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Amyand's Hernia: Case Report and Literature's Review

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Abstract

Amyand's hernia is a rare condition in which the appendix is situated inside an inguinal hernia sac. Incidence of this rare condition rises up to 1% (0.19–1.7%) of all inguinal hernia cases and the preoperative diagnosis is often challenging, even with the aid of ultrasonography or computed tomography. Inflammation of the appendix within the inguinal sac is even rarer, as it corresponds to 0.1% (0.07–0.13%) of all Amyand's hernia cases. We present a case of Amyand's hernia that occurred at our regional first-level emergency hospital center and discovered occasionally during an elective inguinal hernia repair and after a comprehensive review of the limited relevant literature we present the latest evidences about the diagnostic approach and surgical treatment of Amyand's hernia.

Introduction

Inguinal hernias are among the most commonly encountered conditions in general surgery, yet they may occasionally present with unusual contents within the hernia sac. One such rare entity is Amyand's hernia (AH), in which the contents of the hernial sac consist of the appendix. This condition, named after Claudius Amyand, was first described on October 8, 1735, when Amyand performed the world's first successful appendectomy. The patient, an 11-year-old boy, had been admitted to St. George's Hospital with a scrotal hernia. During surgery on December 6, Amyand discovered that the hernia contained a perforated appendix, leading to its removal and representing an important step in surgical practice [1].

In today's clinical practice, AH is observed in approximately 1% (0.19–1.7%) of inguinal hernia cases, with acute appendicitis occurring within the hernia sac in only 0.1% (0.07–0.13%) of all AH cases [2].

AH presents diagnostic challenges due to its nonspecific symptoms and the absence of clear radiographic findings, often leading to its misdiagnosis as an incarcerated or strangulated hernia. Indeed, the diagnosis is frequently made unexpectedly during elective

surgery, which can interfere with the surgical decision-making process and posing difficulties in determining the most appropriate management approach [3]. While the diagnosis of AH primarily relies on clinical evaluation, imaging techniques such as ultrasound and CT scans can provide valuable support. An abdominal CT scan plays can offer a high-resolution images of both the hernia sac and the appendix. In particular, it can differentiate between an inflamed and a non-inflamed appendix, aiding in accurate diagnosis and guiding treatment decisions [4]. However, since the symptoms of AH often overlap with those of other types of hernia and conditions, achieving a preoperative diagnosis can be challenging, requiring heightened clinical suspicion [5].

The surgical management of AH remains controversial, as strategies must be tailored to individual patients, with ongoing debate over the need for appendectomy and the approach to hernia repair [6].

In this report, we describe a case of an AH incidentally diagnosed during elective inguinal hernia repair, followed by a review of the relevant literature on the condition's diagnosis and treatment.

Case Report

A 65-year-old male presented to our regional first-level emergency hospital center with a longstanding swelling in the right inguinal region, first noted 15 years prior. The patient reported intermittent pain but denied any episodes of bowel obstruction. His medical history included allergies to third-generation cephalosporins, chronic obstructive pulmonary disease (COPD), hypertension, hyperuricemia, hypercholesterolemia, and a history of smoking.

Physical examination revealed a tender, non-obstructed inguinal hernia on the right side. Ultrasonography confirmed the presence of an uncomplicated right inguinal hernia with no signs of incarceration or strangulation. Given the patient's clinical history and preference, an elective tension-free open repair was scheduled. The patient was classified as ASA II based on his medical condition, and desensitization therapy was administered in light of his known drug allergies.

The procedure (carried out by Gianlugi Santella and Lorenzo Capasso) performed under spinal anesthesia with the patient in a supine position. A standard oblique incision was made in the right inguinal region. Upon opening the inguinal canal, an external oblique hernia was identified and carefully dissected from the spermatic cord. On opening the hernial sac, the cecum and a vermiform appendix were found within, though the appendix appeared normal, without signs of inflammation or ischemia. The appendix was reduced into the abdominal cavity, and the hernial sac was closed.

