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# Acute appendicitis complicating De Garengéot's hernia treated with combined laparoscopic-open technique: a case series and literature review

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**Acute appendicitis complicating De Garengéot's hernia treated with combined laparoscopic-open technique:  
a case series and literature review**

*An acute appendicitis in the context of a De Garengéot's hernia is a very rare event and represents a hard challenge for surgeons. As only few cases have been reported in literature, there is no consensus about its optimal surgical strategy of treatment. Here we present two consecutive cases of female patients presenting an uncommon acute appendicitis in a femoral hernia treated with a combined laparoscopic-open technique.*

KEY WORDS: Acute appendicitis, De Garengéot's hernia, Laparoscopy

## Introduction

The presence of the appendix inside an incarcerated femoral hernia is defined as De Garengéot's Hernia, so named after the French surgeon René-Jacques Croissant De Garengéot first described it in 1731. This condition is rare, occurring in 0.5-3% of all femoral hernias, and it is mostly diagnosed during the surgical exploration. The presence of an acute appendicitis within a femoral hernia is even rarer, occurring only in 0.08 - 0.5%<sup>1</sup>. Its clinical presentation is similar to an incarcerated or strangulated femoral hernia but generally without any signs of bowel obstruction or general peritonitis. The

differential diagnosis of De Garengéot's hernia includes: other groin hernias, lymphadenitis, lymphoma, soft tissue tumors and retroperitoneal abscesses. In a short period of time, we observed two cases of De Garengéot's hernia with acute appendicitis: that induced us to focus about its optimal surgical strategy and review data reported in the literature about this rare event.

## Case Series

The first case refers to a 85 year-old lady admitted at the emergency department after a 2-day history of pain, swelling, and skin erythema in the right groin. Her past surgical history included bilateral inguinal hernia repair with Bassini's technique and hysterectomy for uterine prolapse. She was haemodynamically stable and not feverish. Her abdomen was soft with no guarding, but a painful and not reducible right inguinal mass was observed. The overlying skin was warm and flushed. Lab-tests showed a white cell count of 11.860/μl and C-reactive protein of 10,28 mg/dl. The abdominal X-ray was negative for gas-fluid levels. Ultrasound scan of the right groin was unable to distinguish between a femoral

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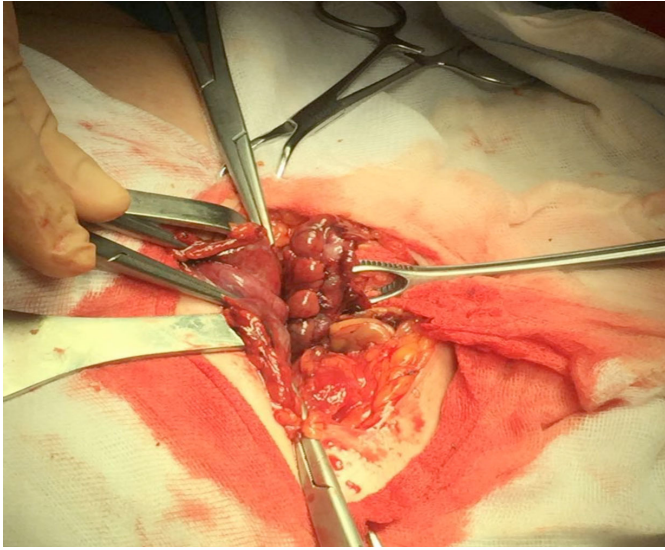


Fig. 1: An inflamed appendix found after the opening of the sac in a femoral hernia.

or inguinal hernia and to give details about the sac content. With a presumptive diagnosis of strangulated groin hernia the patient underwent surgery. After skin and sac incision, a copious purulent collection was drained. Cultures resulted positive for *Escherichia Coli*. A severely inflamed, gangrenous, appendix was seen in the sac of a femoral hernia. Careful attempts to pull the appendix out and to gain access to the caecum were unsuccessful, thus the abdominal cavity was laparoscopically achieved. The appendix was gently reduced from the femoral canal into the peritoneal cavity; a careful inspection of the inflamed appendix revealed a perforation at its base. Appendectomy was followed by warm saline irrigation of the cavity. Once laparoscopy was completed, the femoral defect was repaired by suture through the groin skin incision. Due to soft tissue infection, a negative pressure wound therapy (NPWT) device was applied over the fascial plane and placed for three days. The NPWT device was then removed, the wound definitively sutured and the patients discharged in the following days.

