

Tumour of the vermiform appendix strangulated in the femoral hernia: a case report

Andrzej Żyłuk^{1,A}✉, Filip Fliciński^{1,B}, Tomasz Błaszczowski^{2,D}, Maciej Romanowski^{2,D}

¹ Pomeranian Medical University in Szczecin, Department of General and Hand Surgery, Unii Lubelskiej 1, 71-252 Szczecin, Poland

² Pomeranian Medical University in Szczecin, Department of General and Oncologic Surgery with Subdivision of Vascular Surgery, Unii Lubelskiej 1, 71-252 Szczecin, Poland

^A ORCID: 0000-0002-8299-4525; ^B ORCID: 0000-0002-8898-677X; ^C ORCID: 0000-0003-4987-2750; ^D ORCID: 0000-0002-7401-9877

✉ azyluk@hotmail.com

ABSTRACT

Strangulation of the vermiform appendix into the femoral hernia sac (de Garengeot hernia) is very rare. This article presents a case of a 63-year-old woman with this kind of hernia which contained a strangulated tumour of the appendix. The patient presented to the hospital with a 3-day-long history of a palpable lump in the right groin. She had no other significant complaints, but USG imaging showed suspicion of the strangulated femoral hernia containing a bowel. The patient was operated on. As the tumour was not suitable to remove via groin incision, laparotomy

was performed, followed by a release of the appendix with the tumour and their resection together with a fragment of the caecum. The postoperative course was uneventful, and histological examination showed appendiceal mucinous neoplasm with high-grade dysplasia. After oncological consultation, the patient underwent prophylactic right hemicolectomy.

Keywords: strangulated femoral hernia; de Garengeot hernia; tumour of the vermiform appendix; appendiceal mucinous neoplasm with high-grade dysplasia.

INTRODUCTION

Femoral hernias account for 4% of all groin hernias and they have the highest incidence (30–50%) of incarceration and strangulation of all groin hernias because of the relatively narrow femoral canal. Herniation of the vermiform appendix into the femoral hernia sac is very rare, occurring in less than 1% of femoral hernias [1, 2]. The femoral hernia containing an appendix was first described by the French surgeon Rene Jacques Croissant de Garengeot in 1731 and since then this condition has been called by his name. This specific hernia occurs predominantly in older women and, obviously, in the right groin [3, 4]. The presence of the inflamed appendix in a femoral hernia is even rarer, reported in 0.08–0.5% of all femoral hernias [2, 3]. Herniation of tumour of the appendix in the femoral hernia is extraordinary and, to date, has not been reported.

Typical symptoms and signs of de Garengeot hernia include the presence of a palpable and tender mass in the right groin lasting from 1 to several days, depending on whether the inflammation of the appendix is present or not. Systemic symptoms like mild fever, nausea, and feeling unwell may also be present, although they are not typical for regular acute appendicitis. In some cases reported in the literature, systemic signs and symptoms were absent. Diagnosis of the strangulated femoral hernia is based on clinical symptoms and signs as well as imaging such as ultrasonography (USG) or computed tomography (CT). The USG or CT shows intestine, omentum, or other structures herniating into the femoral canal. In some cases, imaging is not enough accurate to detect the appendix in the strangulated femoral hernia, and it is correctly diagnosed intraoperatively. Treatment is obviously operative, as in every strangulated abdominal hernia.

In this article, we report a case of a 63-year-old woman who presented with the tender mass in the right groin which intraoperatively appeared to be strangulated femoral hernia containing a vermiform appendix with a tumour on its apex. Histological examination showed appendiceal mucinous neoplasm with high-grade dysplasia. The authors did not find any similar report in the literature and this prompted them to prepare this article.

CASE REPORT

A 63-year-old woman presented to the Emergency Department in the authors' hospital with a 3-day-long history of a palpable, tender lump in the right groin. The patient reported that the lump appeared as late as 2 years ago but was asymptomatic and she did not search for medical advice. She was in good general shape and had no other significant complaints, such as nausea, vomiting, loss of appetite, or fever. At physical examination, the abdomen was soft and with slight tenderness in the right iliac fossa at deep pressing. Peristaltic was normal, she defecated normally on the day of presentation. However, further examination showed a 3 cm tumour in the inguinal area which was tender at palpation. The skin over the tumour was normal. The patient had no other serious concomitant diseases. She was given USG imaging which revealed suspicion of the strangulated femoral hernia containing a bowel. Biochemical tests showed a normal leukocyte rate of 8 G/L and slightly elevated C-reactive protein (CRP) – 57 mg/dL.

