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Amyand's hernia concurrent with appendicitis: A literature review

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Abstract When the vermiform appendix is inside the hernia sac, an uncommon kind of inguinal hernia known as Amyand's hernia (AH) occurs. Typically, an unintentional discovery discovered during surgery serves as the basis for the diagnosis. Only a tiny percentage of patients with inguinal hernias have AH, and even fewer experience problems with acute ischemia. The referral to general surgical services was due to an inguinal tumor located in the right lower quadrant of our 65-year-old male patient. There may be consequences from ischemia because this was not touch-sensitive. The appendix was removed by open hernioplasty. Treatment for type 1 AH, which this patient has, consists of mesh repair and hernial reduction. Despite not having acute appendicitis, our patient needed an appendectomy due to anatomical variation in their AH, which raised the possibility of hernial incarceration. Because of its size and adhesions inside the hernia, this treatment was also thought to be essential for preventing the recurrence of the hernia. This paper introduces a new method for handling the accidental finding of a type 1 AH. There are few treatment suggestions available for anatomic variations of the AH. The physical characteristics of AH may be included to overcome the drawbacks of the traditional Losanoff and Basson's AH classification methods for AH management and categorization. By using this method. Amyand's hernia occurs when a vermiform appendix is discovered inside an inguinal hernia sac. The objectives of this comprehensive investigation were to gather information on its occurrence, clinical picture, diagnosis, and treatment course.

Keywords: Amyand hernia, vermiform appendicx, acute appendicitis, management

1. Introduction

Surgeons perform inguinal hernias among their most frequent surgical procedures. It is described as an organ or fascia poking through the surrounding hollow wall. A common occurrence is imprisoned hernia, which is defined as the inability to reduce the hernia content; often, the omentum or small bowel constitutes the hernia content. Sometimes the cecal appendix is visible inside the hernia sac; this condition is called "Amyand Hernia," whether or notit is inflamed.(D'Alia et al., 2003; Kingsnorth & LeBlanc, 2003).

Most intelligent, aspiring surgical college fellows have heard of Littre's hernia, an inguinal hernia with an internal Meckel's diverticulum.

Additionally, students will comprehend that these hernias are rare and that it is likely that they will not see them within their career as surgeons. It is one of those conditions that, like Schatzki's ring and Zollinger–Ellison syndrome, is considerably more common on surgical examinations than it is in actual practice. That being said, examiners do like namesake conditions, so being able to discuss Littre, Meckel, and their particular situations will likely remain a useful test skill. Littre reported suffering a hernia in 17001, 81 years before Meckel was born. Because of his capacity to detect the presence of an organ inside an inguinal hernia that has not yet been recognized, Littre deserves to be recognized by his own name (Baldassarre et al., 2009; Losanoff & Basson, 2007; Sharma et al., 2007a).

Nonetheless, the discovery of an appendix within an inguinal hernia is more frequent than that of a Littre's hernia; also, it is significant that the individual who initially documented this condition, Claudius Amyand, has not been bestowed with the same immortality as Littre. Given that Amyand operated on an inguinal hernia while performing the first appendicectomy, this absence from medical history is all the more amazing (Häuser & Merkle, 1984).

1.1. Background

On December 6, 1735, at St. George's Hospital in London, Claudius Amyand carried out the first appendicectomy. Hanvil Anderson, an 11-year-old child, had a fecal fistula that leaked fluid into his groyne in addition to an inguinal hernia. When the appendix was discovered inside the hernia sac after treatment, a pin was used to connect the fistula to an appendix perforation. Amyand took approximately thirty minutes to remove the appendix. According to Amyand, "It is easy to conceive that this operation was as painful to the patient as laborious to me," in a case study that was published in the Philosophical Transactions of the Royal Society in 17362 (Lyass et al., 1997; Vermillion et al., 1999).

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Young Hanvil seemed to have bravely endured through this adversity. He healed after receiving treatment for the fecal fistula, but the hernia eventually reappeared. The first appendectomy has been fiercely debated, with other doctors claiming varying degrees of credit at various times. As the "first appendicectomists,"35 Mestivier (1757), Parker (1843), Hancock (1848), Tait (1880), Groves (1883), Symonds (1883), Kronlein (1884), Hall (1886), Morton (1887), and Treves (1887) are among the renowned individuals. In reality, Mestivier, Parker, and Hancock simply drained appendiceal abscesses rather than attempting to remove the appendix. When Lawson Tait operated in 1880, he probably removed a highly inflamed appendix first (Hutchinson, 1993; Sarker & Jackson, 2006).

