

CASE REPORT

Amyand hernia as a rare cause of abdominal pain: A case report and literature review

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Key Clinical Message

Amyand's hernia is an uncommon kind of inguinal hernia in which the appendix becomes entrapped within the hernia sac. In patients with an inflamed or perforated appendix, mesh repair is not recommended for hernia repair.

Abstract

Amyand's hernia is an uncommon kind of inguinal hernia in which the appendix becomes entrapped within the hernia sac. We report a 48-year-old man with a right groin protrusion and abdominal pain. In the abdominopelvic ultrasound, an appendix with a diameter of 9 mm was reported in the right inguinal canal. The patient was diagnosed with Amyand hernia.

KEYWORDS

acute appendicitis, Amyand hernia, case report, inguinal hernia

1 | INTRODUCTION

Amyand's hernia (AH) is an uncommon inguinal hernia in which the appendix becomes entrapped within the hernia sac. It is named after Claudius Amyand, the first surgeon who identify and treat it.^{1,2} AH can affect people of various ages, from 6 weeks to 88 years old, and appears to be more prevalent in men.³⁻⁵ Although it may be as high as 1% in children, the actual prevalence of AH is between 0.4% and 0.6% of all inguinal hernias. The average rate of appendicitis in an AH is estimated to be 1%.⁶ Although AH is mostly found on the right side, left-sided AH has been mentioned in the literature.^{7,8} The appendix occurring within AH might be normal, inflamed, or ruptured. It can be confused with an acute hydrocele, testicular torsion, peritonitis, urological emergency, acute appendicitis, or epididymoorchitis.^{3,9}

Here, we report a rare case of AH and acute appendicitis. We would like to share our clinical experience with this rare patient to learn more about its various aspects.

2 | CASE PRESENTATION

2.1 | Presentation

A 48-year-old man with a right groin protrusion was referred to the general surgery department. This protrusion had developed within 3 months, was aggravated by activity, and resolved by rest. However, it did not change for the last week. Two days before to the hospital visit, he experienced abdominal pain in the right lower quadrant (RLQ) and right groin. He also did not report any history

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of nausea, vomiting, defecation pattern changes, or abnormal urinary symptoms. There were also no abdominal surgery, chronic disease, and drug use in the past medical history. In the physical examination, his vital signs were normal and only a mild tenderness without a rebound was found in the RLQ. Routine laboratory tests were normal. Abdominopelvic ultrasound showed a 9 mm appendix in the right inguinal canal (Figure 1), and thus, the patient was diagnosed with an Amyand hernia and became a candidate for laparoscopic surgery.

2.2 | Surgical procedure

During the operation, and after anesthesia induction, prepping, and draping were completed, a pneumoperitoneum pressure of 14 mm Hg was set up by a Veress needle. A trocar with a diameter of 10 mm was inserted at the superior margin of the umbilicus for the camera. At the external margin of the umbilicus, a tow trocar with a diameter of 10 to 5 mm was placed parallel to the rectus abdominis on the right and left sides. Abdominal exploration revealed no purulent discharge in the peritoneal cavity, but the middle part of an inflamed appendix was herniated into the inguinal canal from a small sac (Figure 2). Adhesion of the inflamed appendix was released from the hernial sac. There was a non-purulent discharge inside the sac. The base of the appendix was closed by two purple hemlocks. An appendectomy was performed, and the appendix was removed from the abdomen through an Endo bag. The peritoneal defect was repaired with PDS 2/0, and the hernia repair surgery with mesh was postponed to the future.

2.3 | Postoperative follow-up

On the first day after surgery, the liquid diet was started for the patient. On the second day, after bowel habits were

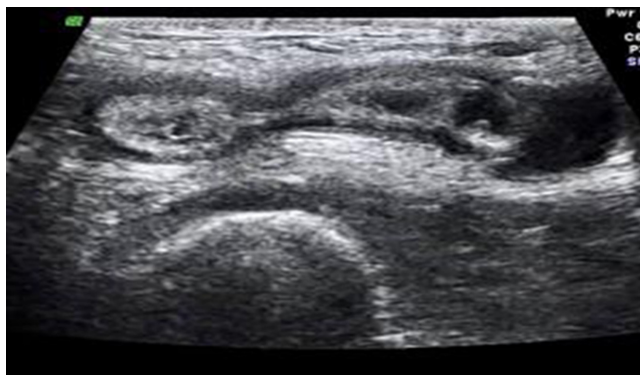


FIGURE 1 The ultrasonography of AH.

generally established, he was discharged in good general condition.

