cavity volume was 6500 mL, LOD percentage according to the Sabbagh method was calculated to be around 58%.

The Rectus to Defect Ratio (RDR), was calculated by adding the width of the left and right rectus (4.11 cm in our patient) divided by the hernia width (14.15 cm) which was measured to be 0.290.

The hernia was repaired and a 20x25 cm synthetic composite mesh was placed in an Inlay plus Onlay method **(Figure 5).** The intra-abdominal pressure was measured post-operatively and was 12mmHg.

The patient's course was then complicated by skin and subcutaneous fatty tissue hematoma formation on the first day after surgery that then progressed to significant tissue loss due to widespread skin flap necrosis surrounding the surgery site.

The patient was under active follow-up. No sepsis was detected and there was no SIRS. Within three weeks, a clear demarcation was formed between necrotic and healthy tissues. **(Figure 6).**

After obtaining a clear demarcation line between necrotic and healthy tissues. A third operation was performed. Debridement and vacuum (VAC) device installation. It should be noted that it was not necessary to remove the implanted mash **(Figure 7).**

The silver-coated sponge was surgically removed in the 5th postoperative day and the skin defect was sutured. The wound healed without complications.

On the latest follow-up (1 year) the patient is doing well, hernia completely repaired and there are no long-term complications **(Figure 8 and 9).**

The sequential surgical method emphasizes the need for careful planning and interdisciplinary care, as single-stage surgical treatment is associated with increased risk of morbidity and mortality. The development of skin flap necrosis after surgery, despite continuous surgical procedures, highlights the inherent difficulties in wound care and the necessity of careful surgical site wound monitoring care.

Results and discussion

An incisional hernia is a type of ventral hernia found in the abdominal wall and develops after a previous surgical incision **[11].** A giant incisional hernia (GIH) is marked by a width greater than 10 cm minimum **[2].**

Incisional hernias more commonly occur in the midline than in other sites, it might be a definite hernia with all of the components, including the defect, sac, and contents **[11]**. Complex giant incisional hernias are often difficult to manage since remodeling the

abdominal wall can only be performed when the defect can be closed without complications, which can be hard in cases of huge defects **[12]**.

The complexity stems from a variety of factors, the most important of which is the size of the hernia, which may need the use of component separation of fascial edges. Another factor to consider is the loss of dominance, which occurs when a significant portion of the abdominal contents shift from the abdominal cavity to the hernial sac **[12]**.

In the case that was presented, the patient had undergone an exploratory laparotomy 29 years ago, which was followed by the development of a complicated giant incisional hernia.

The symptoms range from absence of symptoms to discomfort, and pain, progressing to strangulation and bowel obstruction **[13]**.

Clinical risk factors that contribute to the development of giant incisional hernias include incomplete wound closure, deep wound infections, malnutrition, perioperative hypotension, steroid use, and aortic aneurysm disease **[13].**

A history and physical examination are typically sufficient to identify an incisional hernia. Further imaging methods are necessary for occult hernias, including minor incisional hernias and hernias in obese persons **[11]**.

Dynamic abdominal sonography for hernia (DASH) is an effective diagnostic modality that can rapidly identify and assess the true extent of an incisional hernia at the bedside, along with aiding the planning of operational treatment in difficult patients without exposing the patient to unnecessary radiation as opposed to a CT scan **[14,11]**.

CT scan combined with volumetric analysis preoperatively helps calculate the loss of domain, which describes the distribution of the abdominal contents located between the hernia and the abdominal cavity. Using the Sabbagh method which is calculated as a percentage of the hernia sac volume (9000 mL in our patient) over the total peritoneal volume (15500 mL in our patient) times 100 **[15]**.

LOD is an important parameter to calculate as, the larger the preoperative LOD, the higher the intra-abdominal pressure after hernia repair **[16]**. This increase in intra-abdominal pressure can compress the diaphragm, making inspiration less effective and predisposing to pneumonia; in addition, the increased tension leads to increased local wound complications and increased hernia recurrence, this fact emphasizes the importance of measuring intra-abdominal pressure after hernia repair **[17, 18]**.

Rectus to defect ratio (RDR) also known as the Car-

bonell index, calculated by the summation of the width of the left and right rectus (4.11 cm in our patient) compared to the hernia width (14.15 cm) equals 0.290.

This result predicts the ability to close the abdominal wall defect during routine hernia repair without the need to perform an additional component separation technique (CST) **[17]**.

