

## Case Report

# Perforated Amyand's Hernia

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## Abstract

An inguinal hernia is one of the most common surgical conditions accounting for both elective and emergency cases. Amyand's hernia is a rare entity and is often an incidental intraoperative finding but may present as appendicitis in the hernia sac. It is commonly not identified preoperatively as patients may present as strangulated inguinal hernia, which warrants emergency surgery rather than imaging, such as a Computed Tomography (CT) scan or ultrasound. We report a case of Amyand's hernia in 84 years-old man who presented with a tender and swollen right inguinal mass, who was diagnosed as strangulated right inguinal hernia and underwent emergency surgical exploration. We would like to highlight the knowledge regarding this condition and its principles of management.

**Keywords:** Amyand's; Hernia; Inguinal; Appendicitis

## Introduction

The most common type of abdominal wall hernia is inguinal hernia, which accounts for about 75% [1]. Ventral abdominal and inguinal hernias typically contain bowel or omentum. Amyand's hernia is the presence of a normal or inflamed vermiform appendix inside an inguinal hernia sac. It is named in honour of the surgeon Claudius Amyand who performed the first appendectomy of an appendix located in the inguinal canal after a child swallowed a pin causing appendicitis in 1735 [2]. Amyand's hernia may be inflamed, incarcerated, perforated or completely healthy. Logan MT reported that the incidence of appendix as an inguinal hernia sac content is less than 1% [3]. The incidence of appendicitis within an inguinal hernia is at 0.07%-0.13% [4]. At 0.1% of all cases of appendicitis, the incidence of a perforated appendix within an inguinal hernia is also extremely uncommon [5]. The diagnosis of Amyand's hernia is three-fold higher in the pediatric population due to patent process us vaginalis [6]. The mortality rate of Amyand's hernia can reach 30%, most commonly attributed to the peritoneal spread of sepsis [7]. Although Amyand's hernia usually occurs on the right side, according to the normal anatomical position of an appendix, it can appear on the left side in situs inversus, gut malrotation and mobile cecum [8]. The peculiarity of its clinical signs and symptoms together with the inadequate radiological features of Amyand's hernia make its diagnosis difficult pre-operatively, therefore it is almost always found intra-operatively.

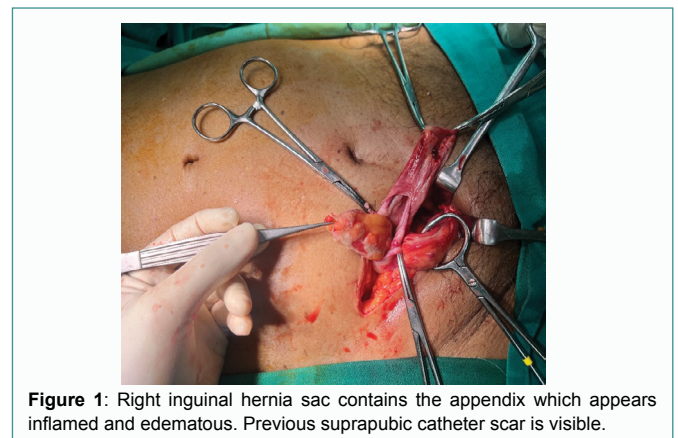
## Case Presentation

An, 84 years-old man with underlying gout, hypertension and benign prostatic hyperplasia presented with painful right inguinal swelling associated with abdominal distension and no bowel output for 3 days. He denied fever and vomiting. Upon arrival at the casualty, he was hemodynamically stable. On clinical examination, abdomen

was soft, slightly distended. There was an irreducible right inguinal swelling measuring approximately 4 cm × 4 cm, tender on palpation with no skin changes. Bilateral testes and scrotal examinations were normal. The digital rectal examination was empty. Blood parameters showed no signs of infection; however, his venous blood gas was mildly acidotic. His chest X-ray was normal. Abdominal X-ray revealed non-specific large and small bowel dilatation. He was given adequate fluid resuscitation. With a preoperative diagnosis of strangulated right inguinal hernia, the patient underwent right inguinal exploration. Intra-operatively noted there was a localized seropurulent collection in the sac with an edematous and inflamed appendix. The appendix base was difficult to visualize, thus proceeded with a lower midline laparotomy which revealed a perforated appendix near its base. There was no incarceration or adhesion, cord structures were normal and preserved. Appendectomy with lavage was done followed by herniotomy and herniorrhaphy using modified Bassini's repair. The abdominal and inguinal incisions were closed without mesh placement. Post-operatively, the patient had an uneventful recovery and was discharged home after 2 days with oral antibiotics. During the follow-up a month later, he was well with no recurrence. Histopathological examination revealed a perforated appendicitis (Figure 1 and 2).