Few days later, a 69 year-old lady with a not reducible lump in the right inguinal region was admitted. She denied nausea and vomiting, fever or symptoms of bowel obstruction. She had no significant medical history or previous surgery. Her laboratory findings were unremarkable. Abdominal X-ray showed no signs of small bowel obstruction; an ultrasound scan of the right inguinal region showed a 4 cm nodular mass below the inguinal ligament, without being able to discriminate neither the type of hernia nor its content. A contrast-enhanced CT scan of the abdomen showed an incarcerated femoral hernia containing an omental flap. Surgery started with a right inguinal incision, by which a femoral sac was identified. The sac was opened and

an inflamed, but not perforated, appendix was found (Fig. 1). Again, laparoscopy was warranted. The appendix was easily reduced into the peritoneal cavity and an appendectomy was performed. The hernia defect was repaired by placing a polypropylene plug fixed with 2-0 prolene suture, *via* open access. The postoperative course was uneventful.

## Discussion

The context of a De Garengeot's hernia is a very unusual place where appendix may get inflamed. This extremely rare entity must be distinguished from the more common Amyand's hernia, which is the presence of the appendix in the inguinal hernia. The localization of the appendix in the sac of a groin hernia can mask typical signs and symptoms of appendicitis and is a potential challenge for diagnosis. The pre-operative diagnosis of De Garengeot's hernia is very difficult, due to non-specific clinical findings. The clinical picture is generally indistinguishable from an incarcerated femoral or inguinal hernia. Furthermore, as the anatomy of the femoral canal limits the spread of the inflammation into the peritoneal cavity, patients with an acute appendicitis in a De Garengeot's hernia are more likely to present local signs of tenderness and erythema rather than general intra-abdominal signs of peritonitis. When applied, ultrasound scan has proved to be of limited value, with just one documented case of a positive diagnosis. To our knowledge, there have been reported only 5 cases of an inflamed appendix within a femoral hernia detected by a CT scan <sup>2</sup>. In the presented cases, either ultrasound and CT scan were unable to identify the appendix inside the femoral hernia. For these reasons, the diagnosis of acute appendicitis within a De Garengeot's hernia is usually made only during surgical exploration. Several kinds of open surgical techniques have been proposed for the treatment of this rare hernia: the trans-inguinal Lotheissen's maneuver, the infra-inguinal (femoral) Lockwood's approach, the McEvedy's high incisions, the De Oliveira's technique and the inguinal King's College approach <sup>3</sup>. The last one has been proposed as the standard approach for this rare disease, being the only technique that treats both femoral and inguinal hernia, and that allows to gain the abdominal cavity via the same single incision. Whatever the technique used, the incision should be wide enough to comply with the need to expose the cecum and to excise the appendix completely and safely. The closure of the defect can be obtained through either direct suture repair or mesh repair. If the appendix and the meso-appendix become very enlarged and thickened for the acute inflammation, the open repair of the De Garengeot's hernia may require a wider incision of the groin wall, in order to expose the caecum without tearing tissues. Consequently, the risk of wound infection and/or of her-

nia recurrence, is increased. A laparoscopic approach of De Garengeot's hernia with appendectomy followed by totally extraperitoneal TEP or TAPP procedure for femoral hernia repair has been previously reported<sup>4,5</sup>. However, the appendix was not inflamed in those cases. We believe that laparoscopy can have a role for the management of De Garengeot's hernia complicated by acute appendicitis. It could be easy to laparoscopically reduce the herniated appendix into the peritoneal cavity without dangerous traction, even though the appendix could be enlarged and thickened. Moreover, the insertion of the appendix at the cecum can be clearly identified, and its base safely closed. Lastly, possible fluid collections around the cecum and in pelvis may be detected and evacuated. Following appendectomy for appendicitis, it is a different question whether the femoral hernia should also be repaired in laparoscopy or in open. In the presented cases, the appendix was removed laparoscopically but the hernia was repaired *via* an open access. As a matter of fact, the hernia sac was probed *via* the open access before laparoscopy in both patients: accordingly, a laparoscopic treatment of the femoral hernia became a non-sense. In addition, in the first patient, the severe local contamination contra-indicated the placement of a mesh: that excluded the option of a laparoscopic repair. A full laparoscopic treatment could be accomplished only in those rare cases in which the diagnosis of De Garengeot's hernia is made preoperatively, the appendix is not inflamed and the local contamination is negligible. In conclusion, we claim that the use of laparoscopy, during an incidental identification of an acute appendicitis in a De Garengeot's hernia, may facilitate the reduction of the hernia content into the peritoneal cavity and allow a proper removal of the appendix with a safer closure of its base. The choice of placing a plug or a mesh for the hernia repair should be made in consideration of the level of local contamination.

