A combined Richter’s and de Garengeot’s hernia
Hau D. Le, Stephen R. Odom, Albert Hsu, Alok Gupta, Carl J. Hauser
Department of Surgery, Beth Israel Deaconess Medical Center and Harvard Medical School, United States

INTRODUCTION: de Garengeot’s hernia is very rare. Richter’s hernia is responsible for 10% of acute strangulated hernias.

PRESENTATION OF CASE: A 91-year-old woman with three days of abdominal distention was found on computed tomogram to have an incarcerated femoral hernia. Operation revealed a de Garengeot’s hernia combined with a Richter’s hernia of small bowel. Primary repair was performed along with appendectomy.

DISCUSSION: We discuss these rare hernias, not previously reported in combination, and options for management.

CONCLUSION: Combined de Garengeot’s and Richter’s hernias are rare, represent a significant diagnostic challenge, and should be repaired urgently to prevent ischemic bowel, or limit contamination if ischemia is already present. Use of computed tomography will likely lead to increased pre-operative diagnosis of this rare entity.

© 2014 The Authors. Published by Elsevier Ltd. on behalf of Surgical Associates Ltd. This is an open access article under the CC BY-NC-SA license (http://creativecommons.org/licenses/by-nc-sa/3.0/).

1. Introduction

The presence of the appendix within a femoral hernia was first described by Rene Jacques Croissant de Garengeot in 1731. In 2005, Akopian and Alexander proposed naming this condition “de Garengeot’s hernia”.

There have been fewer than 90 reported cases of de Garengeot’s hernia in the English literature. The incidence of de Garengeot’s hernia is less than 1% of femoral hernias and it occurs predominately in females (13:1 female: male). In 1785, August Gottlieb Richter first comprehensively described a hernia in which only part of the circumference of the bowel is strangulated. This was later termed “Richter’s hernia” by the famous London surgeon Sir Frederick Treves. Richter’s hernias account for approximately 10% of all strangulated hernias. To date, there has not been a report in the literature of a femoral hernia that contained both the vermiform appendix and a part of the circumference of the bowel.

2. Presentation of case

A 91-year-old woman presented to the emergency department with three days of abdominal distention, nausea and vomiting. The patient had been in her usual state of health when she developed nausea with oral intake, distention of her abdomen and the inability to pass flatus. This was followed by emesis 24 hours prior to admission. The patient denied fever or chills. Past medical history is significant for diabetes mellitus type 2, hypertension, hypothyroidism, recurrent urinary tract infections, and chronic atrial fibrillation. She had no history of abdominal surgery. Pertinent medications included aspirin, levothyroxine, metformin, and warfarin.

At presentation, the patient had a temperature of 36.1°C, heart rate of 72 beats per minute, blood pressure of 160/76 mmHg, respiratory rate of 16 per minute and oxygen saturation of 99% on room air. Her body mass index was 20.2 kg/m². Clinical examination revealed a distended but soft abdomen without tenderness or guarding. No bowel sounds were audible. Examination of the groins failed to reveal any evidence of hernia.

Laboratory findings revealed that the patient had pre-renal azotemia and a mild leukocytosis (WBC count 11.3 K/µL, 80% neutrophils, 8% bands). Serum sodium was 112 mEq/L and potassium was 5.2 mEq/L. Blood urea nitrogen was 20 mg/dL and creatinine was 0.9 mg/dL. International normalized ratio was 1.2. A non-contrast computed tomography (CT) demonstrated high-grade small bowel obstruction with dilated proximal loops, decompressed distal loops and a transition point at the site of a right femoral hernia. There was no other acute pathology.

The patient was admitted for resuscitation to include sodium repletion with plans for abdominal exploration under general anesthesia. A lower midline incision was made from the umbilicus to the pubis. Incarceration of the anti-mesenteric border of a loop of jejunum was found in the opening of a femoral hernia sac (Fig. 1a). This was reduced easily only to reveal that the vermiform appendix was also engaged in the femoral hernia (Fig. 1a). The appendix was reduced from the hernia, revealing that its tip was scarred into the sac. The appendix was delivered by completely inverting the femoral sac. The inverted femoral hernia sac was then ligated.
at its base, distracted from the femoral ring and sutured medi- 
ally with 2-0 silk sutures. The incarcerated jejunal segment had 
a serosal defect and was imbricated transversely with interrupted 
3-0 silk sutures. Apparentectomy was performed uneventfully. 
The postoperative course was complicated by a prolonged ileus that 
eventually resolved with conservative management. The patient 
was discharged home on postoperative day 12. The histological 
examination showed ischemia of the appendiceal tip.

