Management of infected mesh post laparoscopic transabdominal pre-peritoneal inguinal hernia repair

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ABSTRACT A 49-year-old man presented to the emergency department with a six-week history of fevers, weight loss and feeling unwell with anorexia. He had a history of a laparoscopic transabdominal pre-peritoneal left inguinal hernia repair seven weeks prior. An abdominal computer tomography scan showed a collection surrounding the mesh. Initial management involved oral antibiotics and ultrasound-guided drainage. Unfortunately, his symptoms and the collection persisted, and he required surgical intervention. After laparoscopy confirmed the containment of the infection to the pre-peritoneal space, the collection was approached via a moderate skin incision above the inguinal canal. This approach allowed for drainage of the collection, removal of the mesh and a thorough washout and drain placement without disturbing future hernia repair options nor exposing the intra-abdominal compartment to infection. The patient recovered well and was discharged five days after the operation. He did require another brief period of intravenous antibiotics before being discharged once more.

KEYWORDS mesh infection, TAPP hernia repair, general surgery

Introduction

The laparoscopic approach to an inguinal hernia is a popular technique for many reasons, one being the low risk of mesh infection. Though rare, the classical management of mesh infection is local debridement, irrigation, mesh removal and systemic antibiotics. This has been performed and reported by others using various other techniques, but this is the first documented use of this method of mesh removal and local debridement. This technique is unique in that not only does it preserve the tissue planes in the inguinal region to allow for an open hernia repair in the future, but it also prevents any contamination of the intra-peritoneal cavity, thus decreasing the risk of intra-abdominal abscess formation. This is a worthwhile technique to have in the armamentarium against mesh infections in the pre-peritoneal space.

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Case report

A 49-year-old man presented to the emergency department with a six-week history of intermittent fevers, weight loss and feeling unwell with anorexia. He reported approximately 7kg of weight loss in four weeks. He had a history of a laparoscopic trans-abdominal pre-peritoneal (TAPP) left inguinal hernia repair seven weeks prior. The surgery was uncomplicated and prophylactic antibiotics were administered peri-operatively, and a 14x11cm large Bard 3D (polypropylene monofilament mesh) mesh was inserted. The patient recovered well and was discharged the same day from the hospital. He experienced only swelling in the left lower quadrant of his abdomen and left groin. There was no erythema nor discharge from the surgical wounds to suggest a surgical site infection. He was otherwise a fit, (BMI 21.1) non-smoker with no co-morbidities. He had no other symptoms; reporting normal urinary and bowel function, no vomiting nor abdominal distension. On examination, he was mildly tender over the left lower quadrant but did not exhibit peritonism.

He was initially investigated with an abdominal computer tomography scan which demonstrated a 52x26x65mm rim-enhancing fluid-filled collection in the left lower abdominal wall (figure 1) with mesh floating within it (this was also visible on ultrasound, figure 2-A). There was some adjacent fat strand-