In 1883, the Abraham Groves was recognized for performing the first appendicectomy in Canada. In New York, R. J. Hall conducted the first appendicectomy in history in 1886. The ailment of his patient, a ruptured appendix and strangulated inguinal hernia, bore striking similarities to Amyand's description from 150 years prior. Although Amyand's appendectomy occurred almost 150 years before Tait's, leading surgeons could not agree in the 1880s on who carried out the first appendectomy. The 'appendicectomy race' of the late 19th century destroyed Claudius Amyand's name. Amyand is only recognized for her significant contribution to surgery because of Deaver's painstaking research (Aguirre et al., 2005).

It is unfortunate that Amyand is still mostly unknown; his other achievements should have guaranteed a more prominent place for him in medical history had he not undergone the first appendectomy.

Claudius Amyand (1681–1740), one of the most skilled surgeons of his day, rose to the position of Warden and then Master of the Company of Barber-Surgeons. He received one of the earliest smallpox vaccinations. He was the first principal surgeon at Westminster Hospital, the sergeant surgeon to King George II, the founder and first principal surgeon of St. George's Hospital, and a fellow of the Royal Society. The excellent biography of Creese states that Amy was the first surgeon to perform an appendectomy. Claudius Amyand is a kind man, if not a genius, who has been underappreciated for far too long and should be recognized in medical history. It is believed that Amyand's hernia should be the term used to describe an inguinal hernia that includes the appendix (Ash et al., 2005; Inan et al., 2009; Murphy et al., 2014)**.**

2. Review

2.1. Data Sources

We performed a comprehensive search of the MEDLINE database using the term "Amyand's hernia." We compiled and assessed other papers.

The eponym of Amyand's hernia, Claudius Amyand (1660–1740), was the first to document the presence of a vermiform appendix in an inguinal hernia. Regardless of whether the vermiform appendix is normal, inflammatory, perforated, or gangrenous, the term "Amyand's hernia" is used. Amyand served as a military surgeon, sergeant, and surgeon for King George I and King George II of England after fleeing France for safety. He had a good reputation as a surgeon(Solecki et al., 2003).

2.2. Prevalence and characteristics

Traditional descriptions state that 1% of cases of inguinal hernia and 1% of cases of appendicitis are caused by Amy's hernias. 2, 5, 16 These numbers come from earlier research. Because of its rarity, it is challenging to determine the true prevalence of this illness. The true percentage appears to be between .4% and .6% based on an analysis of some of the largest series published in the literature, while the prevalence of appendicitis in an Amyand's hernia seems to be .1%. This assumption has also been made by a number of other writers. With a frequency of up to 1%, Amy hernias are approximately three times more common in the pediatric population; this difference is probably caused by certain anatomical characteristics (Patoulias et al., 2017; “VIII. Of an Inguinal Rupture, with a Pin in the Appendix Coeci, Incrusted with Stone; and Some Observations on Wounds in the Guts,” 1735).

2.3. Clinical signs and symptoms

Amyand's hernia is comparable to an inguinal hernia in that the condition of the vermiform appendix mostly determines how the hernia presents clinically. It often feels like a painful bump in the inguinal or inguinoscrotal area. This is clinically indistinguishable from a strangulated or imprisoned inguinal hernia, which makes establishing an accurate preoperative diagnosis difficult. Children often have pain for two to three days, but adults typically experience discomfort for 24 hours before being taken to the hospital. In contrast to the dull pain that characterizes hernias, discomfort is typically crampy and intermittent. Physical examinations often revealed discomfort, stiffness, and edema in the right groyne (Anagnostopoulou et al., 2006; Brainwood et al., 2020).

Fever, vomiting, gastrointestinal issues, and obstruction of the colon are possible additional symptoms, contingent on the state of the vermiform appendix (normal, inflammatory, perforated, or gangrenous). There are conflicting data to support this association since the hernia's neck often inhibits peritoneal irrigation and prevents inflammation from spreading, dulling the clinical image more than expected. However, inflammatory markers such as C-reactive protein and white blood cell count are unreliable because of their conflicting relationships with the condition of the vermiform appendix, and prognostic indicators such as age and peritoneal irrigation are thought to be less reliable(Diego Alonso et al., 2020; Singhal et al., 2015).

