



## Case Report

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## Preoperative diagnosis of Amyand's hernia: About 3 cases

Kossi Cyprien Vignon<sup>1</sup>, Alexis Mupepe Kumba\*<sup>2</sup>, Habib N'domè Natta N'tcha<sup>1</sup>, Setondji Gilles Roger Attolou<sup>1</sup>, Mahougnon Roméo Eloge Onzo<sup>1</sup>, Delphinkuassi Mehinto<sup>1</sup>, Laurent Dugue<sup>3</sup>

<sup>1</sup> University clinic of visceral surgery "B" at the national university hospital center Hubert Koutoukou Maga of Cotonou, Republic of Benin

<sup>2</sup> Medical Technics' Institute of Uvira, Uvira, South Kivu province, Democratic Republic of Congo

<sup>3</sup> Visceral surgery department of "Saint Camille de Bry-Sur-Marne" hospital, Republic of France

### Abstract

The Amyand's hernia, presence of a vermiform appendix in inguinal hernia sac, represents about 0.13% of all acute appendicitis and 1% of all inguinal hernias. Although described more than 250 years ago, his preoperative diagnosis remains exceptional. We report 3 clinical cases of Amyand's hernia, including a case of right inguinal hernia not strangulated and two cases of right inguinal hernia strangulated (1 case of recurrent right inguinal hernia strangulated and 1 case of appendicular peritonitis complicating strangulated hernia). An abdominopelvic CT-scan performed in 2 cases /3 allowed the diagnosis to be made. No imaging was performed in the case of recurrent inguinal hernia right strangulated; In this case, Amyand's hernia diagnosis was accidentally made intraoperatively. Laparoscopy localized the vermiform appendix in the hernia sac in the case of appendicular peritonitis complicating strangulated hernia. The 3 patients underwent surgery and the postoperative course was uneventful. Laparoscopy or imaging, especially CT-scan makes preoperative diagnosis.

**Keywords:** Amyand's hernia, C-T scan, Preoperative diagnosis, vermiform appendix.

### INTRODUCTION

Amyand's hernia is defined by the presence of a pathological or healthy vermiform appendix in an inguinal hernia sac. This particular anatomical situation allowed Claudius Amyand to perform in 1735 an appendectomy by the hernia sac [1]. The main differential diagnoses to be mentioned in this situation are the hernia of Littre containing a Meckel diverticulum (inguinal location more frequent), Maydl's hernia containing 2 adjacent intestinal loops incarcerated (hernia in "W"), and Richter's hernia, which corresponds to the partial incarceration of an intestinal loop [2].

Although described more than 250 years ago, the preoperative diagnosis of Amyand's hernia remains exceptional and its surgical management controversial [3].

We report three clinical situations, from the simplest to the most complex of Amyand's hernias, which denote the difficulty of preoperative diagnosis and the variability in surgical management.

### CASE REPORTS

#### Patient 1 (P1)

A 61-year-old man, obese (BMI 37), consulted for pain in the right groin aggravated by the effort. Clinical examination did not notice a nonreducible inguinal swelling. Biology was normal. CT-scan showed a normal vermiform appendix in a right inguinal hernia sac. (Figures 1a and 1b)

We performed herniorrhaphy with polypropylene mesh without appendectomy or opening the hernia sac.

#### Patient 2 (P2)

A 71-year-old man with a history of smoking and asthma, consulted for a recurrent right-sided inguinal strangulated hernia indicating an emergency surgical procedure. Biology was normal. At the opening of the hernial sac, we found a phlegmonous vermiform appendix. (Figure 2)

\*Corresponding author:

Dr. Alexis Mupepe Kumba

Medical Technics' Institute of Uvira, Uvira, South Kivu province, Democratic Republic of Congo

Email:

