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# Amyand 'S Hernia: Case Report and Review of the Bibliography

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**Abstract** | **Case Report**

**Amyand's hernia (AH)** is an extremely rare presentation of right inguinal hernia characterized by the presence of the vermiform appendix, either inflamed or normal, in an inguinal hernia sac. The reported incidence is approximately 1% of all inguinal hernia cases. Treatment is not well codified and remains controversial about whether or not to perform an appendectomy when the appendix is normal, and about usage of mesh in cases of appendectomy. We report our experience with five cases of Amyand' S hernia. All patients were male, aged 31, 65, 69, 22 and 29 years old. The diagnosis was a per-operative surprise in all cases. Two patients presented with strangulated hernia without appendicular complication. Treatment included systematic appendectomy followed by inguinal hernia repair using modified Shouldice technique. All patients recovered well without any septic complication or hernia recurrence. Post-operative courses were uneventful. Even in the absence of appendicitis, appendectomy followed by anatomic inguinal hernia repair can be performed in young males without morbidity.

**Keyword:** Amyand's hernia, appendix, inguinal hernia, herniorraphy, appendectomy.



## INTRODUCTION

First described by Claudius Amyand (1685-1740), Amyand's Hernia (AH) is the presence of a vermiform appendix, either inflamed or normal, in an inguinal hernia sac [1]. AH is an extremely rare presentation of right inguinal hernia. The reported incidence of a normal appendix within inguinal sac is approximately 0.5 to 0.6 % and the incidence of acute appendicitis in AH accounts for about 0.1% [2, 3]. It's often a peroperative surprise due to non-specific clinical signs and symptoms [1].The management of AH is not well codified and remains controversial in two points: prophylactic appendectomy in the absence of an inflamed appendix and the use of mesh repair in the presence of inflamed or perforated appendix. Some surgeons argue that prophylactic appendectomy should be avoided when normal appendix is incidentally found in the hernia sac [4]. However, others perform systematic appendectomy in all cases to prevent future appendicitis especially in young males [2,5]. If the appendix is normal, mesh or anatomical hernioplasty is done with or without appendectomy. If the appendix is inflamed, appendectomy with anatomical hernia repair is recommended [1,2].

Although the use of prosthetic mesh repair has been performed in appendicitis, it is generally accepted that mesh repair should be avoided in cases of appendectomy performed for either non-inflamed or inflamed appendices. The purpose of this report is to review our experience of no-mesh inguinal hernia repair and systematic appendectomy performed for AH with non-inflamed appendices. We report a case series of five patients operated for AH in the Department of Surgery at Bembereke Evangelic hospital, Benin, in the period of November 2016 to September 2017. We performed open appendectomy in all the five cases followed by anatomical hernioplasty.

The purpose of this report is to review the experience of mesh inguinal hernia repair plus appendectomy performed for AH with non-inflamed appendices.

## CLINICAL CASES

### Case 1

A young male, 31-year-old, was admitted with right inguinal hernia for elective hernia repair. Patient had had inguinal swelling for 5 years. Clinical examination revealed a complete, reducible and painless hernia with nodule in the scrotum. There was no history of fever, abdominal pain and vomiting. Laboratory parameters were within normal limit. Patient then underwent open anatomical hernia repair

under regional anesthesia. A transversal inguinal incision was performed. During dissection of the hernia sac, an 8 cm long appendix was found without sign of inflammation. Under strict protection of surgical border, appendectomy was performed followed by herniorraphy using shouldice modified repair technique. After surgery, patient recovered well without any complications. The follow up period was 6 months and was uneventful.

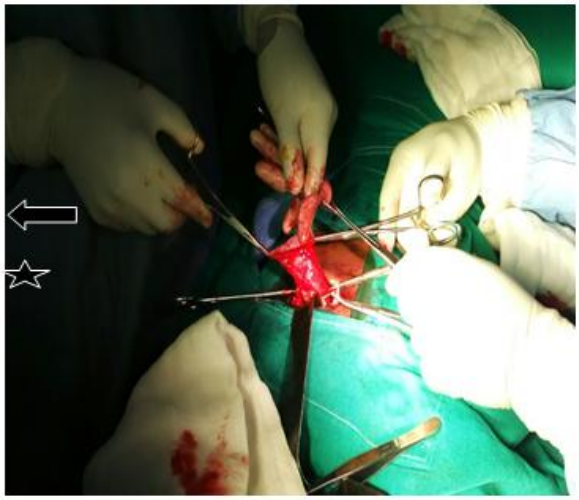


**Fig-1: Normal vermiform appendix (arrow) in the inguinal hernia sac (star)**

## Case 2

A male, 65-year-old, was admitted with bilateral inguinal hernia for elective hernia repair. Clinical examination revealed an enormous reducible and painless bilateral inguino-scrotal hernia. There was no history of fever, abdominal pain and vomiting. Laboratory parameters were within normal limit. Under regional anesthesia patient then underwent open anatomical bilateral hernia repair. A transversal inguinal incision was performed. The hernia sac contained a normal appendix protruding into an indirect sac. Appendix could easily be freed from the sac by dissection and an appendectomy followed by modified Shouldice herniorrapphy was performed. After surgery, patient recovered well without any complications and was discharged on the 7$^{th}$ post-operative day. Follow up period was uneventful.

