CASE REPORT

Delayed onset seroma formation 'opting out' at 5 years after ventral incisional hernia repair

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SUMMARY

We present a case of delayed onset seroma formation presenting 5 years after ventral incisional hernia repair (VIHR) with mesh. The patient presented with several months of progressive abdominal fullness and eventual spontaneous drainage from a prior abdominal surgical incision site. Surgical drainage was performed with involvement of mesh infection. After 5 months of conservative management, the patient remained symptomatic and continued to show evidence of infection. Subsequently, she underwent mesh explantation and definitive repair with complex abdominal wall reconstruction. To the best of our knowledge, this case represents the longest delay in the onset of seroma formation post-VIHR, reported in the literature.

BACKGROUND

Development of seroma after hernia repair is common, especially among patients undergoing laparoscopic or open ventral hernia repairs with prosthetic mesh.¹ It could represent a mere incidental finding causing minimal discomfort, or a complication requiring intervention. The incidence of seroma formation in patients undergoing ventral hernia repair is variable and reported at rates ranging from 0.5–78% after laparoscopic repair, and 30–50% after open repair.^{2,3} The onset is typically during the early postoperative period, with resolution usually within 18–30 days.¹ In contrast, the onset is rarely delayed or accompanied by complications that pose a greater challenge in management. We report a case of seroma formation diagnosed 5 years after ventral incisional hernia repair (VIHR), and describe its management. To the best of our knowledge, this case represents the longest delay in onset reported in the English literature, with the as yet reported longest delay being 2 years.³

CASE PRESENTATION

A 44-year-old woman with a body mass index of 38 presented to the emergency department, with a 1 day history of discharge from a prior abdominal surgical incision. She reported of progressive abdominal fullness over the past several months. The patient denied fever, chills, nausea, vomiting, diarrhoea and constipation. Surgical history included an open Roux-en-Y gastric bypass surgery and umbilical hernia repair performed 7 years prior. This was complicated 2 years later by a ventral incisional hernia that was repaired using

composite mesh, and abdominoplasty. Medical, family, drug and social history were unremarkable.

On examination, the patient had normal vital signs. The abdomen was distended and a left incisional wound lateral to the umbilicus was evident, with spontaneous and an expressible copious serous, yellowish, non-malodorous discharge. There was neither overlying calor nor erythema. Complete blood count and basic metabolic panel were normal.

INVESTIGATIONS

CT of the abdomen and pelvis with contrast revealed a 29 cm×17 cm×13 cm abdominal fluid collection, extending from the epigastrium to the pelvic brim, and into the abdominal wall fascial layers and subcutaneous tissue, forming a pocket of fluid measuring approximately 9 cm×3 cm (figure 1). A linear radiodensity was observed within the collection, representing a separated hernia mesh.

TREATMENT

The patient was provisionally diagnosed with late-onset seroma complicated by spontaneous drainage. Subsequently, incision and drainage were performed with placement of a Jackson-Pratt (JP) draining tube. Approximately 1500 mL of serosanguinous fluid was drained, and culture and sensitivity (C & S) testing was negative for infection. Nonetheless, the patient was discharged on prophylactic antibiotics.

On follow-up, drainage continued from the JP tube at approximately 75–100 mL/day, which gradually became malodorous with microbiological evidence of infection with *Pseudomonas aeruginosa*, and suspicion for underlying mesh infection. At this point, mesh explantation was planned, however, the patient refused further operative intervention and opted for conservative management. Follow-up CT of the abdomen and pelvis with contrast revealed two residual loculated fluid collections in the anterior abdominal wall: a 9.7 cm×9.6 cm×6.7 cm infraumbilical and a small supraumbilical collection. The patient underwent multiple CT-guided aspirations over a period of 5 months, and remained intermittently symptomatic. Culture and sensitivity results revealed sensitivity to multiple antipseudomonal antibiotic therapies. Accordingly, numerous adjustments were made to her antibiotic regimen for appropriate coverage. In due course, follow-up cultures revealed a highly resistant strain of *Pseudomonas* infection. At this point, she agreed to undergo surgical mesh explantation.

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Figure 1 CT of the abdomen with contrast, (A) axial view showing a large fluid collection measuring 17 cm×13 cm (white arrow) extending into the abdominal wall fascial layers and subcutaneous tissue creating an 8.7 cm pocket of fluid (yellow arrow); (B) coronal view showing a fluid collection measuring 29 cm×17 cm with septation. A linear radiodensity (arrow heads) in both views represents separated surgical mesh previously used for hernia repair.

Exploratory laparotomy was performed with excision of the old mesh and surrounding tissue. In vitro dissection of the excised mesh prosthesis demonstrated suppuration (figure 2). The repair included transversus abdominus muscle release (TAR) and sublay implantation of a permanent macroporous monofilament synthetic mesh (Bard Soft mesh), which was transfascially sutured using polydioxanone sutures (figure 3). Posterior fascia to fascia closure was not possible due to a central defective segment which was patched and sutured circumferentially by a 15 cm×25 cm portion of an antibacterial-coated, non-crosslinked porcine dermal graft (XenMatrix AB) (figure 4). Four JP drains were placed and left for multiple weeks to minimise seroma formation and allow incorporation of both meshes. Postoperative microbiological examination of the explanted mesh confirmed *Pseudomonas* infection.

OUTCOME AND FOLLOW-UP

The postoperative course was uneventful and the patient discharged on postoperative day 7. After 9 months of follow-up, the patient continues to do well.