## Discussion

A strangulated hernia differs from Amyand's hernia. It is a result of compromised blood supply to the edematous, incarcerated bowel due to venous and lymphatic obstruction. It is susceptible to necrosis, which can lead to perforation, leakage of bowel contents



**Figure 1:** Right inguinal hernia sac contains the appendix which appears inflamed and edematous. Previous suprapubic catheter scar is visible.

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**Figure 1:** Right inguinal hernia sac contains the appendix which appears inflamed and edematous. Previous suprapubic catheter scar is visible.

and eventually, a catastrophic peritonitis. The patient may present with bowel obstruction symptoms and if bowel ischemia is present, the patient will have severe pain in sepsis. An erythematous or dusky skin overlying the hernia is possible of strangulated hernia. The lactate level may be falsely normal up to 8 hours while the blood supply is compromised [9]. Strangulated hernia needs emergency surgery. It should be managed with placing a nasogastric tube for decompression, adequate fluid resuscitation and broad-spectrum antibiotics should be administered [10]. Intra-operatively, the bowel must be adequately visualized and evaluated to determine its viability before closing the hernia defect. In a poorly perfused bowel, bowel resection is performed, and surgeons would avoid placing synthetic mesh to reduce the risk of bacteria seeding in mesh.

There are many theories have been postulated for the occurrence of Amyand's hernia. A long appendix pointing towards the groin, loose peritoneal reflections and a redundant cecum causes the appendix to reach and gets retained in the hernia sac [11]. The pathophysiology of Amyand's hernia remains controversial. Studies indicated that muscle contractions and sudden rise in intraabdominal pressure may compress the appendix in the external ring. This compromises its blood flow resulting in recurrent inflammation and bacterial overgrowth. Besides that, an extraluminal obstruction causes an edematous appendix due to the narrowing of hernia neck [12]. Unlike other inguinal hernia with bowel content, Amyand's hernia may appear without any signs of obstruction and the inflammatory markers may stay within normal limits. There are various complications which may arise from Amyand's hernia; such as a perforated appendix with peri-appendicular or intra-abdominal abscess, necrotizing fasciitis of the anterior abdominal wall, epididymo-orchitis or testicular abscess, and in-situ arterial thrombosis in rare occurrence [13]. CT scanning can facilitate the diagnosis of Amyand's hernia. However, since CT is usually not the first choice for an uncomplicated inguinal hernia, therefore, the diagnosis of Amyand's hernia will be missed at that time. Laparoscopic surgery can function as a diagnostic and therapeutic approach. The most common treatment modality is appendectomy *via* herniotomy with primary hernia repair without mesh application. A lower midline laparotomy is advocated in perforation, pelvic abscess or when other abdominal pathologies are encountered. Laparoscopic appendectomy in case of Amyand's hernia with appendicitis was first reported by Vermillion et al. [12]. Multiple debates arise as to whether to remove the appendix if it's normal and the necessity of mesh application. While some argued that appendectomy should be done only if there is evidence of inflammation, others supported appendectomy in a non-inflamed appendix to avoid future

complications. The mere manipulation of a healthy appendix may provoke inflammation resulting in secondary appendicitis [14-16]. Appendectomy of a healthy appendix is considered not necessarily beneficial as the transection of a fecal-containing organ in a clean surgery increases septic complications. Besides that, the removal of appendiceal lymphoid tissue may compromise the pediatric patient's immune development [16]. It is generally accepted that the use of mesh in hernia repair in contaminated wounds is strongly opposed due to the high risk of surgical site infection. However, several studies reported the use of mesh repair and adequate antibiotic coverage without infection rate increments [6]. Biosynthetic meshes may have a role in these, but they are not readily available. Ultimately, the surgical decision is in the surgeon's hands, as the aim is to have a lower risk of surgical site infection than the risk of hernia recurrence. This debate led Losanoff and Bassonto propose a classification system for the principal management of Amyand's hernia based on the appendix state, presence of abdominal sepsis and the concomitant abdominal pathology [17]. Type 1 is a normal appendix in an inguinal hernia, perform hernia reduction and mesh placement. Type 2 is acute appendicitis localized in the hernia sac will need appendectomy with primary hernia repair. Type 3 is acute appendicitis complicated with peritonitis which warrants a laparotomy, appendectomy and primary hernia repair. Type 4 is acute appendicitis with concomitant abdominal pathology; its management is similar as type 3 with the management of concomitant disease.

## Conclusion

Amyand's hernia remains a diagnostic challenge due to its low incidence, indistinct clinical presentation, and ambiguous appearance on imaging scans like CT. It may lead to serious and life-threatening complications, thus needs to be handled with utmost vigilance. As it is commonly identified intra-operatively, every surgeon should be prepared to cope with such an unexpected situation and to proceed with the most suitable surgical modality for an excellent outcome.

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