3. Discussion

Femoral hernias are more common in women than men but 
account for only 4% of all groin hernias. By chance, hernias can 
contain any of the mobile intra-abdominal structures. Hernias 
containing omentum, small bowel, colon, uterine tube, Meckel’s 
diverticulum and the appendix have all been reported. There have 
been case reports of hernia sac containing more than one structure 
such as combined appendix and Meckel’s diverticulum, or jejunum 
and uterus with ovaries. To our knowledge however, this is the first 
case report of a combined de Garegeot’s and Richter’s hernia, 
illustrated in Fig. 2. The diagnosis of de Garegeot’s hernia can 
be based on the femoral hernia containing either a normal 
or an inflamed appendix. An incarcerated femoral hernia containing 
the appendix is nonetheless a very rare finding and occurs in 
less than 1% of femoral hernias. Acute appendicitis is present 
in only 0.5% of those cases. Entry of the appendix into the 
femoral canal has been attributed to an abnormal anatomical position 
of the appendix in the pelvis as well as the presence of a large 
mobile cecum positioned low in the abdomen. Femoral hernias 
themselves carry a high risk of incarceration and strangulation, 
historically blamed on the narrowness and rigidity of the femoral 
ring. The pathophysiology of appendicitis in the setting of this 
strangulated de Garegeot’s hernia might involve luminal obstruc- 
tion caused by the rigid femoral neck or by the presence of the 
Richter’s hernia. Either could result in congestion, ischemia, and 
transmucosal inflammation distal to the site of constriction with 
subsequent development of necrosis. The finding of an inflamed 
appendix in a femoral hernia sac has also been described as a pri- 
mary process in the presence of a wide femoral ring. Early 
diagnosis is important to reduce the risk of complications; 
however a de Garegeot’s hernia presents a significant diagnostic 
challenge. Appendicitis in the hernia sac will often lack the clini- 
cal signs of acute appendicitis and is most commonly diagnosed at 
operation. Clinical signs of a de Garegeot’s hernia are commonly 
indicated of an incarcerated femoral hernia and may include vague 
abdominal pain, painful swelling and erythema of the right groin. 
In addition, patients may only rarely develop signs of peritonitis 
since the inflamed appendix can be isolated from the peritoneal 
cavity by the hernia sac. There have only been occasional reports 
where the diagnosis of appendicitis in a hernia sac has been made 
pre-operatively. Currently, there are only three reports where de 
Garegeot’s hernia was diagnosed pre-operatively by CT scan. 
With increasing CT use to evaluate vague abdominal complaints 
though, preoperative diagnosis may become more commonplace. 
There is no standard surgical approach to the treatment of de 
Garegeot’s hernia. Previous reports have described inguinal inci- 
sions, laparotomy or combined approaches. Minimally invasive 
repair via laparoscopy and trans-abdominal pre-peritoneal repair 
is also possible. If perforation or abscess formation is limited to 
the hernia sac, limiting the surgical approach to the groin has 
been recommended, thus avoiding peritoneal contamination. But 
open drainage of the hernia sac followed by interval appendectomy 
with hernia repair has also been described. A trans-abdominal 
approach may be more appropriate if an abdominal sepsis is 
present. Where advanced suppuration is present, drainage with 
delayed appendectomy may be wise. The presence of suppura- 
tion is also often considered a contraindication to repairs using 
prosthetic mesh. The most common reported complication of de 
Garegeot’s hernia repair is wound infection, reported to occur in up to 29% of 
patients. Factors contributing to the high wound complication 
rate likely related to delays in diagnosis, the multiple tissue planes
involved in repair, and the older age and often poor nutritional status of the patients. In this case, a lower midline incision was used because there was concern that the femoral hernia had reduced spontaneously with free spillage. This incision allowed the entire length of bowel to be evaluated for ischemic injury. Appendectomy and repair of the small bowel injury were performed without difficulty. Mesh was felt inappropriate, and in light of the patient’s age, the ligated femoral hernia sac was simply distracted away from the femoral ring to decrease the risk of recurrence.

