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Surgical management of a De Garengot's hernia using a biologic mesh: A case report and review of literature

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ABSTRACT

INTRODUCTION: A De Garengot hernia is a rare form of femoral hernia, where the appendix is found in the herniated sac. This feature is important to report, as both the diagnosis and the treatment are quite challenging in this particular condition.

PRESENTATION OF CASE: We report the case of a 77-year-old female presenting with a femoral hernia, containing an incarcerated necrotic vermiform appendix (De Garengot hernia). A laparoscopic appendectomy was performed and the herniated defect was repaired according to Rives technique, using a biological mesh.

DISCUSSION: The De Garengot hernia is often unexpected and diagnosed intra-operatively. A pre-operative diagnosis is quite difficult, as it often presents clinically as a strangled femoral hernia. In patients without peritoneal signs, a contrast-enhanced Computed Tomography (CT) of the abdomen is useful for the diagnosis. Many surgical techniques have been discussed in literature, but there is no consensus. We show the feasibility and safety of the hernia repair according to Rives technique, through an inguinoscopy with a biologic mesh. A laparoscopic approach was used to remove the necrotic appendix.

CONCLUSION: The De Garengot hernia is an uncommon differential diagnosis for patients presenting with clinical signs of strangled femoral hernia. Although hernia repairs with a synthetic mesh in the presence of appendicitis have been reported, we describe a case of femoral hernia repair using a biologic mesh, in a patient with a De Garengot hernia.

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1. Background and purpose

The De Garengot hernia is a rare form of femoral hernia, containing the appendix, first described by French surgeon René Jacques Croissant de Garengot (1688–1759). The incidence of this pathology is approximately 0.5–5% of all femoral hernias [1–9].

The preoperative diagnosis is quite difficult and the correct diagnosis is almost always made intra-operatively, due to the atypical clinical presentation⁴ and the non-specific radiological findings. Clinical signs and symptoms, such as abdominal pain, are usually in favor of an incarcerated femoral hernia. However, bowel symptoms such as nausea or vomiting, are only reported in 14% [4]. In fewer cases, a perforated appendicitis in a De Garengot hernia, demonstrates classical signs of appendicitis associated with peritoneal irritation.

There is no consensus for the treatment of this subtype of hernia. A hernia repair with a polypropylene mesh could be used in

the absence of local inflammation [10]. We report a case of a De Garengot hernia managed in our University Center Hospital and discuss its clinical presentation and preoperative diagnosis, as well as the surgical considerations concerning the hernia repair using a biologic mesh. Our case was reported in line with the Scare criteria [2].

2. Case report

A 77-year-old woman presented at the emergency department with a painful lump located in her right inguinal region, that she noticed 24h earlier. She reported that the pain had appeared concomitantly with a fit of cough and was associated with the appearance of an inguinal mass. She declared no previous symptoms of hernia, and her medical history only included a hysterectomy and a thyroidectomy. She remained hemodynamically stable during evaluation and follow-up. The clinical examination revealed only a tender and painful groin mass on the right side, with an irreducible lump, but no signs of bowel occlusion. Laboratory investigations showed a small increase of inflammatory markers

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Fig. 1. Contrast-enhanced CT, sagittal oblique reconstruction showing a right femoral hernia containing the appendix. The appendix is well seen from its origin at the base of the caecum, going down towards the hernia. Fluid effusion is also seen along the herniated sac.

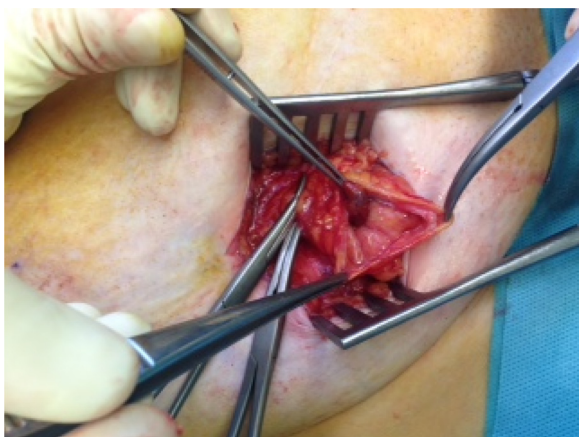


Fig. 2. Intra-operative picture showing the femoral hernia's sac containing the extremity of the appendix.

