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Amyand's Hernia: Review of the Literature

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ABSTRACT

Amyand's hernia is defined as the presence of the cecal appendix inside the sac of an inguinal hernia. The appendix can be normal, inflamed, perforated or gangrenous, but the first situation is the most frequent. The name "Amyand's hernia" is due to the English surgeon Claudius Amyand (1681-1740), who in 1735 performed the first appendectomy on an 11-year-old boy during surgery for an incarcerated inguinal hernia that contained the perforated cecal appendix in its inner.1,2

When the vermiform appendix is found inside a femoral hernia, it is called Garengeot's hernia, in recognition of René Jacques Croissant de Garengeot (1688-1759), a French surgeon who was the first to describe the presence of the vermiform appendix inside the femoral hernia sac from an indirect inguinal hernia in 1731; in this case, the appendix did not present inflammatory signs. Diagnosis is generally intraoperative, since being an infrequent pathology, without specific symptoms and requiring high diagnostic suspicion, preoperative diagnosis is usually exceptional.

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INTRODUCTION

Inguinal hernias are one of the most common pathologies in the field of general surgery, in some cases there are some variants in their presentation; one of them is the Amyand hernia, defined as an inguinal hernia that contains the cecal appendage within the hernial sac; it represents about 1% of all cases reported in the literature. The first finding was made by Claudio Amyand in 1735 where he described the presentation of an 11-year-old boy with a perforated appendix in an inguinal hernia; today its presentation remains a diagnostic challenge.1

EPIDEMIOLOGY

The prevalence of Amyand's hernia varies, depending on the series, between 0.19% and 1.7% of all operated inguinal hernias. It is, therefore, an infrequent pathology. The prevalence of appendicitis in the inguinal hernia sac is even lower, since it is between 0.07% and 0.13% of all appendicitis.1,2

It is three times more frequent in children than in adults, and reaches a prevalence of 1%, due to the persistence of the processus vaginalis in the pediatric population. The most common form of presentation is as an irreducible inguinal hernia, sometimes painful and mostly right, which is why it is clinically indistinguishable from an incarcerated or strangulated inguinal hernia.3

Cases of Amyand's hernia have been described on the left side, in relation to intestinal malrotation, mobile cecum, or situs inversus. This situation, although very rare, makes diagnosis even more difficult. Amyand's hernia is a clearly underdiagnosed pathology. The current trend of reducing hernial content without opening the sac could contribute to this fact. In most cases the diagnosis is intraoperative, as an incidental finding during surgery for an inguinal hernia. 4

PATHOPHYSIOLOGY

The pathophysiology of Amyand's hernia is not entirely clear, the most accepted theory mentions a rare anatomical variation, where the appendix is long, retrocecal and extraperitoneal, with a marked descent from the cecum to the right iliac fossa, with the appendix located near the deep ring, which favors its sliding together with the hernial sac, towards

the inguinal canal. Instead of intraluminal obstruction of the appendix, the cause of inflammation of the appendix in the hernial sac is usually given by extraluminal obstruction, due to contraction of the abdominal muscles, with the consequent increase in abdominal pressure.4,5

DIAGNOSIS

The clinic varies depending on the phase of appendicitis. Fever, vomiting, pain in the periumbilical region (which is later located in the right iliac fossa or inguinal region), abdominal distension and even symptoms of peritoneal irritation (which in most cases will be localized, since the inguinal orifice limits the extent of inflammation).5

The presence of typical inflammatory markers in acute appendicitis, such as leukocytosis and elevated CRP, do not appear constantly in Amyand's hernia with an inflamed appendix.6

Cases of preoperative diagnosis by abdominal CT or abdominal ultrasound have been described. In most cases they were requested to rule out a possible intra-abdominal complication, without suspecting an Amyand hernia. 7

The differential diagnosis should be made with multiple pathologies, including incarcerated hernia, strangulated hernia, Richter's hernia, inguinal adenitis, acute epididymitis, orchiepidymitis, etc.7

Table 1. The classification used for staging is the Losanoff and Basson Classification.

Table 1.	**Losanoff and Basson Classification.**
Type 1	Presentation of normal appendix in inguinal hernia.
Type 2	Presentation of appendicitis in inguinal hernia without evidence of abdominal sepsis
Type 3	Presentation of acute appendicitis in inguinal hernia with data of abdominal sepsis
Type 4	Presentation of acute appendicitis in inguinal hernia with concomitant abdominal pathology

Due to the infrequency of the symptoms, we lack large series that show the proper management of this pathology.

TREATMENT

Reviewing the existing bibliography, there are different options both in the management of the appendix and when addressing hernia repair, namely:

1.- Possibilities in the management of the cecal appendix

Most authors consider appendectomy indicated only in cases in which the appendix is inflamed, without it being necessary when it does not present any inflammatory sign (as occurred in two of the cases presented).8

They argue that by performing the appendectomy on a normal appendix we convert an a priori "clean" surgery into a "clean-contaminated" surgery, a fact that would contraindicate subsequent hernia repair with mesh. This is the technique of choice in inguinal hernia surgery, due to its lower rate of subsequent recurrence (although this contraindication is not accepted by all authors). Among the reasons for not performing appendectomy are a greater risk of infection, fistula and hernia recurrence, in addition to increasing the risk of surgery and, consequently, the morbidity and mortality of patients. 2, 3, 4, 9, 10.

Other authors consider that appendectomy should be performed in all cases(6,8,11) regardless of whether the appendix is inflamed or not, and are based on different reasons:

-Avoid future complications, especially in children (who are at higher risk of developing future appendicitis); left Amyand's hernia, where posterior appendicitis could present with atypical symptoms, and therefore, a greater risk of late diagnosis (and consequently, greater morbidity and mortality).

-Possible diagnostic error: on some occasions the distinction between a normal or inflamed appendix is exclusively intraoperative, through palpation by the surgeon.8,9

-Hernia repair could be carried out with prosthetic material associated with correct antibiotic coverage after appendectomy.9

-The possibility of using biological mesh in these cases, not contraindicated in contaminated areas (a priori resistant to infection although long-term studies are lacking). 8,11

2. HERNIAL REPAIR

The use of mesh in hernia repair has shown a lower recurrence rate compared to anatomical techniques (currently it is the gold standard), but its use is contraindicated in principle in contaminated fields, as is the case of an Amyand hernia with inflamed or perforated appendix, due to a high risk of infection of the prosthetic material with subsequent rejection of it.11

Most authors consider hernia repair with prosthetic material to be safe in the case of Amyand's hernia with a non-inflamed appendix, both laparoscopic and open. The conflict arises in

the management of cases with appendicitis, since as we have previously commented, some authors do not consider this fact a contraindication for the use of mesh and others resort to the use of biological mesh, although the lack of long-term studies and its high cost does not facilitate its diffusion.11

CONCLUSION

In conclusion, it will be difficult to establish an action protocol in this pathology, so each case must be individualized and the ideal treatment proposed in each situation, taking into account not only the criteria of an inflamed appendix or not, but also other no less important factors. such as the phase of the appendicitis, the degree of involvement of the surrounding tissue, the type of hernia, the size of the hernia defect, the incidents that arise during the intervention, the existence of previous surgery of the inguinal region in case of recurrences and comorbidities of each patient.

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