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Case Presentation

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Operational Wound Infection and Hernioplasty with Mesh - Should we always remove the Mesh? A Case Report and Literature Review

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Summary

We present a case of obstructive acute abdomen due to incisional hernia that progressed postoperatively to surgical site infection. We identified the main associated risk factors, as well as a correlation between the steps presented for a satisfactory resolution of the case and the current resources for managing these patients in light of scientific evidence.

Introduction

Repairing incisional hernias using mesh is a procedure performed very frequently today. The use of mesh reduces the recurrence of hernias after surgery [1]. The body's response to the use of synthetic mesh can generate a foreign body reaction, culminating in complications such as seroma, mesh migration, chronic pain and infection [1]. Infection of mesh is one of the most feared complications, with a variable incidence according to the characteristics of each patient, the type of technique and positioning of the mesh used [1,2], generating an impact on morbidity and mortality, with an increase in hospitalization time and costs, in addition to with a greater chance of hernia recurrence and mesh explants [3]. Among the risk factors for mesh infection are emergency surgeries, association of hernia repair with mesh and procedures involving the gastrointestinal tract, previous correction of incisional hernia and surgical site infection [2,3]. Advanced age

and smoking also constitute risk factors for mesh infection, as well as use of corticosteroids and immunosuppressive agents. The fact that immunosuppression increases the risk of mesh infection makes incisional hernias after transplants even more difficult to treat [3]. The association of gastrointestinal procedures at the same time as mesh implantation increases both the chance of infection and the chance of mesh explanation [3]. Obesity, poorly controlled diabetes and chronic obstructive pulmonary disease also increase the risk of infectious complications.

Case Presentation

Female, 63 years old, obese, smoker, appendectomy 10 years ago with infraumbilical midline incision, seeking emergency care due to abdominal pain, vomiting and cessation of evacuations after two days of evolution, presented with symptomatic large ventral incisional hernia 4 years ago, with previous hospitalizations by intestinal subocclusions responsive to conservative treatment. On examination, the abdomen was distended and the incisional hernia in the infraumbilical region was irreducible and painful on palpation. Blood count with leukocytosis and deviation. Computed Tomography (CT) with contrast showing hernia of the anterior abdominal wall in the right paramedian situation - 13.9 x 6.3 cm and neck measuring 3.6 cm, in addition to another median hernia measuring 19.3 x 6.2 cm and neck of approximately 5.0 cm, herniation of fat and segment of small intestine with moderate distension and transition point near the hernial neck **(Figure 1 and 2)**, in addition to a small amount of free fluid.