Amyand's hernia mortality ranged from 30% to 40%, according to an earlier study; however, this seems exaggerated. According to a recent study, no mortality has ever been documented, with Amyand's hernia as the cause; instead, all deaths have been linked to other coexisting illnesses. Another infrequent but deadly side effect of Amyand's hernia that has been reported is necrotizing fasciitis. The prognosis for patients with Amyand's hernia is better than that for patients with appendicitis since the hernia is detected early and the inflammation inside the hernia sac has diminished (Fernando & Leelaratna, 2002).

2.4. Imaging and preoperative diagnosis

Although clinically nearly impossible, preoperative detection of Amyand's hernia can be achieved using CT and ultrasound technologies. The ultrasound image displays a blind-ended, thick-walled tube that joins the cecum inside the hernia sac. With CT, the appendix inside the inguinal canal may be seen directly. Even if this is not possible, the position of the cecum with respect to the hernia sac is indicative of Amyand's hernia. Amyand's hernia has also been diagnosed by barium enema. A plain X-ray of the abdomen does not seem to be particularly helpful. The condition of the appendix inside the hernia can be partially understood by preoperative imaging; gas on CT, heterogenic tissue edema on ultrasound, and fluid in the right scrotum are likely indicators of a perforation. It is unknown whether treatment decisions are aided by knowledge about the state of the vermiform appendix. While most surgeons do not consider this necessary, others believe that this information can be useful in planning surgery and based their choice on intraoperative images showing the inflammatory status of the vermiform appendix. The application of these modalities has enabled a respectable percentage of preoperative diagnoses (Okur et al., 2013; Sharma et al., 2007b).

2.5. Pathophysiology

Two basic questions must be answered to understand the pathophysiology of Amyand's hernia: first, is the appendix accidentally admitted into the inguinal sac, and second, is the appendicitis a coincidence or related to the hernia?

In response to the first question, a number of authors have demonstrated a fibrous connection between the testis and vermiform appendix. 12961 When paired with a patent vaginal process, this may aid in the guidance and passage of the vermiform appendix via the inguinal canal. Amyand's hernia has been demonstrated in two premature twins and infants, indicating a congenital disorder.

The majority of authors believe that hernias and appendicitis are related. A plausible theory is that a retrocecal appendix enters a patent vaginal process, travels down the inguinal canal, and ultimately ends up in the scrotum. However, confirmation of this is difficult due to the unusual circumstances. In this instance, appendicitis and appendix ischemia may arise from a drop in blood pressure in the gastrointestinal system and tight muscles. The appendix may have gangrene or perforation. Fortunately, inflammation seldom spreads outside of the abdominal cavity due to the hernia sac's neck. Another possibility is that discomfort might start in the hernia and spread to the cecum. Another possible cause of appendicitis is a foreign body in the appendix (HerniaSurge Group, 2018; Losanoff & Basson, 2008).

2.6. Treatment

Traditionally, an appendectomy, hernioplasty through the same incision, abscess drainage, and hernia reduction are used to treat Amyand's hernias. Right hemicolectomy could be necessary in cases of cecum incarceration, spread, peritonitis, and ischemic right hemicolectomy. The first laparoscopic repair of an Amyand's hernia without the use of mesh was performed in 1999 by Vermillion et al., and the first preperitoneal repair utilizing mesh was performed in 2004 by Saggar et al. Meanwhile, there is much controversy about two interesting questions: should Amyand's hernia be addressed with mesh surgery, or should an appendectomy be performed as a preventative measure? (Ash et al., 2005)

Appendectomy versus no appendectomy

It is commonly known that when an appendix ruptures or there is appendicitis, an appendectomy should be performed. An inflamed appendix lengthens hospital stays and is occasionally associated with greater inflammatory indicators in terms of the patient's course of therapy.

A prophylactic appendectomy is not necessary if the appendix is discovered by mistake and shows no signs of illness; however, some writers treat every patient they encounter with an appendectomy. Advocates of appendectomy claim that younger people may develop appendicitis in the future due to appendix reherniation. On the other hand, others argue that appendices increase surgical risks and can disperse surgical sites that are otherwise sterile, increasing the risk of unnecessary deep or superficial infection (Vermillion et al., 1999).

