

De Garengeot's hernia: an unusual right groin mass due to acute appendicitis in an incarcerated femoral hernia

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The presence of an acutely inflamed vermiform appendix in a femoral hernia sac is extremely rare; the condition is termed De Garengeot's hernia. Here we describe an elderly patient for whom preoperative computed tomography aided the diagnosis of this rare entity. This Chinese woman had presented with a painful right groin mass. The patient successfully underwent an emergency appendicectomy and primary femoral hernia repair. Once diagnosed, it is imperative to follow key surgical principles to limit the spread of infection.

Introduction

Appendicitis and incarcerated groin hernia are common surgical emergencies. The diagnosis and treatment of these conditions are simple, but when both are combined and present as a painful right groin mass, the resulting complex symptoms and signs can obscure the definitive clinical diagnosis, resulting in high morbidity.¹ For the clinical evaluation of groin hernias, physical examination is important to distinguish the more common inguinal hernia from the less common femoral hernia that occurs through femoral canal (Fig 1a). Preoperative contrast-enhanced computed tomography (CT) of the abdomen and pelvis plays a major role in the diagnosis of an incarcerated femoral hernia containing an acutely inflamed appendix, which leads to change in surgical management.^{2,3} We report such a case in an elderly Chinese woman who had an acute appendicitis within a femoral hernia. She underwent emergency appendicectomy and subsequent primary femoral hernia repair, and was discharged without any complications.

Case report

A 67-year-old Chinese female was referred to our institution with a 1-day history of right inguinal pain and swelling, without nausea or vomiting. Physical examination

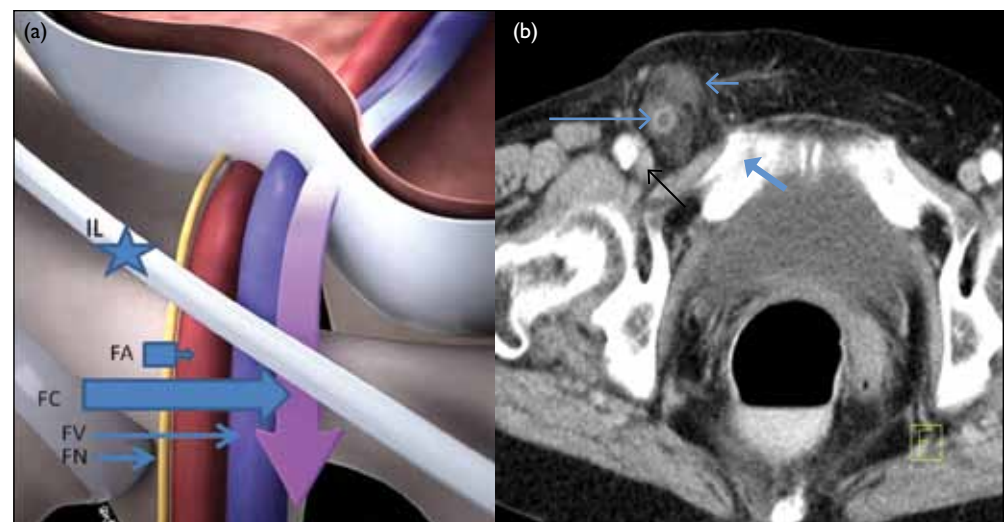


FIG 1. (a) Diagram (anterior view) shows a femoral canal (FC) [purple arrow], a funnel-shaped, potential extra-pelvic space that passes deep to the inguinal ligament (IL) and medial to the femoral vessels; FA = femoral artery, FN = femoral nerve, FV = femoral vein.⁹ (b) An axial section of the contrast-enhanced computed tomographic scan of abdomen and pelvis shows a cross-section of an inflamed appendix (long blue arrow), within the right femoral hernia (short blue arrow) associated with some fluid and fat stranding in the herniated sac. Together they cause compression of the right femoral vein (black arrow), and are located lateral to the pubic tubercle (thick blue arrow)

Key words

Appendicitis; Groin; Hernia, femoral;
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revealed a haemodynamically stable patient with a painful right groin mass (approximately 6 x 4 cm). On closer inspection, the right groin lump demonstrated cellulitis. There were no urinary tract symptoms, diarrhoea, back or flank pain, fever, chills or sweats, and there was no history of previous abdominal surgery. Her medical history included hypertension and hyperlipidaemia. Her vital signs were stable; the blood pressure was 134/80 mm Hg, the heart rate was 60 beats/min and the respiratory rate was about 16 breaths/min. The abdomen was soft and non-tender, and there was no guarding or rigidity; bowel sounds were normal and rectal examination revealed nil abnormal. The total white cell count was elevated (13 000 / μ L). The abdominal X-ray showed normal bowel gas pattern without pneumoperitoneum. After surgical consultation, a presumptive differential diagnosis of an incarcerated inguinal hernia or an inguinal abscess was made and the patient was admitted. In view of her age and the lack of classical clinical signs, a contrast-enhanced CT of the abdomen and pelvis was performed. It showed a fluid-filled tubular structure with mural thickening and post-contrast mucosal enhancement, associated with surrounding fat stranding and fluid contained within a hernia sac in the right groin region (Fig 1b and 2). The hernia sac was located lateral and inferior to the pubic tubercle, with mild compression of the right femoral vein (Fig 1b). The tubular structure was traced from the right groin to the abdominal intraperitoneal cavity and shown to be abutting the low-positioned caecum, and the herniated appendix was seen narrowed at the level of the femoral neck (Fig 2). There was no other segment of bowel loop within this hernia. The CT findings were interpreted as acute appendicitis within the right femoral hernia rather than inguinal hernia. There was no intra-abdominal bowel dilatation, nor was there a pneumoperitoneum or any other relevant finding.