The hernia was repaired using a tension-free technique. A plug was placed at the internal inguinal ring and secured with the transversalis fascia. A prosthetic mesh was placed below the external oblique aponeurosis, and hemostasis was meticulously ensured. The wound was closed in layers. No surgical drains were placed. The postoperative course was uneventful, and the patient was discharged 12 hours after surgery. No postoperative complications, such as seroma or infection, were observed during follow-up visits (Figure 1).

Discussion

AH, though rare, presents a unique diagnostic and therapeutic challenges, requiring careful evaluation of both the hernia and the condition of the appendix. The management of AH should be tailored based on the stage of appendiceal inflammation, the presence of abdominal sepsis, and the patient's comorbidities. Diagnostic challenges stem from the variability of clinical symptoms, which can differ depending on the condition of the appendix—whether normal, incarcerated, or perforated [7].

Abdominal examination, clinical signs, laboratory results, and imaging are not always definitive in establishing a differential diagnosis [8], and in our case, no signs were found to indicate the presence of the appendix within the hernial sac. Imaging is generally not recommended by most surgeons unless the inguinal hernia is irreducible or incarcerated [9]. However, in cases of hernia incarceration or in patients presenting with symptoms such as abdominal pain due to an inflamed herniated appendix, imaging can play a role. It aids in differentiating AH from other potential diagnoses, assists in determining the urgency of surgical intervention, and helps guide through the selection of the most appropriate surgical approach [10].

To assist in managing the surgical complexities of AH, Losanoff and Basson developed a classification system in 2007 that categorizes the condition based on the status of the appendix within the hernia sac [11] (Table 1). This system provides guidance on the surgical management by distinguishing whether the appendix is normal, inflamed, perforated, or complicated by other abdominal pathology, with each scenario requiring a different approach, from simple hernia repair to more involved procedures like appendectomy or other procedures as appropriate.

In subsequent years, Rikki introduced a modification to this classification, emphasizing the importance of considering not only the appendix's condition but also the patient's overall clinical status, such as comorbidities and the severity of inflammation, allowing for a more personalized and flexible approach in determining the optimal surgical strategy for each patient [12] (Table 2).

This classification framework remains a valuable tool for guiding surgical decision-making in AH. However, the inherent challenges in diagnosing the condition preoperatively and the necessity for individualized treatment highlight the importance of a flexible, case-by-case approach in managing this rare and complex clinical entity.

In the presented case, a 65-year-old male with a longstanding right inguinal hernia was found to have a Type 1 AH during elective hernia repair according to Losanoff and Basson classification. The appendix appeared normal, without any signs of inflammation or ischemia. Given this, the appendix was reduced into the abdominal cavity, and a tension-free hernia repair was performed without the

need for appendectomy. This case exemplifies the complexity of AH, as well as the importance of individualizing the therapeutic approach based on the condition of both the hernia and the appendix. In fact, the surgical approach to AH remains a subject of debate, as the presence of a non-essential organ within the hernia sac introduces complexities not found in typical inguinal hernias. The potential for septic evolution, either at the time of discovery or postoperatively, alongside considerations of the appendix's immunological and microbiota-regulating roles, its involvement in autoimmune diseases, and the risk of neoplastic transformation, renders management particularly challenging.

Due to the rarity of AH, its surgical management can be challenging for general surgeons, as most cases are discovered during the operation. In cases of AH complicated by acute appendicitis, it is traditionally recommended to proceed with an appendectomy alongside hernia repair. This approach aims to reduce the risk of sepsis through the use of antibiotics, lavage, and, when necessary, drainage [13]. Although case series have reported successful mesh repair in patients with acute appendicitis without an increase in infection rates—mainly due to the availability of new-generation antibiotics and biological meshes [14], [15]—when the appendix is acutely inflamed, the risk of infection following repair can increase to as high as 50%, raising concerns about the use of mesh in these cases [16]. While a growing body of literature supports the use of mesh in clean-contaminated or contaminated ventral hernias [17], and the World Society of Emergency Surgery (WSES) guidelines for CDC wound class II do not exclude the use of standard or specific prosthetic meshes, even with concurrent antibiotic therapy [18], data specifically addressing the outcomes of mesh in AH repairs is limited. Consequently, although insights from other surgical fields can be considered, they must be applied cautiously.

