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Case report

Preoperative diagnosis of Amyand's hernia by ultrasound and computed tomography

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ABSTRACT

Inguinal hernia is the most common seen groin hernias which mostly contain bowel. The incidence of vermiform appendix in an inguinal hernia is seen in 1% of all inguinal hernia. This is known as Amyand's hernia. Appendix within a hernia can be normal or complicated by appendicitis. Most of these cases are not diagnosed preoperatively and managed during surgery. Preoperative diagnosis of these cases is so rare. Very few cases have been reported so far.

In our case, we diagnosed an inflamed appendix in a 49 years old female within right inguinal hernia by using ultrasound and confirmed it by CT scan.

1. Introduction

Inguinal hernia is the most common acquired abdominal wall hernia. Hernia may contain uncommon components like the bladder, ovaries, fallopian tube, and stones.[1] Appendix may be rarely seen inside the hernia sac, and the particular condition is termed as Amyand's hernia. Most of these cases are not diagnosed preoperatively, and only a few cases have been reported so far. We present a case of Amyand's hernia in a female patient that was diagnosed by ultrasound and confirmed by CT scans.

2. Case presentation

A 49-year-old female was referred to our emergency department with a right-sided groin pain and swelling. The routine lab test showed an increase in white blood cells and CRP. Clinical examination revealed tenderness and a mass in the right groin that increased during Valsalva maneuver. Ultrasound examination showed right inguinal hernia containing small intestine loop and an 8 mm tubular noncompressing structure resembling appendicitis (Figs. 1–2). IV Contrast enhanced CT scan confirmed the diagnosis, showing a blinded thickened tubular appendix arising from the caecum and entering the inguinal canal (Fig. 3). During the operation, an inflamed appendix with appendiceal fecalith was found within the hernia sac. Appendectomy and hernia repair were performed (Fig. 4). Histopathology results confirmed the diagnosis of acute appendicitis. The postoperative course was uneventful, and the patient was discharged without any complications.

3. Discussion

The inguinal hernia is the most commonly seen groin hernia, and the hernia sac mostly contains bowels. Ovaries, stones, bladder, colon diverticula, and the fallopian tubes are uncommon contents that may be seen in the hernia sac.[1]

The incidence of vermiform appendix in the inguinal hernia sac is 1%. Herniation may be further complicated by appendicitis. The presence of inflamed appendix in an inguinal hernia was described in 1736 by Claudius Amyand's who operated an 11-year-old patient with a right inguinal hernia and perforated appendicitis inside the hernia sac.[2]

A possible cause is micro traumatism of the appendix that causes fibrosis and adherence in the sac. Contractions of the muscle decreased blood supply leading to secondary inflammation.[3,4]

Most of the patients are males, and the remaining few are usually postmenopausal, as our patient.[5]

Reported complications of Amyand's hernia include perforation, peri-appendicular abscess, orchitis, epididymitis, groin necrotizing

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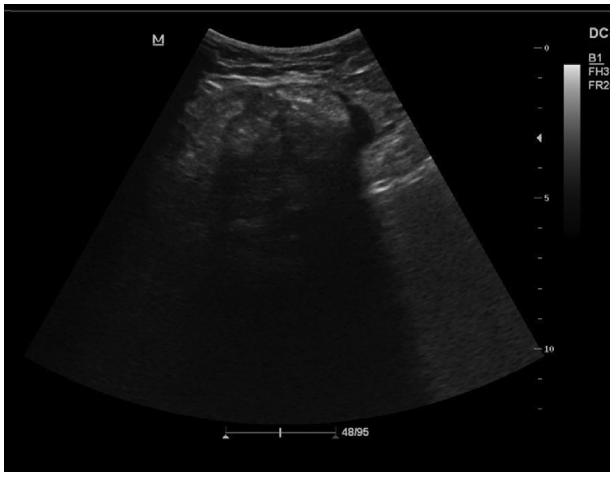

Fig. 1. Ultrasound of the inguinal mass, showing blind-ended tubular structure with a thick wall (Fig. 2) inside hernia sac (Fig. 1), corresponding to the incarcerated appendix.