DISCUSSION

Seroma is a common complication after VIHR, especially with the use of prosthetic mesh. The exact aetiology of seroma formation is unclear. The presence of a mesh is thought to be the culprit that induces a local inflammatory response and alters permeability to fluid causing it to accumulate. Additionally, the large space created by dissection of the hernia sac and the fascial clearances around the hernia neck during repair have been postulated as causal factors. Mesh type may also serve as a

contributing factor that determines the rate of seroma occurrence. Higher rates have been reported with the use of polytetrafluoroethylene (PTFE) mesh (5–15%) than with polypropylene mesh (4–8%).³

Seromas following hernia repair are predominantly asymptomatic and self-resolving. They usually occur within the first month postoperatively and may be undetected on clinical examination.² However, they may progress into a symptomatic complicated state, usually resolving with or without drainage within 4–6 weeks.³ A more chronic course has been reported, presenting at 5 and 24 months after VIHR with mesh implantation.^{1 3} We have not encountered any case reports with delayed presentation at 5 years or more postoperatively in the English literature.

Seromas carry the potential risk for infection and consequent postoperative ventral hernia recurrence. Optimal management of seroma after VIHR is controversial, however, conservative management is frequently advocated due to fear of contamination that may result from aspiration or surgical drainage.² With our patient, surgical drainage was undertaken, being symptomatic and complicated by spontaneous drainage. The incidence of seroma drainage-related mesh infections is reported at 57.1% as opposed to 17.6% for non-drained seromas.⁴

The clinical presentation of mesh infection encompasses a spectrum ranging from peri-incisional erythema to sepsis. A meta-analysis of 6000 patients demonstrated a lack of unanimity on the diagnostic criteria of mesh infection, with inconsistency in definition and classification.⁴ However, deep cultures from the fluid surrounding the mesh or from the mesh itself are recommended to establish a diagnosis due to similarity and overlap of

Figure 2 Picture showing (A) excision of infected mesh with surrounding tissue; (B) showing excised mesh and surrounding tissue; (C) showing opening of excised tissue revealing pus formation and infected tissue material.

Figure 3 Picture showing sublay closure with a permanent macroporous monofilament soft mesh.

clinical and radiological signs with non-infected seromas.⁴ *Staph aureus*, among other organisms, accounts for the vast majority of cases.⁴ The aetiology involves a sequence of microbiological events that are triggered by bacterial adherence to the mesh, and

Figure 4 Picture showing circumferentially sutured portion of the antibacterial coated biological mesh (XenMatrix AB) used to patch posterior facial defect.

their ability to penetrate and adhere to its structural matrix creating a microenvironment biofilm that is impervious to antibiotics.⁴ This might explain the resistance to antibiotics in our case despite a prolonged treatment course, and the presence of sup-puration found within the mesh on dissection. There is no consensus among authors on a specific treatment strategy for mesh infections. More recently, a conservative approach of mesh salvage has been suggested to avoid possible adverse outcomes including hernia recurrence, loss of domain and risk of enterotomy or enterocutaneous fistula formation.⁴ Staged procedures have also been described, permitting wash outs, reduction of bacterial load, and eventual resolution of inflammation and infection prior to definitive repair. Novel use of biological mesh types has been postulated to decrease infection rates in comparison to synthetic mesh, especially during reconstruction against a contaminated background. However, insufficient evidence is currently available to support this.⁵ Despite reservations on the use of synthetic mesh types in a contaminated field, there is ongoing debate regarding the optimal type of prosthetic material (synthetic vs biological) to be used under different circumstances.⁶ While biological meshes are also being used in clean procedures, synthetic materials have shown acceptable results in clean-contaminated and even selected contaminated procedures, as was evident in our case with 9 months of follow-up.⁴ Although explanation helps control infection, it does not prevent hernia recurrence. In a retrospective analysis of patients with ePTFE mesh infections post-VIHR, management constituting exclusive mesh explantation resulted in universal recurrence despite fascial closure.⁴ Our patient, with multiple prior abdominal surgeries and a separated mesh, was rendered at increased risk for future hernia recurrence, warranting our decision to perform mesh explantation in addition to abdominal reconstruction and implantation of a new mesh.

Late onset seroma formation may follow an indolent course, and should be considered in the differential diagnosis of patients with prior VIHR presenting with unremitting abdominal symptoms even up to 5 years postoperatively. Spontaneous discharge

Patient's perspective

This all came as such a surprise to me, I had no idea that such a complication could happen to me so many years after surgery and I wish someone could have told me that.

Learning points

- ▶ Seroma is a common complication after ventral incisional hernia repair.
- ▶ Seromas are predominantly asymptomatic and self-resolving within 4–6 weeks postoperatively.
- ▶ Late onset seroma formation may follow an indolent course, and should be considered in the differential diagnosis of patients with prior ventral incisional hernia repair presenting with unremitting abdominal symptoms.
- ▶ Management of seroma after ventral incisional hernia repair is controversial.
- ▶ Conservative management is frequently advocated due to fear of contamination that may result from aspiration or surgical drainage with subsequent mesh infection.

may inevitably ensue. In our case, conservative management failed to eradicate infection mandating mesh explantation. Definitive repair using a macroporous synthetic mesh in addition to a biological mesh for bridging a posterior fascial defect led to excellent results.

Contributors MM wrote the manuscript and performed the literature review, and was overall responsible for writing the case report. AE and WRS made substantial edits to the drafted manuscript. MMC revised, edited and provided overall supervision of the process.

Competing interests None declared.

Patient consent Obtained.

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