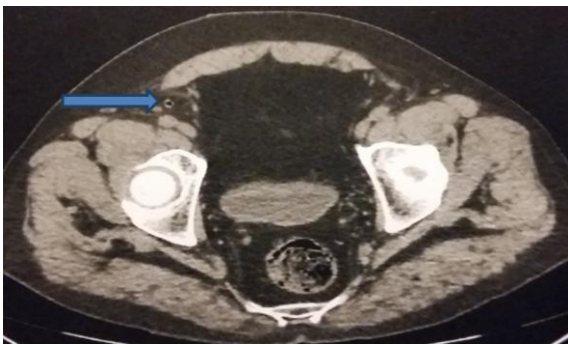
mupepekumba[at]gmail.com

As the previous herniorrhaphy consisted in the placement of a non-absorbable mesh, we performed appendectomy, removal of the old mesh and parietal repair according to BASSINI procedure. The histology of the operative specimen reported neutrophil infiltrate and mucosal ulceration. With antibiotic therapy, the evolution was excellent.

### Patient 3 (P3)

A man of 87 years old with a right inguinal hernia since 2 months was admitted in emergency for 2 days of constipation and strangulated hernia since 24 hours. Physical examination noted generalized abdominal contracture. The biological assessment showed an elevated C-reactive protein (CRP) and hyperleucocytosis. Pelvic CT-scan showing right hernia sac containing liquid and gas. The appendix was not clearly identified. (Figure 3)

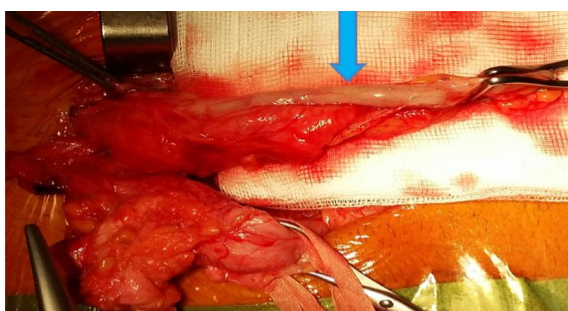
By Laparoscopic surgery, we find a gangrenous and perforated appendix in the hernial sac, and then we realize appendectomy and washing of the peritoneal cavity without parietal repair of the hernia defect. The patient received a double antibiotic treatment. The postoperative course was uneventful. A hernia repair according to Lichtenstein procedure with polypropylene mesh was performed three months later and the outcome was favorable.



**Figure 1a:** Pelvic CT-scan showing a vermiform appendix without sign of complication in a right hernia sac.



**Figure 1b:** Abdominopelvic CT-scan showing the right hernia sac containing vermiform appendix, without sign of complication.



**Figure 2:** Opening of the inguinal hernia sac and discovery of an inflammatory vermiform appendix.



**Figure 3:** Pelvic CT-scan showing Right hernia sac containing liquid (blue arrow) and gas (red arrow).

### DISCUSSION

Amyand's hernia represents approximately 0.13% of all acute appendicitis and 1% of all inguinal hernias. It is mainly found in the male subject [4, 5]. Our 3 patients were all male subjects with advanced age, patient1: 61 years old, patient 2: 71 and patient 3: 87 years old. In the literature, the age of patients varies between 3 weeks and 92 years [6]. The hernia site of the vermiform appendix may be umbilical, at the level of the Spiegel line, obturator, diaphragmatic, or even in the path of a laparoscopic trocar, but the most common site in male subject, remains right inguinal location [7]. The variant called "Garengoet's hernia" characterized by the presence of the appendix in the right femoral hernia is common in women after menopause [8]. Exceptionally, the appendix may be in a left hernial sac in cases of situs in versus, poor bowel rotation, very mobile cecum or if the appendix is excessively long [5, 6]. In all our patients, the site was right inguinal, which corroborates the common description of other authors.

The vermiform appendix can become inflamed and very rarely perforated in 0.1% of cases [6]. The same observations were made at P2 and P3 of our clinical cases, where the appendix was inflammatory and perforated respectively, leading to a generalized acute peritonitis.

Parietal hernia is usually due to the association of abdominal pressure factors and weakening of the abdominal wall marked in case of advanced age and obesity [7]. The precise mechanism of Amyand's Hernia is unknown, but for the majority of authors, acute appendicitis would occur secondarily to parietal ischemic events caused by compression at the neck. Compression of the appendix by lymphadenopathy or by an incarcerated stercolithe has also been suggested [2]. We think that the compression is the main mechanism of pain in patient 1, the cause of inflammation and perforation in patient 2 and 3.