2.7. Mesh repair versus no mesh repair

Many sources recommend avoiding the use of mesh during hernia surgery in cases of appendicitis or a ruptured appendix since it increases the risk of wound infection, sepsis, and the creation of fistulas, which can result in hernia recurrence. Nonetheless, a few writers advise mesh in situations that are not confrontational. Others who used mesh to treat people with

slight discomfort or perforation were successful. Although mesh repair has been used to treat recurrent hernias, longer hospital stays have been reported. Furthermore, Amyand has been recommended for her hernia surgery utilizing the BIO-A plug (W. L. Gore & Associates, Newark, DL). Alternative therapies, such as skin grafts or the body's natural healing process after harm, may be used in some circumstances, such as necrotizing fasciitis (Ryan, 1937) (Figure 1 to 3).

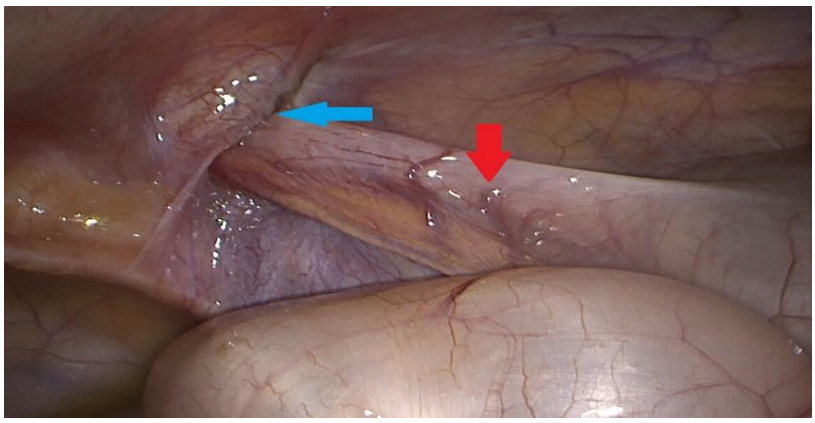

Figure 1 Intraoperative laparoscopic image of the appendix (red arrow) extending into the entrance of the inguinal hernia (blue arrow).

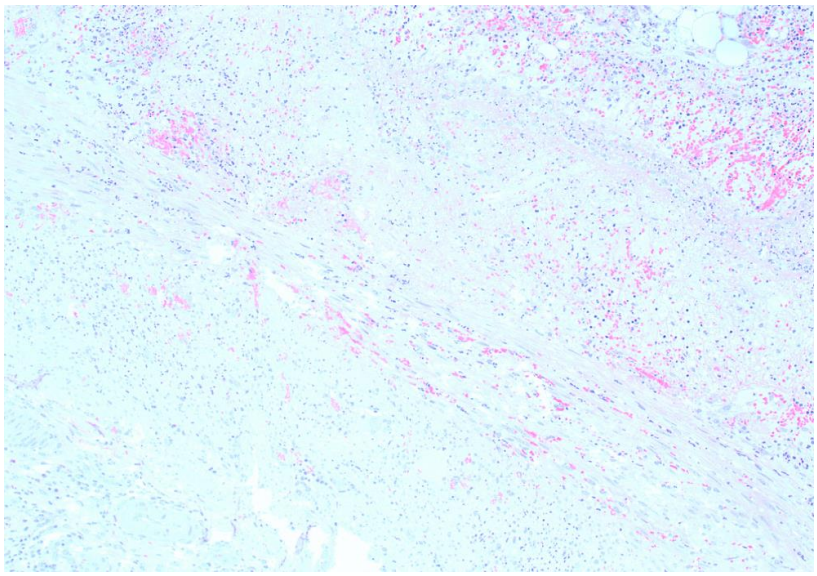

Figure 2 Histology of the tip of the appendix showing significant evidence of acute inflammation.