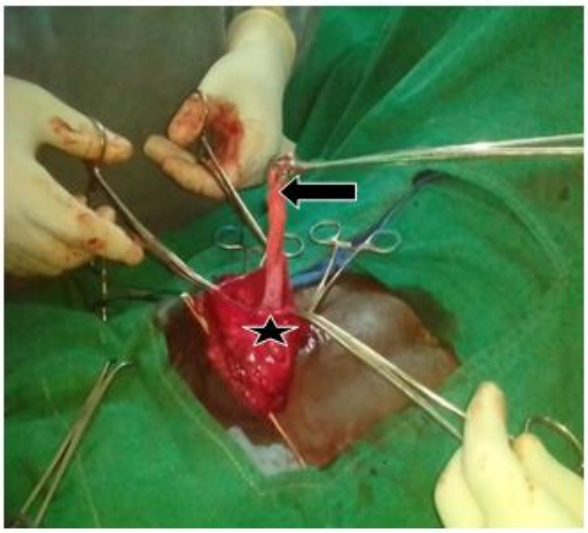
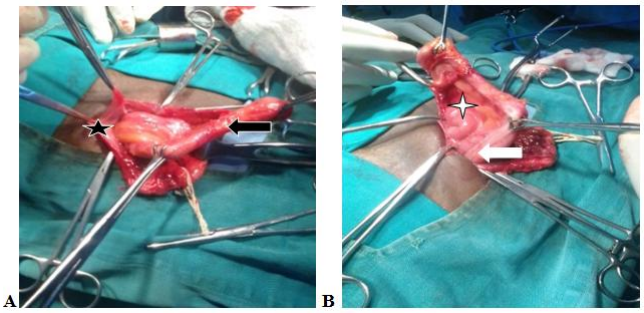


**Fig-2: Normal vermiform appendix (arrow) in the inguinal hernia sac (star).**

## Case 3

A male of 67-year-old with history of heart failure and hypertension presented with right inguinal hernia which he has been suffering of for 2 years, for elective hernia repair. On examination, pulse rate was 96 beats per minute and blood pressure 160/90mm Hg. Hernia was reducible and painful. On palpation, abdomen was soft and non-tender. Prostate was normal. Laboratory investigations were within normal limit. Patient then underwent open herniorraphy under regional anesthesia. An transversal inguinal incision was made. During dissection, hernia content was found to be appendix and terminal end of caecum, which presented adhesions with a direct sac (Figure3). Adhesions were gently released, and appendix was found to be grossly normal in appearance. Appendectomy was perfomed, the sac was closed followed by herniorraphy using modified Shouldice technique. After surgery, patient recovered well without any complications and was discharged on the 6$^{th}$ post-operative day. Follow up period was uneventful.



**A** **B**

**Fig-3: A, B: adhesions (white star) of the vermiform appendix (black arrow), the caecum (white arrow) and the surrounding hernia sac (black star)**

## Case 4

A 29-years-old male with history of a swelling in the right groin for 7 years, presented to the emergency department with irreducible and painful inguinal swelling for 10 days. There was no vomiting,

and he could still pass gas. On examination, pulse rate was 96 per minute and blood pressure 120/70mm Hg. Abdominal examination revealed an irreducible, tense, tender, and painful right inguinal hernia with no impulse on coughing but there was no clinical signs of intestinal obstruction. The patient was taken for emergency surgery, however the hernia was spontaneously reduced during the preoperative period and the patient was again able to pass gas and stools. Under general anesthesia, an oblique inguinal incision was perfomed. Sugery revealed a direct inguinal sac containing the caecum and anormal appendix. The patient underwent appendectomy and an open Shouldice modified herniorraphy. The patient was discharged on the 3rd post-operative day and the skin staples were removed on the 10$^{th}$ post- operative day. After a one month follow up period, the patient was well.

