Case report

Perforated necrotic appendix in Amyand's hernia treated with appendicectomy and simple suture repair of the inguinal hernia

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SUMMARY

A 50-year-old man was referred to the emergency department by his general practitioner with a tender right-sided irreducible inguinal hernia (previously reducible), right-sided testicular pain and scrotal swelling. Clinical examination revealed a non-reducible, tender right inguinal-scrotal hernia and swollen right scrotum. Blood tests showed raised inflammatory markers. The patient went on to have a CT scan which was reported to show an indirect right inguinal-scrotal hernia possibly containing terminal ileum and small bowel mesentery. The scan also showed increased infiltrate changes within the hernia sac suggesting incarceration with possible early strangulation but no obvious evidence of bowel obstruction. The patient was taken to the operating theatre and found to have a large right inguinal-scrotal hernia containing pus and a perforated necrotic appendix. He went to have an appendicectomy and sutured repair of the hernia. Postoperatively, the patient made a good recovery and was discharged 2 days postsurgery.

BACKGROUND

The patient was found to have an Amyand's hernia, a rare hernia where the appendix is found within the inguinal hernial sac. Even rarer is perforated appendicitis within the hernia sac which this patient had. This case highlights a unique case and its subsequent management.

CASE PRESENTATION

A 50-year-old patient was referred by his general practitioner to the on-call surgical team with a right-sided irreducible inguinal hernia. The hernia had been present for 2 years and previously reducible. On presentation to the emergency department, the patient was noted to have a large right-sided scrotal swelling associated with testicular pain. The swelling and pain had gradually developed over a period of a week. There was no history of vomiting, he had been opening his bowels regularly and passing flatus. He presented no urinary symptoms. His previous medical history included anxiety and depression. He did not have any history of abdominal or hernia surgery in the past. His regular medications included venlafaxine and zopiclone, and he was allergic to mirtazapine. He lived alone and did not consume alcohol, however, was an electronic cigarette consumer (vaping). There was no

significant family history of note. Clinical examination revealed a tender right-sided inguinal-scrotal hernia and enlarged right scrotum.

INVESTIGATIONS

Bloods tests on admission showed: haemoglobin 125 g/L, platelet count 813 (10^9 /L), white cell count 20.6 (10^9 /L), neutrophil count 16.3 (10^9 /L) and C reactive protein 207 mg/L.

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DIFFERENTIAL DIAGNOSIS

Incarcerated right inguinal-scrotal hernia was the most obvious diagnosis from the history, clinical examination and CT scan findings. Other differential diagnoses considered at the time were right testicular pathology (epididymo-orchitis, infected hydrocele).

TREATMENT

Based on the clinical history, examination and CT scan findings, the surgical team led by consultant surgeon decided to take the patient to the operation theatre for exploration of this hernia under general anaesthesia. A right oblique incision was

Figure 1 Abdominal and pelvic CT with contrast. Axial view showing inguinal-scrotal hernia with bowel loops as its content with infiltrate changes within hernia sac suggesting incarceration.

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Figure 2 Abdominal and pelvic CT with contrast. Coronal view showing extension of hernia with terminal bowel loop into inguinal-scrotal area with oedematous sac and testis pushed down with evidence of moderate varicocele.

given over the swelling just above the right groin crease. Operative findings confirmed a large inguinal-scrotal hernia containing large amount of pus (about 100 mL) and a necrotic perforated appendix. The muscular layers and the contents of the spermatic cord were extremely oedematous. The sac was separated from the spermatic cord. The procedure was technically very difficult; however, all the pus was drained and sent for culture and sensitivity. The area was generously washed and cleaned with normal saline. The sac was dissected away from the cord structures and excised with preservation of cord structures and testicle. The appendix was traced to its base which was just at the level of the deep inguinal ring. The deep inguinal ring was opened wider to inspect the caecum and terminal ileum. Both these structures were healthy and there was no evidence of any intraperitoneal pus or inflammation. An appendicectomy was performed followed by suture repair of the deep ring. The inguinal hernia was repaired with sutures using Bassini technique. A mesh repair was not carried out due to the presence of pus, accepting the fact that there will be an increased risk of a recurrent hernia at this site in future. A drain was left in situ and wound was closed in layers.

OUTCOME AND FOLLOW-UP

Postoperatively, the patient made an excellent recovery. He was treated with intravenous antibiotics and the drain was removed 2 days postprocedure after minimal output. He was subsequently discharged with oral antibiotics and review in follow-up clinic.

Histology from the operation confirmed acute appendicitis with perforation.