An open surgical exploration via a deep skin incision through the thigh subcutaneous and deeper fascia was performed and the inflamed hernial sac was traced to the medial aspect of the femoral canal. On opening the sac, the appendix was turgid and congested as a result of constriction by the narrow hernial neck. The appendix was traced to its base at the caecum, doubly ligated and excised. The sac was then trimmed and closed with absorbable sutures. The loose defect was darned with prolene 1, forming a lattice between the inguinal and pectineal ligament with anchoring to the pubic tubercle. No mesh was used in view of the cellulitis and possible contamination from the inflamed appendix. The patient was discharged uneventfully on postoperative day 7, taking a course of oral antibiotics.

Discussion

Femoral hernias are thought to be congenital

De Garengo's hernia: 因閉鎖性股疝氣的急性闌尾炎引致不尋常的右腹股溝腫塊

股疝囊內有急性發炎的闌尾又稱為De Garengo's hernia，屬於非常罕見的病症。本文報告一名年長華籍女病人，透過術前電腦掃描確診這罕見病症。病人病發時右腹股溝有腫塊並感疼痛，最後成功接受緊急盲腸切除及原發性股疝修補術。為病人確診此症後，最重要的是遵循主要的手術原則來制止感染擴散。

abdominal wall defects that occur most commonly in women, and account for less than 3% of all hernias. Of all the groin hernias, femoral hernia has the highest rate of incarceration and strangulation (5-20%) owing to the narrow and rigid femoral canal, and therefore it frequently requires urgent surgical repair.⁴ Appendicitis occurs in less than 1% of external hernias, while appendicitis in femoral hernias is even rarer (about 0.5%).⁵

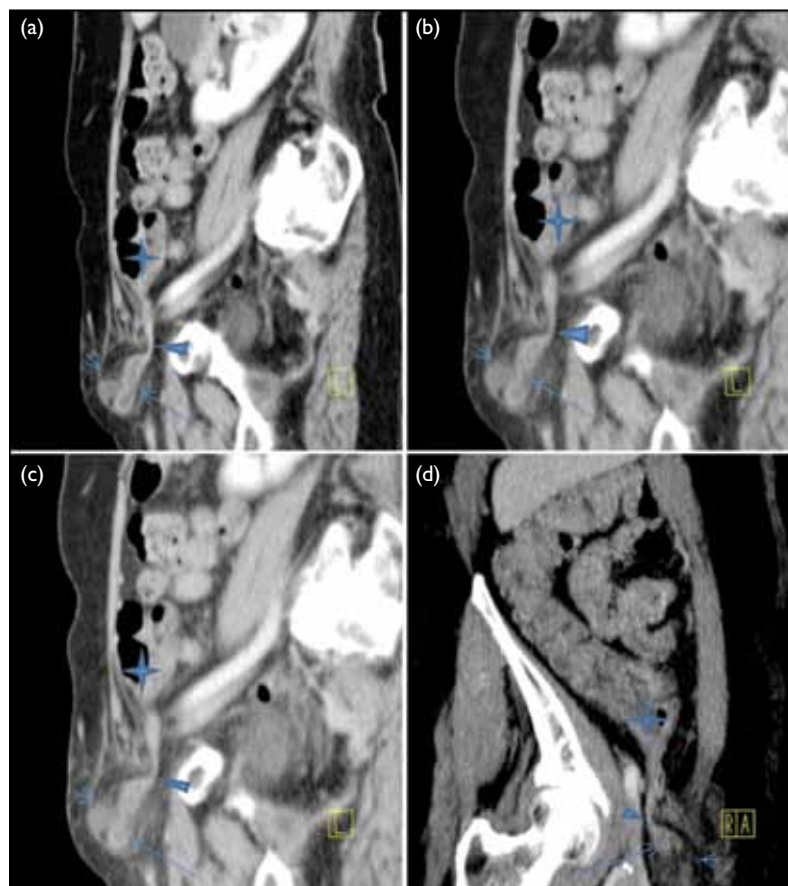


FIG 2. (a, b) Sagittal, (c) sagittal oblique, and (d) coronal oblique sections of the contrast-enhanced computed tomographic scans of abdomen and pelvis depict an inflamed appendix (long arrows) within the right femoral hernia (short arrows). The inflamed appendix (long arrows) can be traced to the tip of the caecum (stars). At the level of femoral hernia neck (arrowheads), there is extraluminal narrowing of the herniated appendix