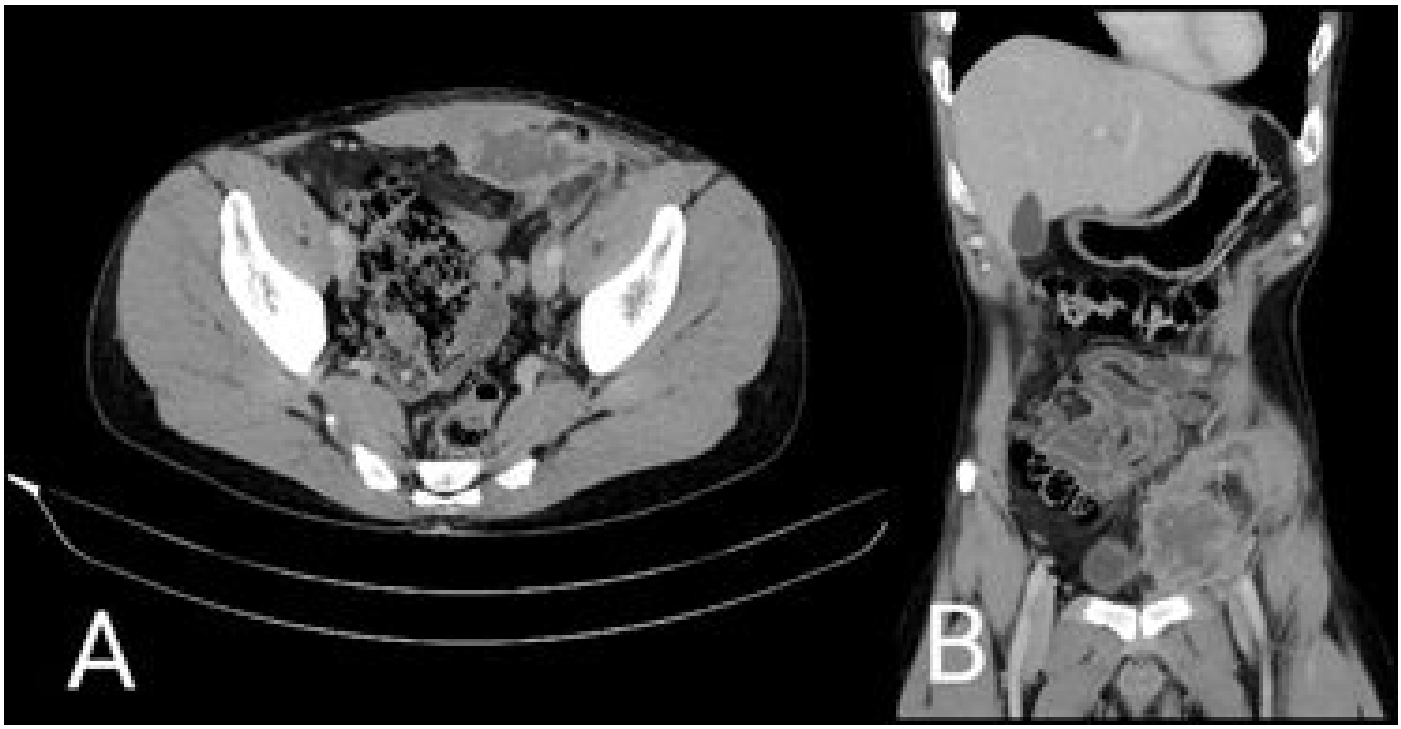

Figure 1: Computer tomography axial (A) and coronal (B) image of the left pre-peritoneal collection containing mesh.

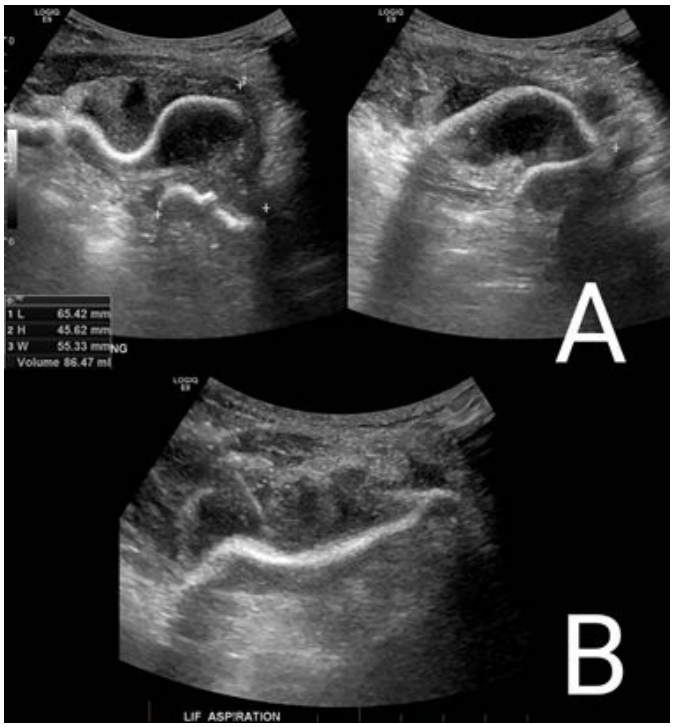

Figure 2: Ultrasound images of the collection with mesh (A) and ultrasound-guided aspiration of the collection above mesh (B).