The patient was operated on due to suspicion of strangulated femoral hernia. Prior to surgery, she received a prophylactic dose of an intravenous antibiotic (Biofazolin). The operation was performed under general anesthesia. The first incision was

done in the right groin, over the palpable tumour. After releasing of subcutaneous tissue, the tumour coming out from under the inguinal ligament was exposed. In consistency with USG imaging, it appeared to be a strangulated femoral hernia. After the incision of the apex of the hernia sac, a yellow-stained fluid evacuated and a cylindrical-shape mass appeared with a white substance on the top (Fig. 1). The tumour was immobile and careful preparation failed its mobilization. As the tumour was not suitable to remove via groin incision, laparotomy was performed. The abdomen was opened via a right lower quadrant incision. After identification of the caecum and the appendix, it was found to be entrapped in the femoral hernia. Careful preparation allowed the release of the appendix together with the tumour and their advancement into the operative wound (Fig. 2, 3). The lower part of the appendix was thickened and seemed inflamed. Due to suspicion of the neoplasm, the appendix was resected together with an adjacent fragment of the caecum using a stapler. Next, the abdomen was closed followed by standard open femoral hernioplasty. Because of signs of inflammation, the repair was performed with a standard technique, but not with a mesh. The postoperative course was uneventful and the patient was dismissed home at the fourth day following the surgery.

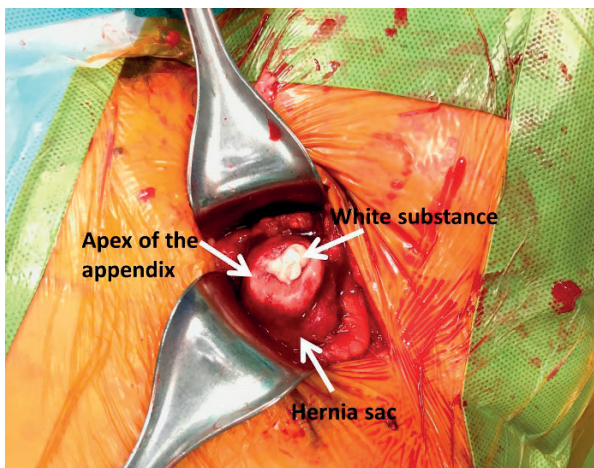


FIGURE 1. Intraoperative view after incision of the hernia sac

Results of histological examination

The vermiform appendix with the high-grade dysplasia of mucinous neoplasm. Mucinous infiltration destroys mucosal and muscular layers, involves fat tissue, and crosses the serosal layer. Numerous degenerative calcifications are present in the areas invaded by mucinous infiltration. Infiltrative growth of the neoplasm was not observed. Moreover, inflammatory infiltration of the wall of the appendix was present.

Further patient's management

After the histological examination, the patient was given oncological consultation. Consultants recommended prophylactic right hemicolectomy as a completion of the treatment. The patient underwent this operation. The postoperative course was uneventful and histological examination of the resected bowel showed no neoplastic changes.