Acute appendicitis in an inguinal hernia is termed Amyand's hernia, named after an English surgeon Claudius Amyand, who first performed appendicectomy in an inguinal hernial sac in 1735.^{6,7} Appendicitis in a femoral hernia is termed De Garegeot's hernia, after the French surgeon Rene Jacques Croissant de Garegeot who first described its management in 1731.^{1,8} A preoperative diagnosis of De Garegeot's hernia is seldom made; CT is frequently the modality of choice to diagnose this entity.⁴ Femoral hernias may present with swelling in the thigh or groin. When patient presents with a groin swelling, it is imperative to distinguish a femoral from an inguinal hernia clinically. Patients with acute appendicitis within a femoral hernia frequently present atypically,³ for which recourse to CT is invaluable in reaching an accurate preoperative diagnosis.⁴

Two possible aetiologies have been proposed for De Garegeot's hernia. According to one theory, the appendix may be abnormal in anatomical position owing to different degrees of intestinal rotation during embryological development, or variations in caecal attachments. Another theory suggests that an anatomically large caecum forces the appendix into the pelvis, which therefore has a high risk of entering a hernial sac from the pelvic peritoneum.⁵

Anatomically, the inguinal region comprises two distinct areas: the inguinal canal and the femoral triangle. The latter is bordered superiorly by the inguinal ligament, medially by the long adductor muscles, pubic bone and lacunar ligament. Laterally, it is bordered by the sartorius muscle and the floor consists of the pectineal ligament, iliopsoas, and long adductor muscles. The major feature of the femoral triangle is the femoral sheath, which is a condensation of the deep fascia (fascia lata) and contains the femoral artery, femoral vein and femoral canal from lateral to medial aspect. The femoral canal is a space medial to femoral vein that allows for venous expansion and contains a lymph node (Cloquet's node). The femoral nerve lies lateral to the femoral sheath.⁹ All femoral hernias occurring through the femoral canal (Fig 1a) are behind the inguinal ligament and mostly positioned below and lateral to the pubic tubercle. They also cause compression of the adjoining femoral vein, which is a useful sign on CTs.² This finding aids in differentiating femoral hernias from the more common inguinal hernias, in which the herniated sac is seen above and medial to the pubic tubercle.² Together with these features, CT is extremely useful in identifying De Garegeot's hernia.

In a few earlier case reports, the sequence of development of appendicitis in a femoral hernia was most likely due to an extraluminal obstruction at the hernial neck rather than the more usual cause of an intraluminal obstruction.^{1,3-5} Our case

also supports this finding of an inflamed appendix due to extraluminal obstruction, which is caused by the narrow and rigid neck of the femoral canal (Fig 2). Histopathology revealed significant serosal inflammation (but without transmural inflammation of the herniated appendix), as well as focal haemorrhagic meso-appendiceal fat infarction.^{1,3-5}

Although identifying De Garegeot's hernia poses a diagnostic challenge, contrast-enhanced CT can help make an accurate preoperative diagnosis and eventually lead to appropriate emergency surgical management. On CT, recognition of the caecum is an important landmark for identification of the appendix. A low caecum together with an enlarged blind-ending, fluid-filled tubular structure with thick and enhancing walls that extend from the base of the caecum into the herniated sac constitutes an important clue to the correct diagnosis.

The clinical situation, however, merits groin exploration, be it an Amyand's or De Garegeot's hernia. Although a preoperative CT diagnosis was useful and self-explanatory, it may not confer any advantage for a minimally invasive surgical approach. A pre-peritoneal laparoscopic groin approach does not allow visualisation of the appendix and gives very limited access for an appendicectomy. Whilst the transperitoneal approach helps to overcome these limitations, there is reluctance to combine femoral hernia repair with a prosthetic mesh to avoid potential wound infections or intestinal soilage. Arguably then, the small groin crease is still the preferred way to tackle this preoperative diagnosis, especially when it comes to emergency surgery. Furthermore, there is the added advantage of enabling vertical extension for the laparotomy (if required).

The principal complication from De Garegeot's hernia repair is wound infection, which ensues in 14 to 29% of instances. Rarer, serious complications include necrotising fasciitis and death due to sepsis.⁵ In the presence of a pathological appendix, hernia repair with a prosthetic mesh is contra-indicated given the increased risk of mesh infection due to a contaminated surgical field.⁵ Hence, an early diagnosis of De Garegeot's hernia is of utmost importance to avoid a perforated appendix, and thereby avoid intra-abdominal contamination.

Conclusion

De Garegeot's hernia is a unique surgical pathology. Its CT findings are characteristic for identifying the combined condition (acute appendicitis within an incarcerated femoral hernia). These findings enabled a prompt diagnosis and appropriate treatment of our patient. Once diagnosed, it is vital to follow key surgical principles to limit spread of infection; use of prosthetic mesh for femoral hernia repair is contra-indicated.

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