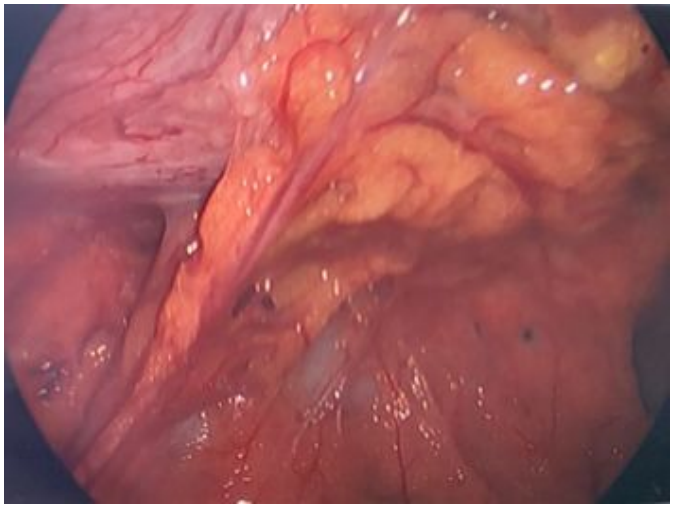

Figure 3: Image from a laparoscopic exploration of the abdominal cavity.

ing, mild displacement of the bladder and a small amount of free fluid within the pelvis. He was subsequently diagnosed with a post-operative mesh infection. There was no evidence of intra-abdominal complications, and the infection appeared to be contained in the pre-peritoneal space. He was subsequently managed with an ultrasound-guided aspiration of the fluid (figure 2-B). 40mL of fluid was removed and sent for microscopy, culture and sensitivities. This sample eventually grew mycobacterium fortuitum; resistant to cefoxitin, clarithromycin, tobramycin and doxycycline but sensitive to ciprofloxacin, cotrimoxazole, amikacin and linezolid.

However, the radiologist was unable to aspirate the fluid beneath the mesh, and the patient's symptoms continued. When he presented to the emergency department, eight days post aspiration, he was still experiencing fevers, and his biochemical investigations showed a white cell count of 20.1 x109/L (normal range: 4-11x109/L), a CRP of 88 (normal range: <5mg/L) and haemoglobin of 130g/L (normal range: 135-180g/L). The remainder of his observations and biochemistry were normal. He was changed to intravenous piperacillin/tazobactam, 4.5g three times a day and the decision was made to remove his mesh and debride the cavity. During the operation, an additional sample of the fluid and tissue were taken for microscopy, culture and sensitivity; however, there was no growth from these samples after five days of incubation.

The operation involved an initial laparoscopic approach to assess the containment of the infection to the pre-peritoneal space. No injury to the small bowel or any contamination was visualised. Thus the intra-abdominal space was left otherwise undisturbed (figure 3). A transverse incision was made over the left groin using a high approach. The external oblique was opened transversely, and the internal oblique retracted to expose the pre-peritoneal space. The inferior epigastric vessels were ligated. The cavity was found to contain 50mL of purulent material which was thoroughly washed out. The mesh and Absorbatacks were removed with some difficulty, and a Yates drain was inserted and secured before the closure of the incision. The patient was kept in hospital on intravenous antibiotics (piperacillin/tazobactam, 4.5g three times a day) for a total of five days. He was discharged on oral Augmentin duo forte (875/125mg twice a day) for five days.

The patient did represent to the hospital the same day after being discharged with a fever (T 38.6°C) and feeling unwell. The wound site appeared to be healing with no evidence of a re-accumulation of the collection. He was admitted once again with his white cell count of 16.9x109/L. He was placed on piperacillin/tazobactam once more for two days. He experienced no further fevers and was discharged after two days, once again on Augmentin duo forte (875/125mg BD). The patient has not represented again to the hospital but was reviewed in surgical outpatients with no symptoms two weeks post washout.