Using DASH to detect hernia recurrences might quite enhance the long-term follow-up of patients with hernias **[19]**.

The first surgery performed on this patient was a herniotomy and resection of the small intestine, followed by hernia repair with composite mesh implantation after 6 months. The reasons for the delay in hernia repair after ECF treatment are to promote weight loss (BMI was 35.1 and after 6 months decreased to 30.9) as obesity is a characterized poor prognostic factor for surgery **[20]** and to decrease the incidence of abdominal adhesions **[21]**. Preoperative transabdominal ultrasonography appears to be a beneficial approach for identifying intraabdominal adhesions before surgery in individuals who have had previous open abdominal surgical operations **[21]**.

Composite mesh advantages are less intraabdominal adhesions, no complications postoperatively, and quick remodeling of the tissues with well-organized collagen fibers **[22]**.

Any abnormal interaction between the gastrointestinal tract and the skin of the abdominal wall is defined as an enterocutaneous fistula (ECF) **[23]**.

Patients with a history of trauma, inflammatory bowel disease, or previous GI surgery are more likely to develop an enteric fistula **[24]**. The majority of ECFs occur during the postoperative phase **[24]**.

ECF complications triad is sepsis, starvation, and electrolyte abnormalities **[24].** ECF can be diagnosed by Ultrasound, CT scan, and fistulography (X-ray procedure used to view a fistula) **[24]**.

The most successful treatment, as long as the intestine looks healthy, is to remove the fistula tract and resect a small section of the related bowel, followed by an anastomosis to restore intestinal continuity **[24].**

Comprehensive treatment for abdominal wall reconstruction must be utilized: prosthetic materials, abdominal component separation, tissue expansion, vacuum-assisted closure devices, local and distant muscle flaps, and free tissue transfer.

The laparoscopic technique has a maximum transverse dimension of 10-15 cm (beneficial due to the smaller incisions, the ability to easily identify all hernial defects, less mobilization of fascial borders, and the ability to position the mesh deep into the fascial layer, which provides a mechanical advantage **[25, 26].**

Those with more than 15 cm transverse dimensions typically require open supplementary components (separation operation) **[25].**

Skin necrosis is a potential postoperative complication of abdominal wall reconstruction after herniotomy, of which the treatment is lengthy, challenging, and expensive **[27].**

Absolute contraindications for the laparoscopic operation are previous incisional hernia repair (due to the usual dense adhesions encountered), open wounds (insufflation is impossible), and loss of domain (because the contents of the hernia sac cannot be reduced), as in our patient **[25].**

Simultaneously repairing the enterocutaneous fistula and reconstructing the abdominal wall (using prosthetic mesh or autologous material as tissue flaps) is a better option as it reduces recurrence rates for fistula as compared to enterocutaneous fistula repair alone **[28, 29].**

A potential novel approach to treat open abdominal wounds and strengthening fascial closure that we utilized for this patient is Vacuum-assisted wound closure (VAC) with a silver- coated sponge **[30]**. Studies suggest that VAC is associated with a low incisional hernia rate, and possible short-term wound issues **[30].** The use of silver-coated sponge is associated with a decreased surgical site infection risk and fewer postoperative complications **[31].**

Conclusion

The case at hand concerns an obese woman with a 24-year history of incisional hernia. She developed GIH associated with ECF as a result of a previous exploratory laparotomy two decades ago, which was followed by the development of an incisional hernia. The patient received a herniotomy and resection of the small intestine as the primary operation. Six months later, a hernia repair with mesh implantation was done. However, this surgery was exacerbated by the occurrence of significant skin flap necrosis. Which was successfully managed with debridement and Vacuum assisted wound closure (VAC). "