## Riassunto

La presenza di un'appendicite acuta all'interno di un'ernia di De Garengeot è senza dubbio un evento veramente raro e, per questo motivo, la sua gestione in emergenza rappresenta una difficile sfida per il chirurgo generale. Dal momento che, in letteratura, sono riportati solo pochi casi, non esiste un chiaro consenso riguardo l'ottimale strategia chirurgica da intraprendere. In questo articolo, riportiamo due casi consecutivi riguardanti due pazienti giunte in pronto soccorso con un quadro di appendicite acuta nel contesto di un'ernia femorale, sottoposte entrambe ad un trattamento chirurgico combinato open/laparoscopico. Abbiamo quindi riportato una revisione della letteratura riguardo questa infrequente emergenza chirurgica, focalizzando la nostra attenzione sull'iter diagnostico-terapeutico e sulle varie tecniche chirurgiche descritte.

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## Commento e Commentary

PROF. NICOLA PICARDI

Già Ordinario di Chirurgia Generale

*I due casi presentati mi fanno tornare in mente una osservazione personale di tanti anni fa – probabilmente il 1974 – non affidata alla letteratura nonostante la peculiarità del caso, che riguardava la scoperta casuale intraoperatoria della presenza nel sacco di una ernia crurale destra dell'appendice vermiforme.*

*La sintomatologia dell'anziana paziente (65 anni se non ricordo male) consisteva soltanto nella tumefazione parenchimatosa e non particolarmente dolente, e si pose naturalmente la diagnosi differenziale con una linfadenopatia inguinale isolata, senza considerare seriamente l'ernia crurale per la completa assenza di sintomatologia nella storia. L'ecografia non era ancora entrata nella diagnostica strumentale dell'allora nostro Istituto di Clinica Chirurgica III dell'Università "Sapienza" di Roma, e del resto muoveva ancora i primi passi, e dunque mi venne affidato il compito di procedere chirurgicamente all'asportazione del presunto linfonodo.*

*La dissezione dell'area portò ad individuare la vera natura della tumefazione: un'ernia crurale nettamente incarcerata. All'apertura del sacco si scoprì l'esistenza di gran parte dell'appendice vermiforme di colorito grigio-brunastro, disseccata e del tutto mummificata. Con un'ernio-laparotomia il fondo del cieco venne attratto nella breccia chirurgica provvedendo all'appendicectomy secondo i canoni classici, seguita dall'affondamento e riposizione del cieco nella sua sede.*

*L'intervento si concluse con la sutura del peritoneo, dopo resezione radicale del sacco crurale, e con la plastica del legamento inguinale interrotto. Il decorso postoperatorio fu privo di eventi, come lo era stata l'intera storia della paziente, praticamente asintomatica, che durava da anni, e la paziente non seppe riferire nella anamnesi epicritica raccolta prima della dimissione di particolari dolori addominali pregressi. Questa osservazione non richiede alcun commento ulteriore.*

\* \* \*

*The two presented cases remind me of a personal observation of many years ago – probably in 1974 – not entrusted to literature despite the peculiarity of the case, which concerned the occasional intraoperative discovery of the presence in the sac of a right crural hernia of the vermiform appendix.*

*The symptomatology of the elderly patient (65 years if I correctly remember) consisted only of a firm not particularly painful inguinal swelling, and of course the differential diagnosis was with an isolated inguinal lymphadenopathy not seriously considering the crural hernia because of the completely absence of history. Ultrasound devices had not yet entered the instrumental diagnostics of our Institute of Clinica Chirurgica III of the "Sapienza" University of Rome, and after all it was still at its first steps, so I was entrusted of the surgery with the task of removal of the alleged lymph node.*

*The dissection of the area led to reveal the true nature of the swelling: a crural hernia firmly incarcerated. At the opening of the sack the presence of most part of a gray-brownish appendix vermiformis, wilted and completely mummified, was surprisingly discovered. With an hernio-laparotomy the bottom of the cecum was attracted in the surgical breach, and a classical appendicectomy was performed, followed by the surgical "sinking" of the stump and resting of the cecum in its seat.*

*The surgery ended with the suture of the peritoneum, after radical resection of the crural sac, and with reconstruction of the inguinal ligament. The postoperative course was devoid of events, as it had been the whole patient previous history, that lasted practically asymptomatic for years, as the patient could not report in the epicritical history collected before the discharge of previous particular abdominal pains. This case doesn't deserve any adjunctive comment.*