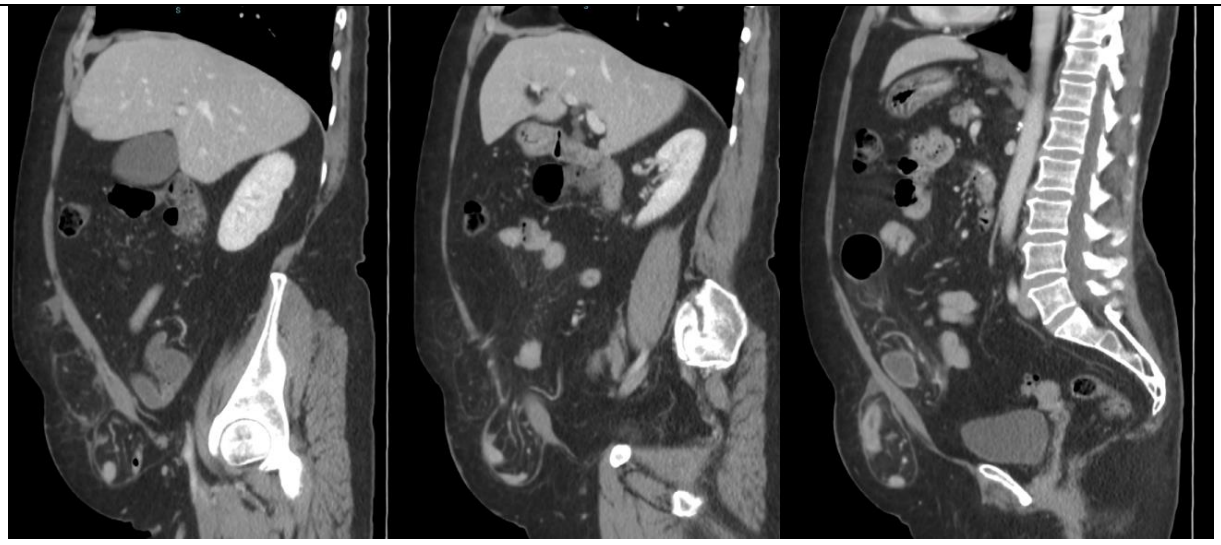

Figure 1: Complex incisional hernia at different levels according to sagittal view.

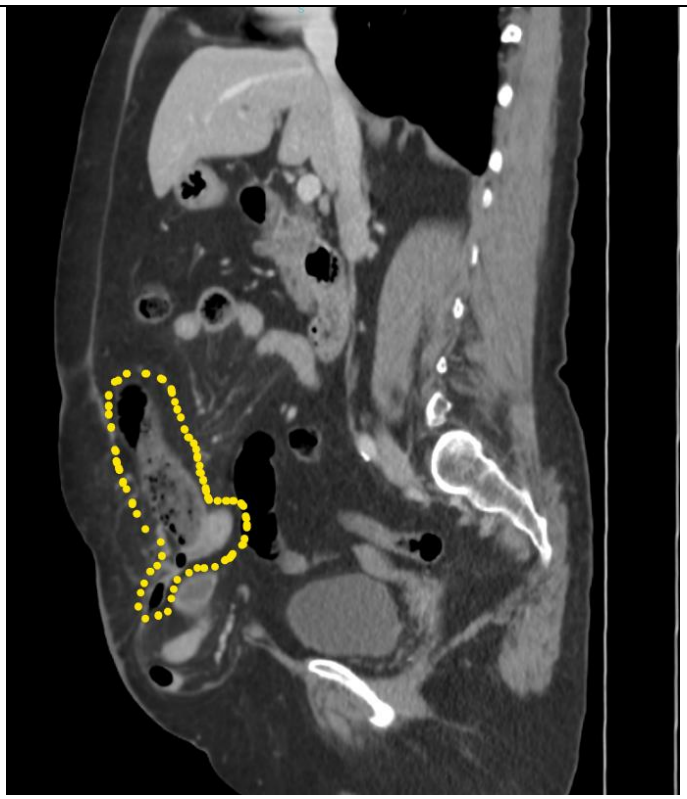

Figure 2: Gauge transition between handles (yellow dotted).

She underwent laparotomy on the same day, due to acute obstructive abdomen, with a median infraumbilical incision with identification of the two hernial necks containing epiplon and segments of viable small intestine, without the need for intestinal resection. Reduced hernial content, with resection of the excess hernial sac, continuous suture of the aponeurosis with polydioxanone. Subcutaneous dissection was performed and a polypropylene mesh measuring approximately 15 x 20 cm was fixed over the aponeurosis with 0 prolene. A two-way suction drain (portovac®) was placed over the mesh. The patient had a good postoperative evolution, accepting an oral diet, preserved physiological eliminations, surgical wound in good appearance, drain with a serohematic appearance and low output (~90 ml) in the first days. He was discharged from hospital on the fifth postoperative day (PO). First review appointment on the seventh PO; on physical examination, the surgical wound showed no phlogistic signs, and the drain was removed. On the 12th PO, he returned to the emergency room with diffuse hyperemia in the abdomen, purulent drainage in the lower third of the surgical wound and a fever spike **(Figure 3)**. Laboratory tests showed leukocytosis with left shift and elevated inflammatory test (CRP). CT demonstrated infiltration and the presence of liquid areas in the abdominal wall at the abdominopelvic transition and near the surgical wound, closed aponeurosis and absence of other intracavitary changes **(Figure 4)**.