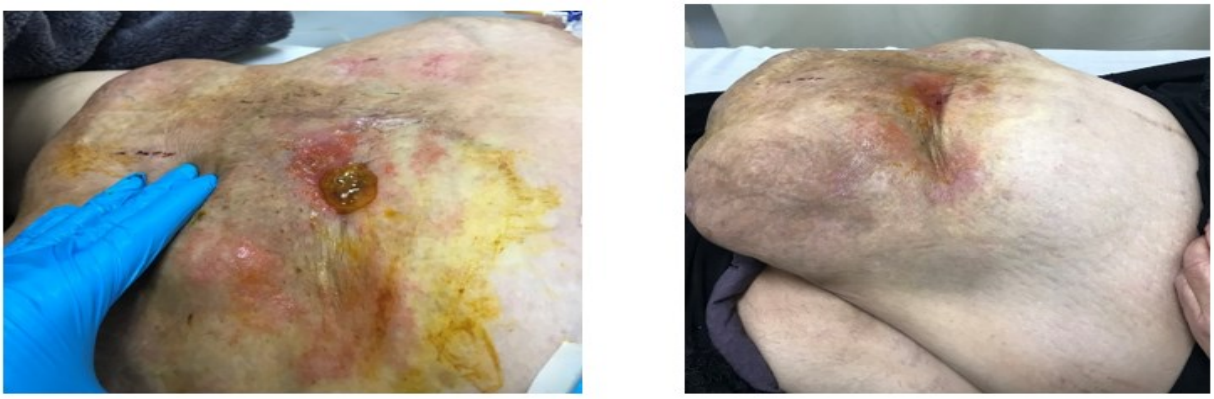

Figure 1: large, irreducible abdominal hernia with active chyme outflow from the fistula.

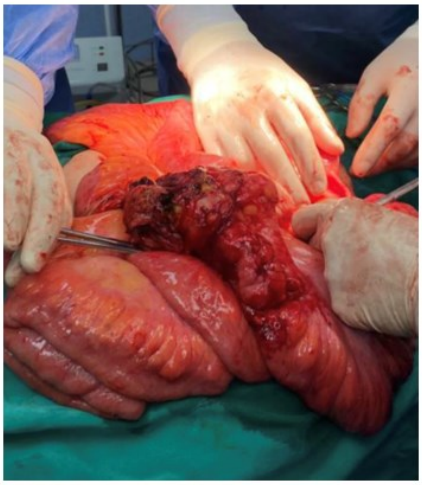

Figure 2: Herniotomy and resection of the small intestine.

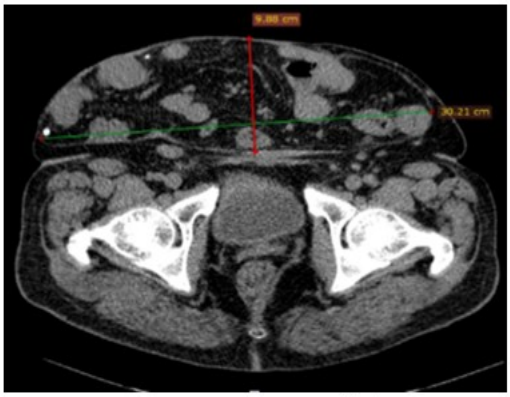

Figure 3: CT (Cross-sectional Plane).

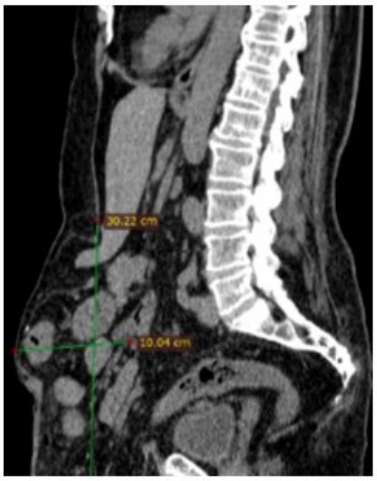

Figure 4: CT (Sagittal Plane).

Figure 5: Hernia repair with 20x25 cm synthetic composite mesh.

Figure 6: After three weeks clear demarcation line is formed.

Figure 7: Vacuum-assisted closure (VAC) with a silver-impregnated sponge.

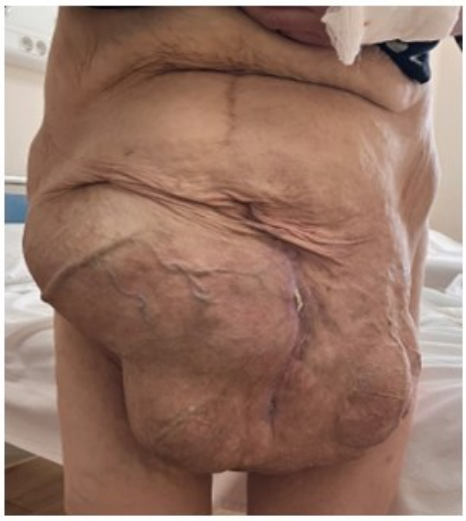

Figure 8: Before 1 year.

Figure 9: After 1 year.

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