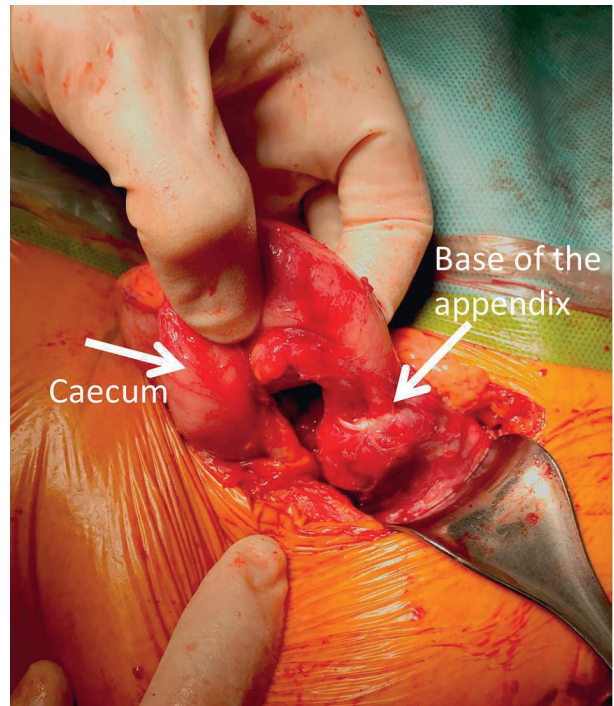


FIGURE 2. Intraoperative view after laparotomy via McBurney's incision

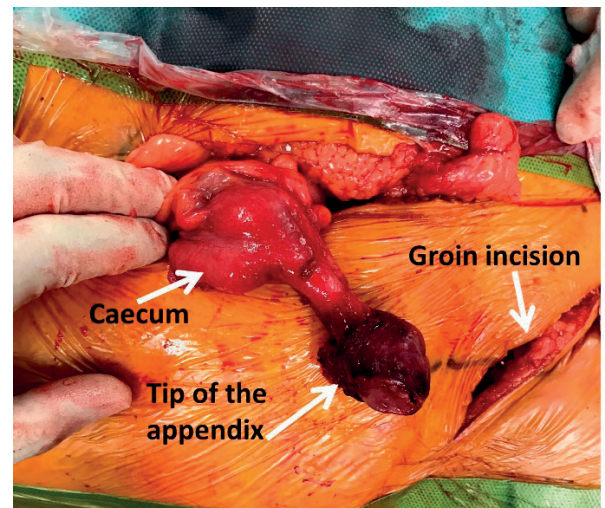


FIGURE 3. Tumour of the appendix exposed

DISCUSSION

Strangulated femoral hernia typically presents as an irreducible groin mass that is usually painful and tender at palpation. Changes in the overlying skin such as erythema or cellulitis are sometimes present. Depending on the contents of the hernia's sac, other symptoms and signs may be predominant, such as small bowel obstruction or inflammation [1, 2]. The herniation of the vermiform appendix is usually indistinguishable from a strangulated femoral hernia containing other viscera such as small bowel, omentum, fallopian tube or ovary. The presence of a vermiform appendix in the hernia's sac may be asymptomatic until strangulation and/or inflammation will occur. As the femoral ring is narrow and tight, the compression on the

entrapped appendix develops relatively quickly, resulting in ischaemia and subsequent necrosis. In the other scenario, an inflammation of the appendix (acute appendicitis) may occur. It is not known whether it is prompted by an entrapment of the appendix in the hernia's sac or if it occurs accidentally.

The typical symptoms and signs of acute appendicitis are not usually present in a strangulated and inflamed appendix, because the tight femoral neck acts as a mechanical barrier and prevents the spread of the inflammation into the peritoneal cavity. The diagnosis of de Garengot's hernia is usually made intraoperatively; however, USG or CT may suggest the content of the hernia's sac. Blood tests may show elevated white blood cells and CRP concentration, indicative of inflammation. The differential diagnosis for de Garengot's hernia includes other groin hernias (free or strangulated), adnexitis, enlarged lymph node, soft tissue tumour (i.e. lipoma), and a retroperitoneal abscesses penetrating into a groin [4, 5].

Standard treatment of this condition consists in an appendectomy via groin incision and the hernia sac. If it is not applicable, classical appendectomy via McBurney's incision is the best solution (Fig. 2). Another option may be the laparoscopic approach, but it is unlikely to be the first choice procedure because of uncertain diagnosis in many cases. A primary simple hernioplasty is recommended to avoid the risk of infection with implanted materials [6].

Strangulated femoral hernia containing an inflamed appendix is very rare and less than 100 cases of this condition were reported to date. Some of these reports will be shown in the next paragraph.