Figure 3: Surgical wound infection, intense cellulitis, penrose drain placed in an external service, ineffective, it was promptly removed and the patient was referred for surgery.

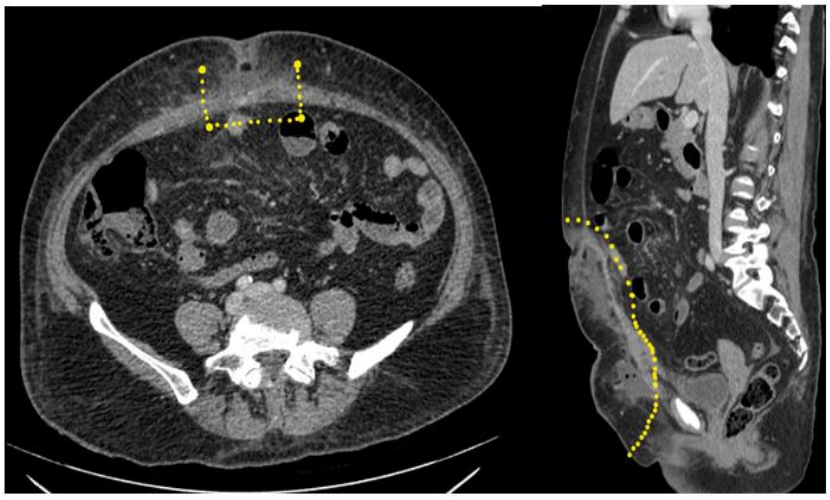

Figure 4: Yellow dotted area: intact aponeurosis and subcutaneous collection in axial and sagittal section.

Antibiotic therapy and surgical exploration were chosen due to surgical wound infection with systemic symptoms in a patient with mesh. A median infraumbilical incision was opened and an extensive subcutaneous purulent collection was drained. Aponeurosis and inorganic mesh were intact, with no folds or signs of dead space in the mesh and no signs of fasciitis. A semi-occlusive dressing was applied with vaseline gauze, opting for the preservation of the mesh and healing by secondary intention **(Figure 5A)**. Subsequently, antimicrobial therapy was adjusted according to the culture of the collection (Staphylococcus aureus sensitive to oxacillin) and the dressing was changed daily. The patient presented

laboratory and cellulitis improvement in the anterior abdominal wall, but there was still mild purulent drainage in the surgical wound. A new surgical approach was performed on the 17th PO, with removal of a few mesh fragments not integrated into the aponeurosis and with debridement of necrotic tissue in the subcutaneous tissue. We chose to close the wound with a vacuum dressing **(Figure 5B)**.