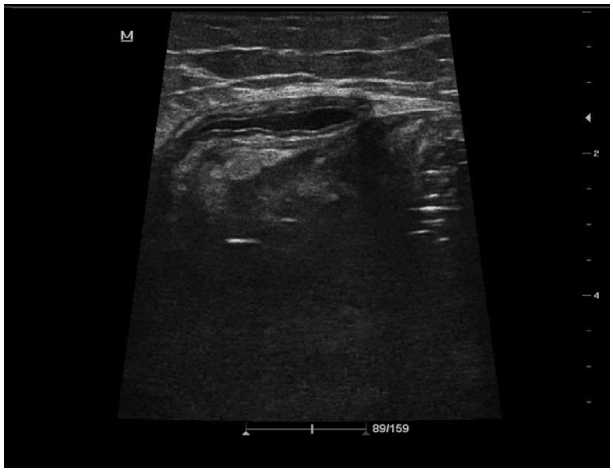

Fig. 2. Ultrasound of the inguinal mass, showing blind-ended tubular structure with a thick Wall (Fig. 2) inside hernia sac (Fig. 1), corresponding to the incarcerated appendix.

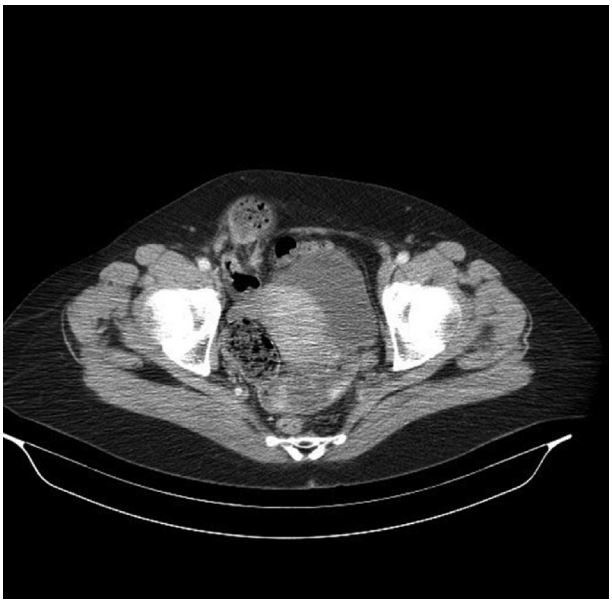

Fig. 3. Contrast enhanced axial CT scan showing a blind-ended appendix next to small bowel segment in right inguinal hernia.

Fig. 4. Intraoperative Lateral view of inflamed appendix in right inguinal hernia sac.

fasciitis of the abdominal wall and gangrenous appendicitis secondary to strangulation of the hernia sac.[6]

Moreover, perforation of the inflamed appendix may cause thrombotic complication as seen in a case reported by Wilson et al in which in situ arterial thrombosis was caused by an intra-abdominal abscess. Mortality of Amyand 's hernia is caused by peritoneal spread and sepsis due to a perforated appendix. It has been reported to range between 14–30%.[6]

Most of these cases are diagnosed and managed during surgery. It may present like a strangulated inguinal hernia with local peritonitis. Weber was the first surgeon that reported preoperative diagnosis of Amyand's hernia.[3]

Preoperative ultrasound diagnosis of Amyand's hernia has rarely been reported in the literature. We diagnosed an acute appendicitis within the right inguinal hernia containing small intestinal loop by ultrasound and confirmed it by contrast-enhanced CT (Figs. 1, 2 and 3). Preoperative diagnosis plays an important role in decision making and planning the repair procedure.

Ultrasound is readily available, cheap and free from radiation. It is the modality of choice in children and young patients. It is effective in identifying abnormal appendixes, especially in thin patients. Anatomic knowledge of the groin may allow for correct preoperative diagnosis of the different types of hernias and their contents.[7]

The criteria for diagnosing acute appendicitis by ultrasonography are the identification of a blind-ending, noncompressible, nonperistaltic tubular structure measures greater than 6 mm in diameter. Appendiceal wall hyperemia as seen with color Doppler is another common finding in acute appendicitis. Appendicoliths, which appear as hyperechoic foci that can also sometimes be seen within the lumen of an inflamed appendix. The presence of pericaecal inflammatory changes such as hyperechoic fat or free fluid is often considered suggestive of but not specific for appendicitis.[8,9,10]

Doppler ultrasound helps in showing the vascularity of the intestines and in the diagnosis of necrosis.[11]

CT plays an important role in early diagnosis and shows hernias with their contents. CT is highly sensitive and specific in diagnosing acute appendicitis. Diagnosis of Amyand's hernia is done by

showing a blind ended tubular structure connected to caecum within the hernia sac. MPR and 3D reconstructions are very useful in showing the appendix and its surrounding structures (and their complications such as perforation).[2,4,11]

In conclusion, Amyand's hernia is an extremely rare condition, and is often misdiagnosed. Preoperative diagnosis plays an important role in the treatment planning. Ultrasound plays an important role in hernia diagnosis and showing the contents of the hernia sac. Doppler ultrasound should be used to check the vascularity of the herniated parts. Once hernia has been diagnosed, its content should be carefully checked as well in order to help in surgical decision making.

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