Akbari et al. reported 3 cases of de Garengot's hernias. All patients were women aged 58–80 years. They presented with a 1-day to 1-week history of an enlarging right groin mass becoming increasingly painful, associated with nausea, loss of appetite, and episodes of fever in 1 case. There was no history of vomiting or symptoms of bowel obstruction. In all patients, the abdomen was soft and non-distended but mildly tender on palpation in the right lower quadrant in 1 patient. In all patients, blood tests were normal for leukocyte count and CRP. In 1 case, the ultrasound image of the right groin showed a “gas-filled lumen” herniating into the femoral canal, although it did not identify the presence of the appendix. In another patient, CT of the abdomen revealed a femoral hernia with surrounding inflammatory changes. Similar to the previous case, the herniated appendix was not visible. All 3 patients were given emergency surgery due to the diagnosis of strangulated femoral hernias. They received prophylactic intravenous antibiotics prior to the operation. Intraoperatively, strangulated appendices were found in the femoral hernia sac in all cases. Two of them were oedematous and dusky, with surrounding inflammatory changes. In 1 case, an ischaemic-looking appendix was found. No perforation of the inflamed/ischaemic appendix was noted. All patients received appendectomy through a groin incision. Femoral hernias were repaired by standard primary hernioplasty. The post-operative course was uneventful in all cases. The histological examination of the appendix for all 3 patients confirmed non-perforated acute appendicitis [1].

Ying and Yahng reported the case of an 87-year-old woman presenting to the emergency department with a 5-day history

of right groin pain, with an associated loss of appetite and weakness. There was no fever, nausea, or vomiting. Physical examination revealed a tender right groin mass below the pubic tubercle, 4 x 4 cm in size, with overlying red-stained skin. Biochemical tests showed an elevated white blood cell count of 10 G/L and CRP of 190 mg/dL. Contrast-enhanced CT revealed a hypodense rounded lesion below the pubic tubercle in the proximal anterior thigh, most consistent with an incarcerated femoral hernia. The patient was given surgery and intraoperatively a perforated necrotic appendix with pus contained in the hernia sac was found. Postoperatively, the patient received 2 days of intravenous antibiotics. The post-operative course was uneventful [2].

Papatheofani et al. reported the case of a 95-year-old woman presenting with an irreducible right-sided femoral hernia lasting several days. There was no abdominal pain, history of bowel obstruction, nausea or vomiting. Blood tests were normal, without signs of infection. Ultrasonography examination showed suspected an incarcerated femoral hernia. The patient was given surgery and intraoperatively a femoral hernia containing swollen vermiform appendix in the sac was found. An appendectomy was performed, followed by standard, primary herniorrhaphy. The patient recovered postoperatively without complications [5].

Snoekx and Geyskens reported a case of an 88-year-old woman who was diagnosed with an abscess in the right groin caused by acute, gangrenous appendicitis within a strangulated femoral hernia sac. The emergency incision and abscess drainage were performed. After stabilization of the patient, delayed laparoscopic appendectomy was performed followed by a standard, open herniorrhaphy. Both procedures were uneventful and the patient fully recovered [4].

In conclusion, a strangulated femoral hernia containing an inflamed appendix is a very rare condition which has not been reported in Polish literature before. The herniation of the tumour of the appendix in the femoral hernia is absolutely extraordinary and, to date, has not been reported elsewhere in the world. This prompted the authors to submit this case for publication.

REFERENCES

1. Akbari K, Wood C, Hammad A, Middleton S. De Garengot's hernia: our experience of three cases and literature review. *BMJ Case Rep* 2014;2014:bcr2014205031. doi: 10.1136/bcr-2014-205031.
2. Ying L, Yahng JJM. The rare case of De Garengot hernia: femoral hernia containing perforated appendicitis. *J Surg Case Rep* 2019;2019(11):rjz287. doi: 10.1093/jscr/rjz287.
3. Erdas E, Sias L, Licheri S, Secchi L, Aresu S, Barbarossa M, et al. De Garengot hernia with acute appendicitis. *G Chir* 2013;34(3):86-9.
4. Snoekx R, Geyskens P. De Garengot's hernia: acute appendicitis in a femoral hernia. Case report and literature overview. *Acta Chir Belg* 2014;114(2):149-51.
5. Papatheofani V, Estaller W, Hoffmann TF. Femoral hernia with vermiform appendix herniation: a case report and review of the literature. *J Surg Case Rep* 2021;2021(3):rjab036. doi: 10.1093/jscr/rjab036.
6. Linder S, Linder G, Månsson C. Treatment of de Garengot's hernia: a meta-analysis. *Hernia* 2019;23(1):131-41.