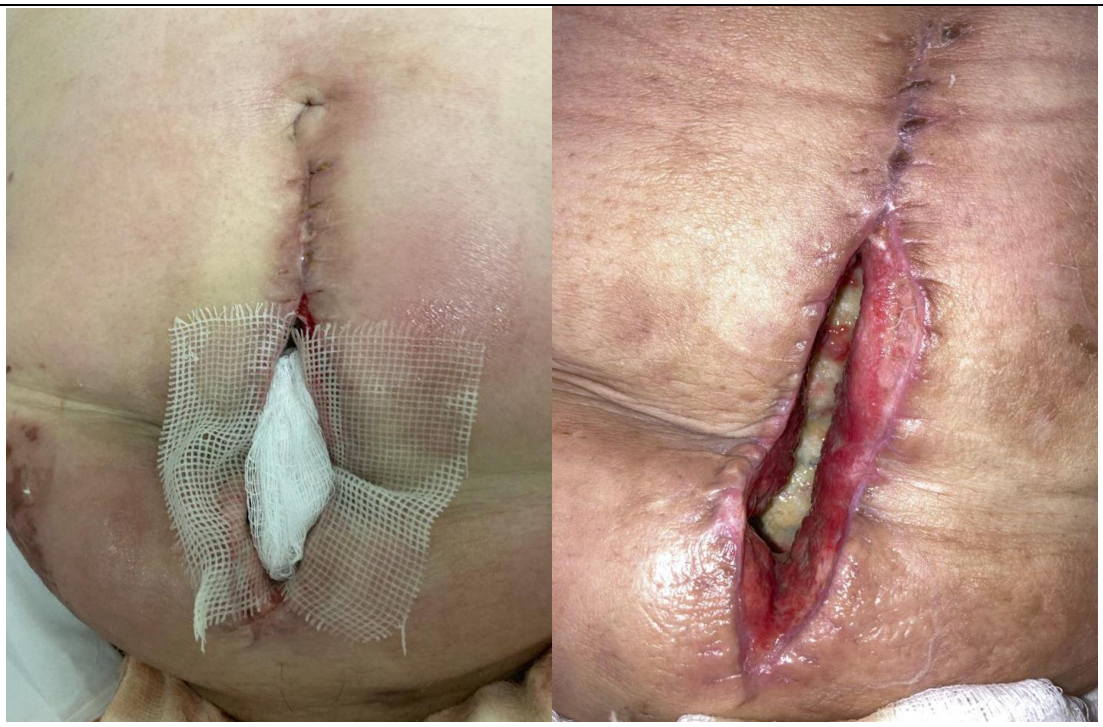

Figure 5: A) First dressing, before opting for vacuum therapy and B) After vacuum dressing.

The dressing was maintained for seven days, with improvement in phlogistic signs and cessation of purulent drainage in the subsequent days. After removing the vacuum dressing, a wound was observed with granulation tissue on the mesh incorporated into the aponeurosis, greater contraction of the edges and lack of drainage. A new dressing was applied with silver alginate and the patient was discharged from hospital afterwards.

Discussion

Studies reveal gram positive bacteria as the main ones found in mesh infections, with Staphylococcus aureus being the most frequently found, suggesting the importance of contamination with germs from the skin and subcutaneous tissue in the genesis of the infection [3]. Several variables are associated with complications related to the use of mesh, among they are the type of mesh, the surgical strategy and factors intrinsic to the patient [3]. The use of onlay mesh is associated with a higher risk of explanation, while sublay positioning is associated with lower rates of infection and recurrence, possibly due to less mesh exposure to the skin microbiota [2]. Multifilament meshes are associated with greater biofilm formation and, therefore, have a greater