Discussion

The laparoscopic approach to an inguinal hernia is a popular technique for many reasons, one being the low risk of mesh infection. The incidence of mesh infection after a laparoscopic inguinal hernia repair has been quoted to be less than 0.16% [1]. The incidence of mesh infection after laparoscopic inguinal hernia repair is so small that some studies question the utility of prophylactic antibiotics. Though general recommendations are for the use of prophylactic antibiotics for surgeries involving the implantation of foreign materials, observational studies show no benefit in prophylactic antibiotic in elective laparoscopic inguinal hernia repair. This is echoed in the guidelines from the International Endohernia Society[2]. Mesh infections are more common in patients with the following risk factors; chronic obstructive pulmonary disease, high body mass index, smoking, advanced age and American Society of Anaesthesiologists (ASA) score ≥ 3; and as such antibiotic prophylaxis is recommended for these patients[2,3]. This patient did not have any of these risk factors, which makes this situation even more uncommon.

Mesh infections typically present either early (within four weeks) or late. Early infections are more common, with more than 50% of cases presenting within the first month. Late cases have been shown to present from four to twenty-nine months post-operative[4]. Mesh infections are commonly caused by skin bacteria such as staphylococcus species, (especially S. aureus, Coagulase-negative Staphylococcus) as well as; Enterococcus faecalis, Corynebacteria and Pseudomonas aeruginosa[1]. However, most of the time, the cultures are negative. From the initial sample of the collection fluid, it appears this case was infected with M. fortuitum. M fortuitum is an acid-fast bacterium which is found in water, soil, food products and animals. M. fortuitum is a rapidly growing, (Runyon Group IV) non-tuberculous mycobacterium which is commonly associated with surgical site infections; it has been previously reported in cases of injectables, inguinal hernia repair and breast implants[5]. It has been previously shown to be transmitted through contamination of surgical equipment. It was not known to be the causative organism at the time of presentation to our establishment and hence, the antibiotic regime was not rationalised accordingly.

The classical management of mesh infection is local debridement, irrigation, mesh removal and systemic antibiotics. However, some studies have shown success using conservative non-surgical management. Conservative management generally involves percutaneous drainage of the associated collection, intravenous antibiotics and, in some cases, infusion of antibiotics directly into the wound [6]. However, other studies have demonstrated that success in treating these infections is directly related to mesh removal and that drainage and antibiotics may be effective only in the short-term [7,8]. It is the method of mesh removal that differentiates this case from other cases described in the literature. Initially, meshes have been removed via large incisions over the infected groin. That technique, though useful in encouraging any ongoing infection to drain out via the skin, disrupts the planes of tissue of the inguinal canal, thus making an open repair more difficult in the future.

Other surgeons have used a completely laparoscopic technique, both TAPP and total extraperitoneal (TEP) approaches, to remove the mesh [1, 4]. The concern with both approaches (more so with the TAPP approach) is the potential for seeding of the peritoneal cavity with infection and the development of intra-abdominal abscesses.

The recurrence rate of hernia post mesh removal has been reported as high as 20% [9]. Hence avoiding disruption of the tissue planes surrounding the inguinal canal is essential when removing the infected mesh. By preserving these tissue planes, the subsequent open hernia repair required by 20% of patients will be a more comfortable and safer operation. It is acknowledged that by incising the abdominal wall, the patient is at risk of developing an incisional hernia however given this is the first documented case of this approach the significance of this risk is difficult to quantify.

Conclusion

From this case, we would recommend mesh infections should be treated with removal of the mesh in entirety, a thorough washout and antibiotics. Though an infected TAPP-placed inguinal hernia mesh can be removed via a laparoscopic or open approach, an open approach to mesh removal avoids potential seeding of the peritoneal cavity. A high open approach, which preserves the tissue planes around the inguinal canal, allows for a more comfortable and safer open repair of the recurrent inguinal hernia, which occurs in 20%.

Conflict of interest

No conflict of interests.

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