**Case 5**

A young 22 years old male with history of a swelling in the right groin since childhood, presented to the emergency department with irreducible and painful inguinal scrotal swelling for 9 hours. There was no vomiting no gas arrest no fever. On examination, pulse rate was 96 beats per minute and blood pressure 120/70 mm Hg. The swelling was tense, tender, with no impulse on coughing and without features of intestinal obstruction. With a diagnosis of strangulated right sided inguino-scrotal hernia, patient was sent for emergency surgery. The inguinal incision was extending into the groin. Incision was deepened to reach the external oblique aponeurosis, across the superficial inguinal ring. Incision was then extended and deepened downwards along the root of thescrotum. Hernia sac was identified and carefully opened. Viability of the bowel was appreciated. The patient underwent appendectomy and an open shouldice modified herniorraphy. A drain was placed into the inguinal wound. The patient was discharged on the 3rd post-operative day and the skin staples were removed on the 10$^{th}$ post- operative day. After one month follow up, the patient was well.

## DISCUSSION

The eponym Amyand's hernia is related to the presence of appendix inside indirect inguinal hernia. It was first described by Claudius Amyand, a British military surgeon,who performed in 1735, the first successful recorded appendectomy on an 11-years-old boy named Hanvil Anderson who suffered perforation of the appendix by a pin [1].

Amyand's hernia is a rare condition. Three times more common in children than in adults, due to the patency of the processus vaginalis [6]. D'Alia *et al*. reported an incidence of 0.6% on 1341 inguinal hernias [7]. Acute appendicitis occurs much less frequently, and perforated appendix and peri-appendicular abscess formation within an inguinal hernia sac is an extremely rare clinical presentation. Solecki *et al*. observed that acute appendicitis was found in 0.62% of inguinal hernia sac [8]. Gurer *et al*. reported that acute appendicitis was found in 0.1 % of inguinal hernia sac [2]. In our case series, AH always occurred on the right side, probably as a result ofnormal anatomical position of the appendix. However, AH has also been reported on the left side which may be associated with situs inversus, intestinal malrotation or mobile caecum [9].

When the appendix enters the sac, the deep ring causes obstruction of the lumen and compromises blood supply leading to a localized inflammatory process. Singal et al observed that appendicitis is usually caused by extra luminal obstruction due to pressure on the hernia neck rather than intraluminal obstruction of the appendix [10]. Abu-Dalu and Urca have suggested that the appendix becomes more vulnerable to trauma in AH and is ultimately retained by adhesions when it enters the sac [11].

In our case series, AH was per-operative surprise. Diagnosis of amyand's hernia before surgery is elusive. The presence of appendix inside hernia is always a per-operative surprise for many surgeons due to non-specific clinical signs and symptoms [4]. Apostolidis *et al*. have shown that only one out of 60 cases was diagnosed pre-operatively [12]. When the appendix is incarcerated or inflamed,the patient presents with acute pain in the right iliac fossa, vomiting, fever and tender swelling in the right groin and this condition is always misdiagnosed as a strangulated hernia or confused with acute scrotal condition in male [13,14].

We performed systematic appendectomy followed by hernia repair using modified Shouldice technique. The follow-up was uneventful.

At the moment, there is different surgical approach for Amyand's hernia and the management remains controversial. Some authors argue that AH associated with normal appendicitis within the sac must lead to hernia repair without appendectomy especially when mesh repair is performed because of potential septic contamination of prosthetic mesh [1,4]. Hutchinson advocates that appendectomy of a normal appendix followed by mesh procedure is not profitable, and may actually be harmfull, as resection of a fecal-containing organ may lead to septic complications and increase morbidity and mortality [15]. However, others surgeons performed systematic appendectomy in all cases to prevent future appendicitis especially in young male [2,5]. The decision to remove or to leave behind a healthy appendice is rather based on common sense based on the age, life expectancy, and lifelong risk of developing acute appendicitis. Along these lines, children or adolescents have a signicantly higher risk of developping acute appendicitis compared to elderly

individuals in whom the appendix can more safely be left behind.

When inflamed or perforated appendix is found within the sac, appendectomy is systematic but the controversy exists on the type of hernia repair. In our context, usage of prothetic material was not possible because of its high cost. We preferred modified Shouldice repair which in competent hands, give satisfactory results and reasonably low recurrence rates. However, prosthetic repair techniques have overshadowed the various pure tissue repair and have widely become the preferred standard.

In the past, Amyand's hernia associated with appendicitis led to appendectomy followed by anatomical hernia repair. Mesh was forbidden because of high possibility of post-operative wound infection due to inflammatory response [4]. However, Chatzimavroudis et al have shown that inflamed or perforated appendix inside hernial sac is no more a contra-indication for use of prosthetic mesh and reported no post-operative complications with mesh repair [16]. Mesh procedure in cases with appendectomy for inflamed appendices has also been reported by many authors without septic complications and could be considered a safe technique [17, 18]. Laparoscopic surgery is now feasible for hernia repair with or without appendicitis and is becoming popular. Saggar et *al*. reported total extraperitoneal management, including appendectomy and hernia repair using synthetic mesh [19]. Milanchi et *al*. recommended laparoscopic appendectomy, followed by open hernia repair in cases of appendicitis [1].

