

## An approach to the management of Amyand's hernia and presentation of an interesting case report

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### Abstract

**Introduction** Inguinal hernia is one of the most common operations and 1% of the cases contain appendix in the hernial sac, which is known as Amyand's hernia. Inflamed appendix and its presence in recurrent inguinal hernia is a rare encounter in general surgery. The management of Amyand's hernia is not straightforward without awareness. **Methods** Recurrent inguinal hernia with Amyand's hernia history, clinical features and management was studied and compared with the present literature. We have discussed the management options and an approach using a Medline literature review.

**Results** An 80-year-old gentleman who had a right-side inguinal hernia operated 40 years ago presented with a right groin swelling and increasing redness associated with pain for 3 days. Clinical signs and symptoms were in favour of strangulated inguinal hernia. He was operated and appendicectomy was done for inflamed non-perforated appendicitis. Prolene mesh repair was done and he was treated with a full course of antibiotics.

**Discussion** Amyand's hernia is difficult to diagnose pre-operatively and its presence in recurrent hernia has only been reported once before. The management of Amyand's hernia is not straightforward in most of the cases. Inflamed

and perforated appendix needs to be removed. Delayed mesh repair is a better surgical option in perforated appendix cases.

**Keywords** Amyand's hernia · Recurrent inguinal hernia · Mesh repair and Amyand's hernia · Management and Amyand's hernia

### Introduction

Amyand's hernia is one of the rare presentations of inguinal hernia. The absence of specific clinical features precludes initial diagnosis and investigations. Its presence in incidental cases requires good decision-making skills. Complicated Amyand's hernia in recurrent inguinal hernia has only been reported once before. Our discussion about this case and the literature review aims to simplify the decision-making process based on the best literature evidence.

### Case history

An 80-year-old energetic gentleman presented to us in the emergency department earlier this year with right groin pain and swelling for 3 days. The patient initially noted a swelling in that region after a bout of coughing, which gradually became larger. It was associated with a knife-like excruciating pain, which later became painful to touch. In spite of the patient's age, his urinary system has not given him any problems. His dietary habits and bowel movements were regular. The patient was known to have emphysema and has not had any recent exacerbation. He underwent right-side inguinal hernia repair 40 years ago

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and he was not fit enough for his left inguinal hernia operation 4 years previously.

Examination showed his vital signs was stable and erythema extending from the right groin to the midline of the abdomen (Fig. 1) and with the swelling in the groin extending into the right scrotum. There was no obvious abdominal distension. It was painful on palpation and irreducible. Examination showed no cough impulse. Clinically, strangulated recurrent inguinal hernia diagnosis was made and with possible omentocele. The left-side inguinal hernia was reducible and uncomplicated.

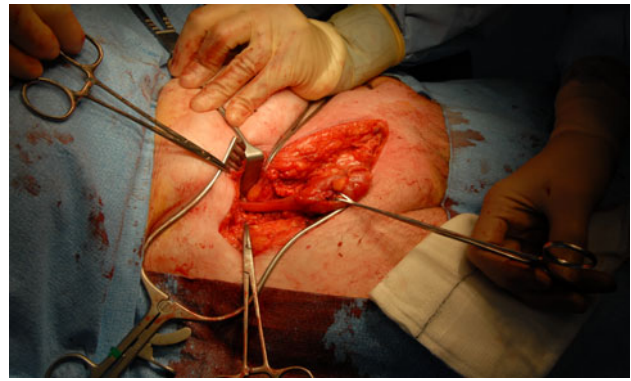
The patient underwent blood investigations, which showed a borderline rise in white blood cells (WBC) count of  $12.4 \times 10^9/L$  with raised C-reactive protein (CRP) of 145, and the rest of the haematological investigations were within normal limits. The patient's chest X-ray has not shown any new changes and his abdominal X-ray was unremarkable.

After informed consent, the patient was operated under general anaesthesia. Through the skin crease incision, routine inguinal hernia steps were performed. A dense adhesion between the external oblique and internal oblique was noted due to previous hernia operation. Thickened and inflamed sac was separated from the cord structure. Inflamed appendix was seen in the sac, along with caecum (Fig. 2) and turbid fluid. The appendix base was healthy and there was no evidence of perforation. Routine appendectomy was done after thorough wound washing. Prolene mesh was placed and routine tension-free repair was performed.

He received cefuroxime and metronidazole for 5 days because of surrounding cellulitis. The patient developed spikes of temperature during the post-operative period. He later developed a lump, which turned out to be a haematoma; it was drained by removing a few clips. The scrotal swelling decreased in a few days. Post-operatively, the patient's chest condition was good and he was discharged



**Fig. 1** Picture showing erythema secondary to complicated Amyand's hernia



**Fig. 2** Inflamed appendix with bulging tip

in 7 days. The patient recovered well after the surgery. Histology confirmed transmural appendicitis.

