

Acute appendicitis complicating Amyand's hernia: imaging features and literature review

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ABSTRACT

Acute appendicitis complicating Amyand's hernia is an extremely rare condition, in which the appendix herniates into the inguinal sac and, subsequently, gets inflamed. The condition is difficult to diagnose clinically. Imaging is valuable for its diagnosis and detection of the associated complications. In this article, we will discuss the imaging features of acute appendicitis complicating Amyand's hernia and the results of a literature review on the condition.

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Introduction

Amyand's hernia is a rare condition in which the appendix herniates into the inguinal sac. It is most commonly detected incidentally during hernia repair.

Acute appendicitis in Amyand's hernia occurs even less frequently, and is difficult to diagnose clinically. Imaging is valuable for its diagnosis and detection of the associated complications. Here we report our experience with this disease entity, its imaging features, and the results of a literature review.

Case report

An 82-year-old man with unremarkable history presented to the surgeons with fever and generalised abdominal pain. On physical examination, he had a temperature of 38.8°C, diffuse abdominal tenderness, and a tender, irreducible right inguinal lump. Laboratory tests revealed mildly elevated white cell count. His supine abdominal radiography was unremarkable. A provisional diagnosis of irreducible right inguinal hernia was made. However, it was atypical that the patient did not have symptoms or signs suggestive of intestinal obstruction. Urgent ultrasonography (USG) of the right groin showed a blind-ending fluid-filled tubular structure within the right scrotal sac. This structure extended superiorly along the inguinal canal, entered the right lower abdomen and joined the caecum (Fig 1a). It was compatible with the appendix. Acute inflammation was indicated by wall hypervascularity and tenderness elicited upon compression. There was no adjacent free fluid or collection to suggest abscess formation or a ruptured appendix. The diagnosis was confirmed by computed tomography (CT) as dilated appendix with wall hyperenhancement and herniation into the right scrotal sac (Fig 1b). Periappendiceal strandings, reactive regional lymph nodes, and oedematous right scrotal wall were

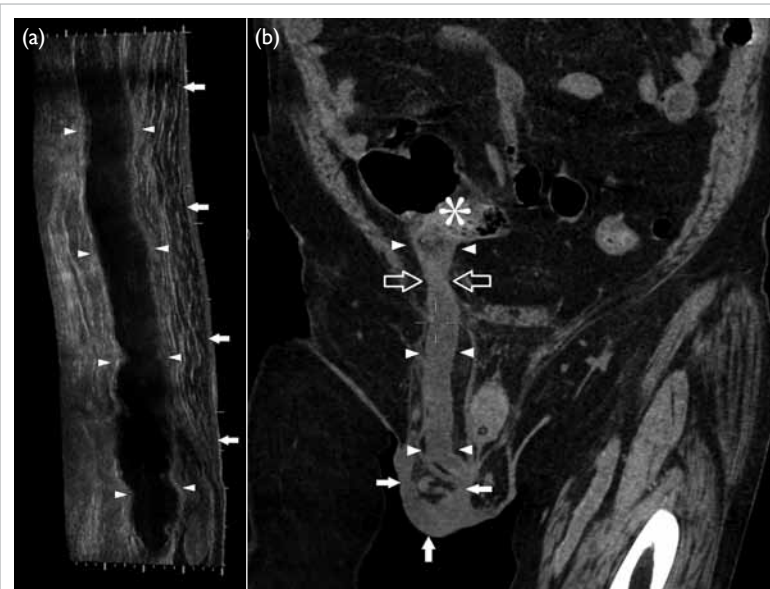


FIG 1. (a) Ultrasonography of the right scrotal sac shows a tender non-compressible blind-ending fluid-filled tubular structure (arrowheads). It extends superiorly and connects with the caecum. Features are suggestive of acute appendicitis complicating Amyand's hernia. The right scrotal wall is thickened and oedematous (arrows) due to secondary inflammation. (b) Coronal multiplanar reformation from multidetector computed tomography of the abdomen and pelvis confirms the diagnosis. A dilated appendix (arrowheads) originates from the caecum (asterisk) herniates into the right scrotal sac via the right inguinal ring (empty arrows). Wall hyperenhancement and adjacent strandings are present. Thickened oedematous right scrotal wall from secondary inflammation is again noted (solid arrows).