chance of infection1. Meshes with larger pores, due to the smaller area of contact between the mesh and bacteria, have a lower risk of infection [1]. There is no evidence to recommend the use of antibiotics to prevent mesh infections, with only the prophylactic dose being routinely used before the incision, at the time of surgery [1,3]. Furthermore, there is no consensus regarding the benefit of soaking topical antibiotics into the mesh. Contamination of the mesh tends to occur at the time of its implantation, through contact with bacteria from the patient's skin and subcutaneous tissue, by the hands of surgeons or by the environment itself [1,3], therefore, care should be taken such as minimal manipulation of the mesh, avoiding contact with the skin, changing gloves when inserting the mesh, avoiding the presence of foreign bodies and using drains when necessary in order to reduce dead space are of great importance in preventing mesh infection [3]. The patient in the report above had some risk factors for mesh infection, including the fact that she was a smoker and obese and had undergone emergency surgery due to intestinal obstruction. The treatment of mesh infection classically involves hospital admission, antibiotic therapy, and drainage of collections and removal of the mesh, however new studies have demonstrated the possibility of preserving the mesh, supporting the approach applied in the case [2]. New approaches such as the use of vacuum dressing [4], parenteral antibiotic therapy and percutaneous drainage of collections as a therapeutic arsenal to "salvage" the mesh are changing the old concept of always removing the mesh. Negative pressure therapy favors healing and incorporation of the mesh by removing excess tissue subject to bacterial growth, increasing the formation of granulation tissue, blood flow and local tissue oxygenation5. However, to adopt these conservative measures, it is necessary to consider factors such as the patient's hemodynamic stability, mesh incorporation time and whether it has areas with dead space, presence of fasciitis, surgeries requiring intestinal resection and/or prolonged time, characteristic of pathogens, systemic signs of uncontrolled infection and whether there is improvement in the first 24/48 hours after first measures such as drainage and antibiotic therapy. These studies involve small series with a smaller segment, it is expected that studies with a greater number of cases and longer follow-up can identify which group of patients would benefit best from these measures [4]. The chronic consequences of the inflammatory state generated by prosthesis-related infection, such as an increased risk of cardiovascular disease, are not yet well established [5,6]. Maintaining the screen and not needing re approaches reduces the chance of recurrence, avoiding a vicious cycle of re approaches **(Figure 6)** [7]. All of the factors mentioned above influence the conduct of a mesh infection, however the topic remains controversial and there is no guideline that determines the ideal conditions for establishing conservative management. Therefore, a retrospective cohort study with 1885 participants sought to analyze the risk of mesh explanation in early (less than 90 days postoperatively) and late surgical site infections. It was found that conservative management is more appropriate for early infections, as in the case reported, while late infections are less likely to preserve the mesh, requiring surgical removal. However, more studies are needed to understand the relationships between the risk factors inherent to the patient, characteristics of the infection and treatment modalities and mesh recovery [8].

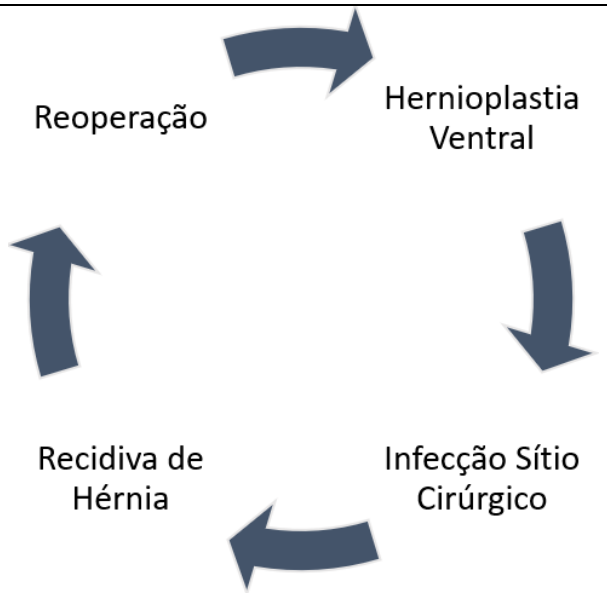

Figure 6: Free translation by the authors and adaptation of the "VICIOUS CYCLE OF COMPLICATIONS" presented by Holihan, Julie L et al. "Adverse Events after Ventral Hernia Repair: The Vicious Cycle of Complications. **[7]**".

Conclusion

The abdominal wall is the access route for some surgeries and for others it is the surgery itself from beginning to end. Reference services have their own team or abdominal wall group and in others it is the responsibility and routine of the general surgeon. In the authors' opinion, understanding strategies for adequate closure that minimize the occurrence of hernias is as essential as knowing how to correct them. Care such as serial review of patients for early diagnosis of complications such as the one presented (surgical wound infection) is a fundamental measure to avoid outcomes such as fasciitis or recurrence with possible loss of the prosthesis. It is up to the surgeon to stay up to date with alternatives such as the use of negative pressure therapy, early antibiotic therapy and, whenever possible, collection of material for culture, in addition to partial removal of the mesh in cases of non-incorporation. We should not underestimate hernia surgeries. As Lawrence T. Kim, an American researcher and surgeon, would say, "A humble umbilical hernia remains a simple yet complex case" **[9]**.

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