2.4 | Histopathology

Histopathologic examination showed appendiceal tissue with a few neutrophils in the superficial layer of muscularis propria and a final diagnosis was early acute appendicitis.

3 | DISCUSSION AND CONCLUSION

In this report, we discussed a 48-year-old white man complaining of a right groin protrusion. Clinical signs and symptoms as well as ultrasonography findings drove us to strongly suspect AH before the surgery and the diagnosis then was confirmed laparoscopically.

AH, known as an uncommon hernia present with the appendix as one of its contents. Preoperatively, AH is difficult to diagnose because it is a rare clinical condition. The rate of complications (wound infections in particular) rises when an appendix is inflamed or gangrenous. Although a perforated appendix in the groin hernia is uncommon, it is an urgent condition that necessitates infection control to prevent sepsis and should not be delayed because it could result in catastrophic outcomes.^{8,10,11}

Papaconstantinou et.al⁵ reported the mean age of patients was 58.5 years, the male-to-female ratio was 5.4:1, and right-sided AH was more common than left-sided in their systematic review. In addition, appendiceal inflammation confirmed either by direct observation of the appendix during surgery or after pathologic examination was present in 54.2% of AH cases, while a perforated appendix was noted in 16% of patients. More than half of

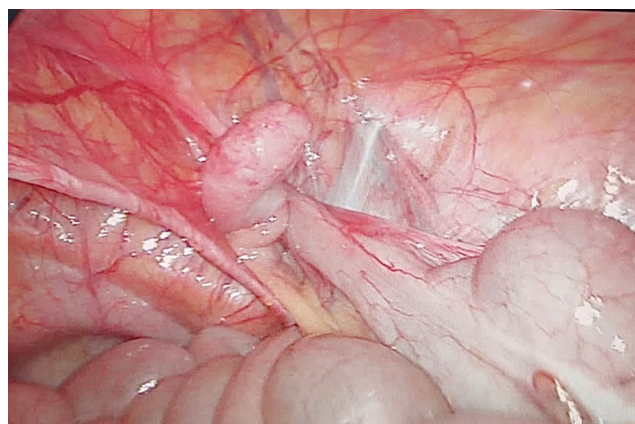


FIGURE 2 Laparoscopic view of AH.

the cases reported in the literature were associated with acute appendicitis requiring an appendectomy to be performed as we performed this on our patient. However, the age of our case was lower than the mean age of this study.

AH can show a various range of clinical symptoms. It may be found incidentally during an elective surgery without any signs or symptoms or manifested by acute appendicitis with perforation and abscesses along with an incarcerated hernia. Although WBC and CRP can help us differentiate the inflamed appendix from the healthy one,^{3,12} typical epigastric or periumbilical pain that is limited to the RLQ of the abdomen is the most important symptom of AH. This situation would be presented with a compressible mass in the inguinal or inguinoscrotal area.¹³ Like our case, clinical presentations typically include an inguinal hernia with RLQ pain. However, there wasn't any leukocytosis in the blood test of our case.

AH is difficult to diagnose due to its rarity and lack of specific symptoms.¹⁴ Hernia complications, acute appendicitis, peritonitis, cutaneous complications, and urological emergencies should all be considered in differential diagnoses.³ Acute appendicitis in an AH is a rare condition that is easy to miss before surgery.¹⁵ AH looks to be more common in children and thus, pediatric

surgeons should be aware of it. However, its prevalence is too low to be included in the "first-line" differential diagnosis.⁶

Imaging techniques like ultrasonography and computerized tomographic (CT) scan help us to better recognize involved intra-abdominal organs resulting in a more efficient surgery plan.¹¹ Although CT can be useful for preoperative diagnosis, it is not routinely used in underdeveloped countries due to cost and staffing issues. In this situation, ultrasound might be an appropriate diagnostic method. The sonographer should use a high-frequency linear array transducer to observe the inguinal canal if AH is a possibility. Although, imaging of any components found in the hernia sac to investigate a non-irreducible tubular structure must be considered,^{4,8,14} final and certain diagnosis will be made by laparoscopy during surgery.¹² As a result, surgery often serves both diagnostic and therapeutic purposes. Since the appendix might be non-inflamed when found inside the inguinal hernia sac, appendectomy is not required all the time.² In cases where the appendix is not inflamed, appendectomy is not necessary.¹⁶