(WBC = $9260 \times 10^9/L$; CRP = 11.3 mg/L), with a normal renal function.

As the patient presented with atypical signs of femoral hernia incarceration, we performed a contrast-enhanced Computerized Tomography (CT) of the abdomen that showed a right femoral hernia containing the appendix, with associated fluid effusion in the herniated sac (Fig. 1). The appendix was followed from its origin on the caecum down to the hernia, best seen on sagittal oblique reconstructions.

We performed in emergency a right inguinoscopy. The opening of the transversalis fascia exposed the femoral hernia. The sac was then opened and it contained a clear fluid effusion (the bacteriological examination was negative). The vermiform appendix was incarcerated within the sac and its extremity showed signs of necrosis (Fig. 2). A conventional appendectomy was not possible in this case due to the length of the appendix and as the caecum was also not accessible through the inguinal incision. Thus, we chose to drive the appendix back into the abdominal cavity and then performed a laparoscopic appendectomy (Fig. 3). The femoral hernia

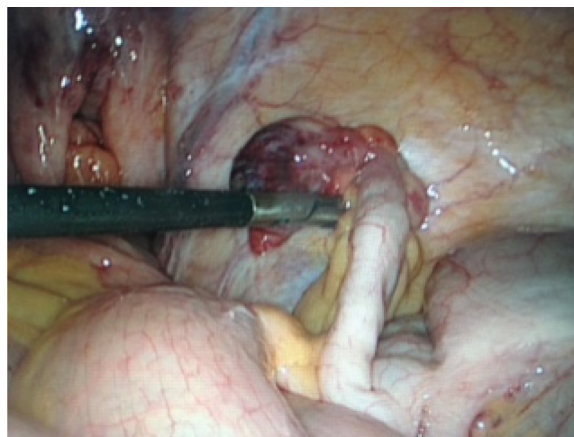


Fig. 3. A laparoscopic appendectomy was performed after the appendix was pushed back into the abdominal cavity.

defect was repaired using an acellular matrix of Tutomesh® (Tutogen Medical GmbH), according to Rives technique, which is based on the fixation of the mesh on the Cooper ligament, in order to close in a definitive and tension-free way the femoral orifice [3].

The patient recovered well quickly after the surgery and was discharged after two days. On follow-up, one month later, there were no sign of complication or recurrence.

3. Discussion

The De Garengeot hernia is a rare subtype of femoral hernia. A femoral hernia occurs in most of the cases in female patients and its incidence is approximately 5% of groin hernias [4]. These hernias are difficult to diagnose and are at high risk of strangulation. Thirty five to forty percent of all femoral hernias are diagnosed after a complication has occurred [5]. A confirmed femoral hernia always requires a surgical management.

The clinical presentation of the De Garengeot hernia is often characterized by absence of occlusive syndrome [6]. Only 14% of those are diagnosed prior to surgery on imaging (contrast-enhanced abdominal CT) [7].

The use of a mesh repair in hernia reduces by half the risk of recurrence, compared to an open-mesh repair [8]. However, the use of a polypropylene mesh is associated with a higher risk of infection in a contaminated setting and exposes patients to a higher morbidity rate. Hernia repair using a biologic mesh in this condition could be discussed, even though the cost of this material would be higher than that of a synthetic mesh [9]. The use of a biologic mesh is unheard of in a potentially contaminated field, such as in this case.

There is also no consensus for the surgical approach in case of a De Garengeot hernia. In the literature, an inguinal incision is used in 48% of the cases, a low midline laparotomy in 10% of the cases, a laparoscopy converted to inguinoscopy in 5% of the cases and a vertical over the femoral incision in only 3% [10] of the cases. The challenge is to close the parietal defect, while treating the pathological appendix. The most common approach starts with an inguinoscopy and, when facing the content of the sac, continues with an appendectomy through the same incision [11]. However, to use this technique, the caecum must be low-positioned [12]. In this case, with the caecum anatomy and position, the surgeon was not able to pull the entire appendix out of hernia's sac, as the caecum could not be exposed properly. Thus, we chose to perform a laparoscopic appendectomy. Beginning the surgical procedure with a laparoscopic approach enables the surgeon to be sure about the diagnosis and to explore the abdominal cavity first [13]. A total laparoscopic surgical management of a De Garengeot hernia was

recently described [14]. It started with an inspection of the abdominal cavity, with the diagnosis of a femoral hernia. The appendix was then moved back into the abdominal cavity and the surgeon was able to proceed to the appendectomy and finished the procedure with a transabdominal preperitoneal patch [15].