Losanoff *et al*. proposed a classification to improve management of Amyand's hernia. This classification mentioned four types of hernia basedon the extent ofinflammation of the appendix within the sac, along with treatment layout [20].

- Type I is a normal appendix in hernia sac; perform reduction with mesh hernioplasty, appendectomy in young patients.
- Type II is acute appendicitis localized in the hernial sac; perform appendectomy through inguinal incision, no mesh hernia repair.
- Type III is acute appendicitis complicated by peritonitis; perform appendectomy through laparotomy, hernia repair without mesh.
- Type IV is acute appendicitis with or without abdominal pathology; manage as type I to III, treat abdominal pathology.

## CONCLUSION

In conclusion, Amyand hernia is a rare pathology with variable clinical presentation. Rarely diagnosed before surgery, it remains a per operative surprise. Controversies on the management are still present because no evidence-based data exists due to its rarity. Losanoff classification based on extent of inflammation of the appendix determines the surgical approach and the type of hernia repair. In our context, systematic appendectomy associated with anatomical hernia repair have given satisfactory results and could be proposed even in absence of appendicitis, especially in young male, to prevent future appendicitis.

### COMPETING INTERESTS

The authors declare no competing interests.

### AUTHORS' CONTRIBUTIONS

All authors have contributed to the management of the write up of the manuscript. All authors have read and approved the final version of the manuscript.

## REFERENCES


1. Milanchi S, Allins AD. Amyand's hernia: History, imaging, and management. Hernia. 2008;12:321–322.
2. Gurer A, Ozdogan M, Ozlem N, Yildirim, Kulacoglu H, Aydin R. Uncommon content hernia sac. Hernia 2006;10:152-158.
3. Michalinos A, Moris D, Vernadakis S. Amyand's hernia: a review. The American Journal of Surgery. 2014; 207(6)989–995.
4. Sharma H, Gupta A, Shekhawat NS, Memon B, Memon MA. Amyand's hernia: A report of 18 consecutive patients over a 15-year period. Hernia. 2007;11:31–35.
5. Priego P, Lobo E, Moreno I, Sánchez-Picot S, Gil Olarte MA, Alonso N, Fresneda V. Acute appendicitis in an incarcerated crural hernia: analysis of our experience. RevistaEspanola de EnfermedadesDigestivas. 2005;97(10):707–715.
6. Baldassarre E, Centonze A, Mazzei A, Rubino R. Amyand's hernia in premature twins. Hernia. 2009;13:229–230.
7. D'Alia C, Lo Schiavo MG, Tonante A, Taranto F, Gagliano E, Bonanno L. Amyand's hernia: Case report and review of the literature. Hernia. 2003;7:89–91.
8. Solecki R, Matyja A, Milanowski W. Amyand's hernia: a report of two cases. Hernia.2003; 7:50-51.
9. Gupta S, Sharma R, Kaushik R. Left-sided Amyand's hernia. Singapore Med J.2005; 46:424-425.
10. Singal R, Mittal A, Gupta A, Gupta S, Sahu P, Sekho MS. An incarcerated appendix: report of three cases and a review of the literature. Hernia. 2010;14:26.
11. Abu-Dalu J, Urca I. Incarcerated inguinal hernia with a perforated appendix and periappendicular abscess. Dis Colon Rectum.1972; 15:464-465.
12. Apostolidis A, Papadopoulos V, Michalopoulos A, Paramythiotis D, Harlaftis N. A case report and review of literature. Internet J Surg. 2005;6:1.

13. Thomas WE, Vowles KD, Williamson RC. Appendicitis in external hernia. Ann R CollSurg Engl. 1982;64:121–122.
14. Carey LC. Acute appendicitis occurring in hernias: a report of 10 cases. Surgery. 1967;61(2):236–238.
15. Hutchinson R. Amyand's hernia. J R Soc Med. 1993;86:104–105.
16. Chatzimavroudis G, Papaziogas B, Koutelidakis I, Tsiaousis P, Kalogirou T, Atmatzidis S. The role of prosthetic repair in the treatment of an incarcerated recurrent inguinal hernia with acute appendicitis (inflamed Amyand's hernia). Hernia J Hernias Abdom Wall Surg. 2009;13(3):335–336.
17. Reilly DJ, Macula B, Brandt C. Primary mesh repair of Amyand's hernia. ANZ Journal of Surgery. 2015;85(1-2):93-94.
18. Ranganathan G, Kouchupapy R, Dias S. An approach to the management of Amyand's hernia and presentation of an interesting case report. Hernia. 2011; 15(1):79-82.
19. Saggar VR, Singh K, Sarangi R. Endoscopic total extraperitoneal management of Amyand's hernia. Hernia. 2004;8:164–165.
20. Losanoff JE, Basson MD. Amyand hernia: a classificationto improve management. Hernia. 2008; 12(3):325-326.