In 2007, Lasanoff and Basson, classified the AH into four types for better management as shown in Table 1. This classification helps surgeons decide on treatment in surgery.¹⁷ Our case was consistent with the second type because the patient suffered from an inflamed appendix without any peritonitis. Therefore, we did an appendectomy without using mesh for hernia repair. In patients with an inflamed or perforated appendix, mesh repair is not recommended for hernia repair, since it theoretically increases the risk of both wound and mesh infection; and we did not use mesh either.⁴ When the appendix seems normal, tension-free mesh repair should operate. It is best to perform an appendectomy if you face acute appendicitis in the hernia sac. Using mesh repair required precision. In case of infection and peritonitis, mesh repair should be avoided.^{12,18} Although current surgical procedures for AH type 2 hernias are under the influence of new prosthetic materials like biological mesh which prevents recurrence, there is not enough research to support this claim.¹⁹

Despite the high index of clinical suspicion during the surgery, the decision to perform an appendectomy or use a mesh to repair a hernia should always be individualized, since it depends on the patient's condition such as appendix inflammation level, surgery and cavity contamination grade, age, comorbidities, and hernia type.^{12,20-22}

To better understand and compare the findings of our study and other similar studies, we compared and classified various cases in Table 2.

TABLE 1 Classification of Losanoff and Basson for Amyand's hernia.

Classification	Description	Treatment
Type 1	Appendix is normal in hernia sac	Reduction of hernia and use mesh repair
Type 2	Acute appendicitis in hernia sac without peritonitis	Appendectomy and hernia repair without using of mesh
Type 3	Acute appendicitis in hernia sac with peritonitis	Perform both laparotomy and appendectomy and hernia repair without using mesh
Type 4	Acute appendicitis in hernia sac complicated with abdominal disease	Perform both laparotomy and appendectomy and hernia repair without using mesh (like type 3) and treatment of the abdominal disease

TABLE 2 The comparison between various cases.

N	Author	Age	Sex	Site	Hernia Type	Appendix	Preoperative diagnosis	Surgery
1	Balasubramaniam ¹⁹	11	Boy	Right	Type 1	Ruptured	Appendicitis	Appendectomy
2	Amsriza ²³	63	Male	Right	Type 1	Uninflamed	Inguinal hernia	Appendectomy
3	Ahmed ¹¹	3	Boy	Right	Type 1	Uninflamed	Indirect inguinal hernia	Appendectomy with herniotomy
4	Gao ¹²	77	Male	Right	Type 2	Perforated	Appendicitis and inguinal hernia	Appendectomy
5	Mendez ²²	70	Male	Right	Type 2	Abscessed	Incarcerated right inguinal hernia	Appendectomy with primary repair of the hernia without mesh.
6	Schaaf ²⁴	82	Female	Right	Type 2	Inflamed	A right femoral hernia containing an inflamed appendix	Appendectomy and mcvey hernia repair
7	Joshi ²⁰	1	Male	Left	Type 1	N/A	Left complete irreducible inguinal hernia	Left inguinal exploration with hernia repair
8	Maeda ¹⁶	62	Male	Left	N/A	Normal	Left-sided inguinoscrotal hernia	Bilateral standard oblique inguinal incisions
9	Present case	48	Male	Right	Type 2	Inflamed	Amyand's hernia	Appendectomy

AUTHOR CONTRIBUTIONS

Mahsa Radboy: Data curation; investigation; writing – original draft. **Mohammad Ebrahim Kalantari:** Conceptualization; data curation. **Negar Einafshar:** Data curation; investigation; writing – original draft. **tooraj Zandbaf:** Writing – review and editing. **Ali Akbar Bagherzadeh:** Investigation; writing – review and editing. **Mahta Shari'at Moghani:** Data curation; investigation; writing – review and editing.

ACKNOWLEDGMENTS

The authors would like to express their profound gratitude to the medical personnel who helped in the treatment of this patient at Imam Reza Hospital.

FUNDING INFORMATION

None.

CONFLICT OF INTEREST STATEMENT

The authors declare that they have no competing interests.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

CONSENT

The patient's written consent was obtained for the publication of this case report.

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How to cite this article: Radboy M, Kalantari ME, Einafshar N, Zandbaf T, Bagherzadeh AA, Shari'at Moghani M. Amyand hernia as a rare cause of abdominal pain: A case report and literature review. *Clin Case Rep*. 2023;11:e7929. doi:[10.1002/ccr3.7929](https://doi.org/10.1002/ccr3.7929)