In recent years, minimally invasive techniques have gained widespread acceptance in hernia repair and are increasingly used in the management of AH as well. The first laparoscopic repair without mesh was reported in 1999, followed by the first with mesh in 2004 [19]. However, it is important to note that during laparoscopic TEP (total extraperitoneal) hernioplasty, AH may go unrecognized, as intraperitoneal structures are not routinely visualized, potentially leading to missed cases of acute appendicitis. For this reason, alternative approaches, such as open hernia repair combined with laparoscopic appendectomy or laparoscopic TAPP (transabdominal preperitoneal) repair with or without appendectomy, have been described in the literature [20], [21]

Conclusions

AH is a rare clinical entity that, if not appropriately addressed, can result in significant morbidity.

The diagnosis of AH can be challenging without a high index of clinical suspicion, even with the use of advanced imaging techniques. The use of mesh is traditionally contraindicated in cases of an inflamed or perforated appendix and primary tissue repair is advocated. However, case series have been published with mesh repair even in patients with acute appendicitis with no increase in infection rates. Considering the limited literature on the topic, we recommend using the mesh only if the tissue planes are not contaminated.

While AH has historically been predominantly diagnosed during surgery, it is now conceivable that advancements in imaging diagnostics allow for the preoperative assessment of hernia contents and the extent of inflammation spread. The choice of surgery (appendicectomy and hernioplasty or only hernioplasty) is surgeon-dependent, based on the presentation and difficulties encountered as well as the therapeutic options put in place.

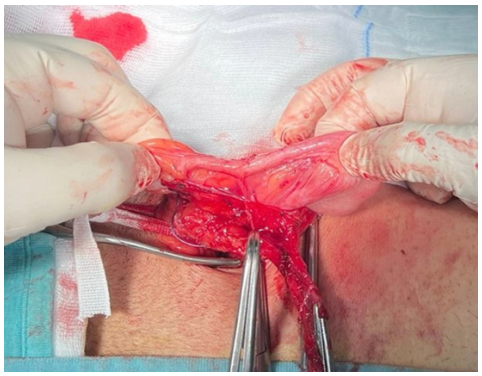

Figure 1: Type A appendix in an Amyand hernia (open approach).

Losanoff and Basson Classification	Description	Surgical management
Type 1	Normal appendix within an inguinal hernia	Hernia reduction, mesh repair, appendicectomy only in young patients
Type 2	Acute appendicitis within an inguinal hernia, no abdominal sepsis	Appendicectomy through hernia, primary repair of hernia, no mesh
Type 3	Acute appendicitis within an inguinal hernia, abdominal wall, or peritoneal sepsis	Laparotomy, appendicectomy, primary repair of hernia, no mesh
Type 4	Acute appendicitis within an inguinal hernia, related or unrelated abdominal pathology	Manage as types 1 to 3 hernia, investigate or treat second pathology as appropriate

Table 1: Losanoff and Basson Classification

Rikki Classification	Description	Surgical Management
Type 1	Normal appendix within an inguinal hernia	Hernia reduction, mesh repair, appendectomy in young
Type 2	Acute appendicitis within an inguinal hernia, no abdominal sepsis	Appendectomy through hernia, primary repair of hernia, no mesh
Type 3	Acute appendicitis within inguinal hernia, abdominal wall or peritoneal sepsis	Laparotomy, appendectomy, primary repair of hernia, no mesh
Type 4	Acute appendicitis within an inguinal hernia, related or unrelated abdominal pathology	Manage as type 1 to 3, investigate or treat second pathology as appropriate
Type 5 a	Normal appendix within and incisional hernia	Appendectomy through hernia, primary repair of hernia including mesh
Type 5 b	Acute appendicitis within an incisional hernia, no abdominal sepsis	Appendectomy through hernia, primary repair of hernia
Type 5 c	Acute appendicitis withing an incisional hernia, abdominal wall, or peritoneal sepsis or in relation to previous surgery	Manage as type 4

Table 2: Rikki Classification

Declarations

Consent for publication: The authors affirm that human research participants provided informed consent for publication

Data Availability: The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

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