## Discussion

Inguinal hernia repair is one of the most common operations routinely carried out. It is not unusual to find Meckel's diverticulum, bladder, fallopian tubes and ovaries with inguinal hernia, but it is rare to find the appendix in a hernial sac. It was first reported by Claudius Amyand (1680–1740) after he found a perforated appendix in the inguinal hernia. Since then, it has been increasingly reported in literature, with an incidence of 1% in all inguinal hernias and complications of Amyand's hernia as appendicitis is 0.13%. Recurrent inguinal hernia with Amyand's hernia has been reported once previously in the literature, which is much rarer than complicated cases. The appendix also been reported in femoral hernia (De Garregeot's hernia). Detailed description of the historical background and management was first described by Hutchinson in 1993 [1]. It can occur in either extremes of age, but is most commonly seen around the fourth decade.

Most of the cases occur with short duration of history and without any precipitating causes. The literature review suggests that it occurs more often in the right side because of anatomical location, but occurrence on the left side has also been reported. It has been commonly reported due to congenital laxity of the right colon, since all of the cases were found to contain caecum along with appendix. No classical history of reducibility in most of the cases has been reported, hence, once an appendix with the caecum comes into the hernial sac, it becomes irreducible. Incidental finding of Amyand's hernia during radiological investigations requires intervention of the hernia with or without appendectomy.

It is retained in a long run due to adhesions as reported by Abu-Dalu and Urca [2]. The patient becomes

**Table 1** Management of Amyand's hernia

Elective (1%)	Emergency (0.13%)
Incidental	Non-perforated
Open or laparoscopic hernia repair ± appendicectomy	Hernia repair with mesh and appendicectomy
Single dose of antibiotics	Three doses of antibiotics
	Perforated
	Inguinal exploration and appendicectomy
	± mesh repair delayed (TAPP, TEP)
	Full course of antibiotics

**Table 2** Recommendations

Pre-operative period
Awareness of Amyand's hernia
Investigations are not routine
No specific clinical features
Intra-operative period
Hernioplasty depends on pathological status of the appendix
Adequate coverage of antibiotics
Anticipation of complications

symptomatic in a short period of time compared to all other irreducible inguinal hernias; this may be due to the fact that the appendix is more prone to damage in the hernial sac. All of the cases reported in the literature show features of appendicitis and its complications, rather than with bowel ischaemia [3]. This may be because constricting points are beyond the deep inguinal ring, but not all of the cases presented with appendicitis due to constriction. Hence, the most probable explanation would be a contraction of abdominal muscles and sudden increases in intra-abdominal pressure causing compression of the appendix, later inducing inflammation and bacterial overgrowth. Most of the cases in the literature were obstructive appendicitis and only a few cases have been reported with faecoliths and villous adenoma [4].

Pre-operative clinical diagnosis is difficult and there are no specific signs and symptoms related to Amyand's hernia. The most common presentation is irreducible painful hernia (83%). Clinical features of appendicitis have been reported in a few cases [2, 5]. Hence, radiological investigations are not routine for strangulated inguinal hernia, and largely, it does not alter the management of Amyand's hernia and the mode of intervention, except in a few cases with a pelvic collection. Pelvic collection sometimes warrants laparotomy, even though it can be managed in most cases with percutaneous radiological intervention.

Amyand's hernia is most often approached through the inguinal incision and rarely through laparoscopy in elective patients. Appendicectomy is generally not indicated in incidental Amyand's hernia during the routine repair of inguinal hernia, since it may convert clean wounds to contaminated wounds. The repair of inguinal hernia is essential to avoid the complications in incidental Amyand's hernia.

Routine appendicectomy indicated in all of the pathological appendicitis cases with a necessary course of antibiotics (Table 1). The role of mesh is controversial in all of the perforated cases, and it is strongly not recommended. Mesh repair in strangulated hernia has been studied and reported in the literature. It was found to be safe, but it requires long-term follow up and more evidence [6]. In our case, redness was seen around the groin, but there were no inflammatory signs in the inguinal canal. We performed mesh repair after the wound toileting because of the recurrence of hernia, non-perforated appendicitis and poor fitness for future procedure.

The role of other hernioplasty techniques is not widely discussed. Since we can always repair the hernia at a later date using totally extraperitoneal (TEP) or trans-abdominal pre-peritoneal (TAPP) procedures, it is not mandatory to repair the hernia in complicated Amyand's hernia. The role of drain is not discussed widely but has been reported in a few cases; indications for it are controversial. Peritoneal toileting not discussed in all of the cases, but it should be selective and depends on individual cases.

The role of orchidectomy in older patients is discussed in the literature because of post-operative sepsis, but we did not perform it due to the lack of any strong evidence for recommendation and failure to obtain informed consent. Primary wound closure is done in most of the cases reported in the literature and only Lyass et al. reported delayed closure due to retroperitoneal collection. Mortality associated with this varies between 14 and 30% in most of the perforated appendicitis cases [7]. It might be related to abscess formation, peritonitis causing a pelvic abscess and retroperitoneal extension. We should be aware of and anticipate these complications when we come across Amyand's hernia in order to avoid morbidity and mortality (Table 2).

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