Amyand疝氣併發急性闌尾炎：影像特徵及文獻回顧

曾慧勤、李嘉樂、譚國輝、李醒芬

Amyand疝氣併發急性闌尾炎是一種極為罕見的情況，其中闌尾疝入腹股溝囊，繼而併發炎症。此病的臨床診斷非常困難。造影檢查對其診斷及併發症偵察極有價值。本文旨在展示此病症的影像特徵以及文獻回顧的結果。

noted. Emergency appendectomy and right inguinal herniorrhaphy were performed. A pus-filled appendix was revealed within the right scrotal sac during the procedure (Fig 2).

Discussion

Amyand's hernia is named after Claudius Amyand (1660-1735), a sergeant-surgeon to King George II of England. In 1735, he performed the first documented successful appendectomy on an 11-year-old boy who had a perforated, acutely inflamed appendix within the right scrotal sac.¹ The appendix was perforated by a previously swallowed pin, leading to formation of an enterocutaneous fistula.



FIG 2. Emergency appendectomy and right inguinal herniorrhaphy reveal a pus-filled appendix (arrowheads) within the right scrotal sac

Courtesy of Dr Wing-hang Kwong, Department of Surgery, North District Hospital, Hong Kong

Amyand's hernia is uncommon, with a prevalence of 1% among all the repaired inguinal hernias.² Most often, it is found incidentally during surgery.² It is more frequent in males. The condition may present in individuals from any age, through premature neonates to the elderly people.^{3,4} The majority of cases occur on the right side, the side where appendix normally locates and inguinal hernia more commonly happens. Less than 10 cases of left-sided Amyand's hernia have been reported in the literature; these can occur in patients with situs inversus, intestinal malrotation, or a mobile caecum.⁵⁻⁹

Appendicitis more frequently occurs in Amyand's hernia than in appendix at normal position. The superficial location of the appendix within the inguinal sac can possibly make it more vulnerable to trauma and secondary inflammation. Another postulation is that the abdominal muscles can constrict the hernial orifice and induce intermittent compression of the appendix. This might induce ischaemia of the appendix and make it more susceptible to infection.¹⁰ Apart from appendicitis, the other documented complications of Amyand's hernia include irreducibility and strangulation of the appendix, abscess formation, peritonitis, and enterocutaneous fistula formation.¹ Other intra-abdominal structures such as the caecum, urinary bladder, and omentum can accompany the appendix and herniate into the hernial sac.^{6,7}

The diagnosis of Amyand's hernia is rarely made clinically. Most often it is mistaken as an irreducible inguinal hernia. Imaging is valuable for preoperative diagnosis and detection of any complications. Coronal multiplanar reformations from multidetector CT of the abdomen and pelvis are excellent imaging modalities for demonstrating a blind-ending tubular structure arising from the caecum which extends into the inguinal sac. Luminal dilatation, wall thickening and hyperenhancement, adjacent stranding and fluid are suggestive of acute appendicitis. Complications such as perforation and abscess formation should be sought. In children and pregnant women, USG and magnetic resonance imaging are preferred with the advantage of being radiation free. In USG, the acutely inflamed appendix appears dilated, non-compressible with thickened hypervascular wall, and is tender upon compression.^{11,12} Sometimes the connection between the appendix and caecum might not be readily demonstrable, especially in overweight and pregnant patients.

The differentiation between usual inguinal hernias and Amyand's hernia can be readily made by imaging. In usual inguinal hernia, a segment of small or large bowel is seen within the hernial sac. Littre's hernia, which is defined as herniation of Meckel's diverticulum, can mimic Amyand's hernia both clinically and radiologically. It occurs in 11%

of patients with Meckel's diverticulum. Similar to Amyand's hernia, Littre's hernia is more prevalent in males and on the right side.¹³ About 50% of the cases occur in the inguinal region, with 20% occurring in the femoral canal, and 20% in the umbilicus.¹⁴ Just like Amyand's hernia, a blind-ending tubular structure can be found in Littre's hernia. Instead of arising from the caecum, it originates from the antimesenteric border of the distal small bowel.¹⁵ In addition, a normal appendix should be detected in patients with Littre's hernia unless it has been resected.

Conclusion

Acute appendicitis complicating Amyand's hernia is extremely rare and is difficult to diagnose clinically. Imaging is valuable for its diagnosis and detection of associated complications.

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Answers to CME Programme

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I. Live birth rate, multiple pregnancy rate, and obstetric outcomes of elective single and double embryo transfers: Hong Kong experience

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| A | 1. True | 2. False | 3. True | 4. False | 5. False |
| B | 1. False | 2. True | 3. True | 4. True | 5. False |

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II. Lateral epicondylalgia: midlife crisis of a tendon

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| A | 1. False | 2. True | 3. False | 4. True | 5. False |
| B | 1. False | 2. False | 3. True | 4. False | 5. True |