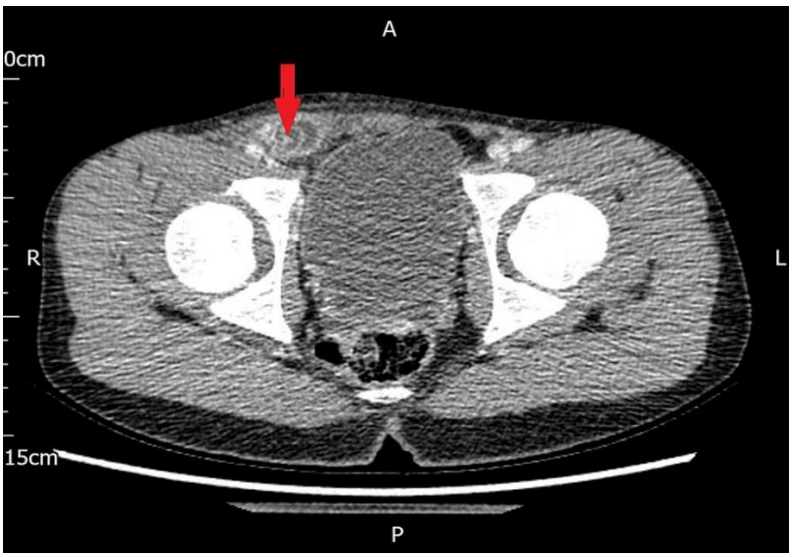

Figure 3 Axial CT image showing the right inguinal hernia, which contained the appendix.

2.8. Disscussion

The successful laparoscopic treatment of a middle-aged man with acute appendicitis and an Amyand hernia was the topic of discussion. Development of the appendix inside the inguinal hernia sac is quite rare. Amyloid hernias account for less than 1% of inguinal hernias. Furthermore, it is quite rare for someone who already has an amyloid hernia to also suffer from acute appendicitis. In this patient, neutrophilic leukocytosis was detected, indicating inflammatory disease. However, these outcomes lack specificity.

For example, because Amy has undergone both an appendectomy and acute appendicitis, the surgeon is unable to perform straightforward hernia repair. An appendix, whether normal or inflamed, may be a part of an Amyand hernia. On the other hand, a herniated appendix has a greater risk of infection. Blood flow is thought to be restricted by the small hernial neck, leading to edema and pain. Amyloid hernias need to be diagnosed and treated as soon as possible. Hernias and amyloids have been associated with up to 30% of recorded deaths. However, because previous Amys and hernias were frequently discovered by accident during surgery, the death rate decreased significantly (Anagnostopoulou et al., 2006; Sharma et al., 2007b).

The widespread use of sophisticated imaging has made it possible to diagnose Amy's hernia and acute appendicitis before surgery. The diagnosis of inguinal hernias is made clinically, as radiological imaging is usually not required before surgery. However, it was discovered that the patient had aberrant laboratory indications that indicated an inflammatory condition, necessitating further examination in this case. If the appendix was normal or only slightly enlarged, many experts did not advise appendectomy in patients with amyloid hernia since it might increase the risk of bacterial complications. In our study, the appendix was severely inflamed, which increased the risk of perforation. Since there was no sign of peritoneal infection, we attached the mesh without tension (D'Alia et al., 2003; Robinson, 2011; Shaban et al., 2018).

3. Conclusions

Amyand-related hernias are rare. Although certain issues have been identified in the past, recent research has shown that this type of hernia does not cause greater morbidity or mortality than a typical inguinal hernia when treated appropriately. An appendectomy cannot be conducted without first performing a comprehensive inspection of the vermiform appendix. Based on the characteristics of the hernia, the patient's particular characteristics, and their demographics, they should decide whether mesh surgery is needed. Given that younger patients are more likely to develop appendicitis as adults, under some circumstances, they may be better candidates for an appendectomy than older patients. Although this condition is too rare to be considered a "first-line" differential diagnosis, pediatric surgeons should be especially aware of it, as it seems to be more common in young people.

Amyand's hernia is an intriguing medical condition that has applications outside of medicine. Because of its lengthy history, uniqueness, combination of two typical general surgery scenarios, and, last but not least, the fact that it is an eponymous illness (always a source of intrigue), surgeons and residents on surgical wards and during examinations will continually bring it up.

Clearly, there are still unanswered questions regarding Amy's hernia. There are still unanswered questions about its etiology, clinical appearance, actual prevalence, and course of therapy. It will be challenging to find more studies and data due to its rarity. To provide the best possible patient care until then, radiologists, pediatricians, surgeons, gastroenterologists, and paramedical experts must work closely together.

Ethical considerations

Not applicable.

Conflict of Interest

All authors should disclose any personal and/or financial relationships with others or organizations that may improperly influence their paper. A conflict of interest statement should be provided in the manuscript file immediately before the References section. Case there are no Conflicts of Interest, so report "The authors declare no conflicts of interest".

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