DISCUSSION

An Amyand's hernia is defined as an appendix inside of an inguinal hernia and is a rare clinical entity. Amyand's hernia with perforated appendix is extremely rare. The incidence of appendicitis with an inguinal hernia is at 0.1%, and that of perforated appendicitis is even rarer, at 0.01%.^{1 2} The pathology is named after the French born English surgeon Claudius Amyand, who operated on an 11-year-old boy with an inguinal hernia combined with an inflamed appendix in 1735 at St George's Hospital in London.³

Amyand's hernia can be very difficult to diagnose preoperatively as it presents identical to an incarcerated inguinal hernia.³ Patients can also present with epigastric or periumbilical pain alongside localised right iliac fossa tenderness, this can often be associated with a painful irreducible mass in the inguinal-scrotal region.¹ For these reasons, the diagnosis is most often made intraoperatively. CT scan is the imaging modality of choice for an acute abdomen and abdominal hernias; however, inguinal hernias are typically diagnosed clinically. Physical exam findings, laboratory results and imaging are not always helpful in the differential diagnosis.¹ The pathophysiology of Amyand's hernia is not clear, however, thought to involve the vermiform appendix herniating through a patent processus vaginalis.¹

The surgical management of Amyand's hernia is still open to debate. There are numerous strategies mentioned in the literature. Commonly, Amyand's hernia is treated with appendicectomy via herniotomy with primary hernia repair.^{1 4 5} For suspected perforation or pelvic abscess, a lower midline laparotomy is recommended as this provides technical ease and good control.⁶ Shouldice's herniorrhaphy is recommended in cases of gangrenous acute appendicitis in Amyand's hernia by Solecki *et al.*⁶ Interestingly, there have also been cases reported where there has been a two-step approach to management, first laparoscopic appendicectomy for perforated appendix in the inguinal hernia followed by elective inguinal hernioplasty.⁷

Losanoff and Basson have come up with a classification system for Amyand's hernia and its surgical management, highlighted in table 1. The current treatment options depend on the condition of the appendix within the hernia sac.

A type 1 hernia has a normal appendix in the inguinal hernia, which is managed with reduction and mesh repair.⁸ As there is no inflammation in a type 1 hernia, mesh usage improves longevity of the repair because it avoids tension on the suture lines and prevents the metabolic problems related to collagen deficiency known to exist in hernia patients.⁸ A type 2 Amyand's hernia is an inflamed appendix in the inguinal hernia and confined to the sac without abdominal sepsis. Due to the presence of infection such hernias carry a higher risk of mesh infection. Therefore, primary repair is recommended without mesh. A type 3 hernia is where the infection is no longer confined to the sac and spread beyond requiring extensive surgery. In this setting, the use of mesh is not appropriate due to sepsis and a laparotomy with appendicectomy and primary repair without mesh is recommended. Finally, a type 4 hernia includes all cases where a serious pathology exists outside of the hernia sac. Pathologies which have been reported

Table 1 Losanoff and Basson classification of Amyand's hernia

Classification	Description	Surgical management
Type 1	Normal appendix in an inguinal hernia	Hernia reduction, mesh repair
Type 2	Acute appendicitis in an inguinal hernia, without abdominal sepsis	Appendicectomy, primary repair of hernia without mesh
Type 3	Acute appendicitis in an inguinal hernia, with abdominal wall or peritoneal sepsis	Laparotomy, appendicectomy, primary repair without mesh
Type 4	Acute appendicitis in an inguinal hernia, with abdominal pathology	Manage as type 1–3, investigate pathology as needed

in the literature include appendiceal mucocoele with coexisting colon cancer, diverticulitis, adenocarcinoma of the appendix and inguinal appendicocoele with pseudomyxoma peritonei. Management of such cases involves appendectomy, diagnostic workup and other procedures as appropriate.⁸

Our case represented a type 2 Amyand's hernia according to the Losanoff and Basson classification. It was managed with open appendectomy and primary repair of the defect without mesh. Losanoff and Basson's classification is a guideline to management of Amyand's hernia, however, by no means an exact algorithm. There is debate as to exact management and each case should be judged on its own merit

Learning points

- ▶ Amyand's hernia is a rare hernia, where the appendix is found within the inguinal hernia sac.
- ▶ Most commonly, the diagnosis is made intraoperatively.
- ▶ Patient's often present with features of an incarcerated inguinal hernia.
- ▶ Operative management takes into account the condition of the appendix according to the Losanoff and Basson classification, both open and laparoscopic approaches have been reported with or without the use of mesh.

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