4. Conclusion

The De Garengeot hernia is an uncommon subtype of femoral hernia. Its diagnosis is quite challenging based on clinical symptoms and imaging alone, and there is no consensus for its surgical management. In this case, we chose to perform an inguinal approach associated with a laparoscopic procedure. We considered the hernia management and the appendectomy separately, in order to be sure to treat both of them in safe conditions, and we chose to repair the femoral hernia with a biological mesh to prevent infections. The surgeon shall be made aware of this atypical type of femoral hernia, as it is often not diagnosed prior to surgery and requires a more complex surgical procedure than the one expected.

Conflict of interest

None.

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None.

Ethical approval

Ethical approval isn't necessary for this case report.

Consent

Patient had done her consent for publishing.

Authors contribution

AK, BR: study design, case report written.
AV, CN, MNR, FV: radiological interpretation.
All the authors: reading and correcting proofs.

Guarantor

Serge Rohr.

References

- [1] E.T. Nguyen, I.K. Komekana, Strangulated femoral hernia containing a perforated Appendix, *Can. J. Surg.* 47 (1) (2004) 68–69.
- [2] Riaz A. Agha, Raafat Affi, et al., The SCARE statement: consensus-based surgical case report guidelines, *Int. J. Surg.* 34 (2016) 180–186.
- [3] M. Mathonnet, D. Mehinto, Femoral hernias: repair techniques, *J. Chir. (Paris) 144* (September–October) (2007), Spec No 4:5S15–8.
- [4] R.J. Fitzibbons, R.A. Forse, Groin hernias in adult, *N. Engl. J. Med.* 372 (2015) 756–763.
- [5] U. Dahlstrand, S. Wollert, P. Nordin, G. Sandblom, U. Gunnarsson, Emergency femoral hernia repair: a study based on a national register, *Ann Surg.* 249 (April (4)) (2009) 672–676.
- [6] T. Piperos, V. Kalles, Y. Ahwal, et al., Clinical significance of de Garengeot's hernia: a case of acute appendicitis and a review of the literature, *Int. J. Surg. Case Rep.* 3 (2012) 116–117.
- [7] V. Kalles, A. Mekras, D. Mekras, I. Papapanagiotou, W. Al-Harethee, G. Sotiropoulos, P. Liakou, A. Kastania, T. Piperos, T. Mariolis-Sapsakos, De Garengeot's hernia: a comprehensive review, *Hernia* 17 (April (2)) (2013) 177–182.
- [8] N.W. Scott, K. McCormack, P. Graham, P.M. Go, S.J. Ross, A.M. Grant, Open mesh versus non-mesh for repair of femoral and inguinal hernia, *Cochrane Database Syst. Rev.* (4) (2002) CD002197.
- [9] F. Köckerling, N.N. Alam, S.K. Narang, I.R. Daniels, N.J. Smart, Biological meshes for inguinal hernia repair – review of the literature, *Front. Surg.* 15 (September (2)) (2015) 48.
- [10] V. Kalles, A. Mekras, D. Mekras, I. Papapanagiotou, W. Al-Harethee, G. Sotiropoulos, P. Liakou, A. Kastania, T. Piperos, T. Mariolis-Sapsakos, De Garengeot's hernia: a comprehensive review, *Hernia* 17 (April (2)) (2013) 177–182.
- [11] Carolina Talini, Luan Ocaña Oliveira, Allan César Faria Araújo, Fernando Antonio Campelo Spencer Netto, André Pereira Westphalen, De Garengeot hernia: case report and review, *Int. J. Surg. Case Rep.* 8 (2015) 35–37.
- [12] K. Akbari, C. Wood, A. Hammad, S. Middleton, De Garengeot's hernia: our experience of three cases and literature review, *BMJ Case Rep.* 2014 (2014), bcr2014205031.
- [13] B. Thomas, M. Thomas, B. McVay, J. Chivate, De Garengeot hernia, *JLS* 13 (2009) 455–457.
- [14] A. Comman, P. Gaetzschmann, T. Hanner, M. Behrend, DeGarengeot hernia: transabdominal preperitoneal hernia repair and appendectomy, *JLS* 11 (2007) 496–501.

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