Our 3 patients presented the factors of abdominal hyperpressure and weakening of the abdominal wall, namely obesity for P1, smoking and asthma for P2 and constipation for P3. P1 was 61 years old, the vermiform appendix was normal, while in P2, 71 years old it was inflamed and P3, 87 years old, the vermiform appendix was perforated. Is advanced age a factor of gravity?

The clinical presentation of Amyand's hernia is that of a strangulated hernia with a non-reducible inguinal groove. There may be signs of acute appendicitis with, for some authors, intermittent pain. Many authors agree that the diagnosis must be evoked in front of any patient with strangulated hernia without sign of intestinal obstruction [9]. Biological abnormalities are inconsistent [2]. In our observations, patient 1 had no inguinal nonreducibleswelling, but a right inguinal pain exacerbated in the effort. Patients 2 and 3 presented the classic form of strangulated hernia, with, for P3 the signs of generalized acute peritonitis.

In the absence of imaging, the preoperative diagnosis is very difficult and the discovery of the appendix in the hernia sac is often fortuitous.

Ultrasound (more or less Doppler) and intravenous contrast CT-scan are the most commonly used medical imaging exams [3, 7]. In Patient 1, tomography localized the vermiform appendix; in Patient 2, the discovery of the vermiform appendix in the hernia sac was fortuitous intraoperatively because no imaging examination was performed before surgical procedure because of the emergency and evidence of the diagnosis of hernial strangulation. In patient 3, it is rather laparoscopy that made it possible to locate the vermiform appendix. This shows different situations and difficulty of preoperative diagnosis of Amyand's hernia.

Parietal repair and nature of the material depends on the degree of contamination of the intervention: non-resorbable mesh in the presence of a healthy appendix and not removed [10, 11], as we did in our patient 1; repair using resorbable material or deferred repair if the appendix is inflamed or perforated because of the high risk of occurrence of infectious complications [4]. We realized in P2 a herniorrhaphy according to BASSINI procedure and a delayed parietal repair by non resorbable prosthesis in P3 because of the infectious risk. In these 2 cases, P2 and P3, a bio prosthesis such as that of bovine origin could have been used because it carries a low risk of recurrence and postoperative morbidity [12]. Any ways, its use in emergency can be discussed in our third patient who had a generalized peritonitis acute.

However, Torino *et al.* [13] and Chatzimavroudis *et al.* [14] have reported uneventful after cure by synthetic prosthesis of hernia Amyand with inflamed or perforated appendix. Indeed, to reach these results, these authors systematically associated: drainage, irrigation and antibiotic therapy. Other authors such as Upadhyaya *et al.* [15] recommend systematic appendectomy, whether the appendix is inflamed or not. It seems rather wise, on the one hand, not to open the hernia sac or perform systematic appendectomy when the appendix is normal, as we did in our patient 1. On the other hand, to repair the hernia defects by non-resorbable mesh immediately or delayed depending on the infectious state, as we did in our patient 3.

## CONCLUSION

Amyand's hernia, a conjunction of two very frequent pathologies in digestive surgery, is paradoxically rare. Its diagnosis must be evoked in front of strangulated hernia without sign of intestinal obstruction. Laparoscopy or imaging, especially CT-scan, allows preoperative diagnosis. The surgical management is still uncodified.

## Conflicts of interest

The authors declare no conflict of interests (financial, political, personal, religious, ideological, academic or intellectual competing interests included).

## Authors' contribution

- Alexis **MUPEPE KUMBA** and Kossi Cyprien **VIGNON**: Drafting the article, Substantial contribution to conception and design, acquisition of data. (Wrote the paper)
- Habib N'Domè **NATTA N'TCHA**, Setondji Gilles Roger **ATTOLOU** and Mahougnon Roméo Eloge **ONZO**: Final approval of the version to be published.
- Delphin Kuassi **MEHINTO** and Laurent **DUGUE**: Revising it critically for important intellectual content and final approval of the version to be published.

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