4. Conclusion

de Garengeot’s hernia is a rare diagnosis. This is the first report to describe the presence of a jejunal Richter’s hernia simultaneous with an appendix in a femoral hernia sac. This combination presents a diagnostic challenge but its recognition may be more frequent with the use of CT. Thus the clinician should be aware of its possibilities and the available therapeutic options.

Conflict of interest

The authors have no conflicts to declare.

Funding

None.

Ethical approval

Written informed consent was obtained from the patient for publication of this case report and case series and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contributions

Hau D. Le: data gathering, writing; Stephen R. Odom: data gathering, writing; Albert Hsu: writing; Alok Gupta: writing; Carl J. Hauser: data gathering/interpretation, writing.

Key learning point

- de Garengeot’s and Richter’s hernias can occur in combination, present a diagnostic challenge and should be repaired expediently.

References

1. de Garengeot RJ. Traite des operations de chirurgie. Paris: HUART; 1731.
2. Akopian G, Alexander M, de Garengeot hernia: appendicitis within a femoral hernia. Am Surg 2005;71:526–7.
3. Tanner N. Strangulated femoral hernia appendix with perforated sigmoid diverticulitis. Proc R Soc Med 1963;56:1105–6.
4. Rajan SS, Girn HR, Ainslie WC. Inflamed appendix in a femoral hernial sac: de Garengeot’s hernia. Hernia 2009;13:551–3.
5. Richter A. Abhandlung von dem Bruchen. Gottingen: Johann Christian Dieterich; 1785.
6. Treves F. Richter’s hernia or partial enterocoele. Med Chir Trans 1887;70:149–67.
7. Frankau C. Strangulated hernia: a review of 1487 cases. Br J Surg 1931;19:176–91.
8. Bay-Nielsen M, Kehlet H, Strand L, Malmstrom J, Andersen FH, Wara P, et al. Quality assessment of 26,304 herniorrhaphies in Denmark: a prospective nationwide study. Lancet 2001;358:1124–8.
9. Phillips AW, Aspinall SR. Appendicitis and Meckel’s diverticulum in a femoral hernia: simultaneous de Garengeot and Littre’s hernia. Hernia 2011;16:727–9.
10. Ay A, Agac Ay A, Kaptanoglu B, Ozer S, Akalin C. Femoral hernia containing strangulated ileum along with the uterus and both ovaries: a first case report. Hernia 2011;16:351–3.
11. Sharma H, Jha PK, Shekhwat NS, Memon B, Memon MA. de Garengeot hernia: an analysis of our experience. Hernia 2007;11:235–8.
12. Griffin JM. Incarcerated inflamed appendix in a femoral hernia sac. Am J Surg 1968;115:364–6.
13. Carey LC. Acute appendicitis occurring in hernias: a report of 10 cases. Surgery 1967;61:236–8.
14. Temple CL,UCHCROFT SA, Temple WJ. The natural history of appendicitis in adults. A prospective study. Ann Surg 1995;221:278–81.
15. Nguyen ET, Komenaka IK. Strangulated femoral hernia containing a perforated appendix. Can J Surg 2004;47:68–9.
16. Thomas B, Thomas M, MCVAY B, Chivate J. de Garengeot hernia. JSLS 2009;13:455–7.
17. Kagan Coskun A, Kilbas Z, Yigit T, Simsek A, Harlak A, de Garengeot’s hernia: the importance of early diagnosis and its complications. Hernia 2011.
18. Comman A, Gaetzschmann P, Hanner T, Behrend M. de Garengeot hernia: transabdominal preperitoneal hernia repair and appendectomy. JSLS 2007;11:496–501.
19. Watkins RM. Appendix abscess in a femoral hernial sac – case report and review of the literature. Postgrad Med J 1981;57:306–7.
20. Ebisawa K, Yamazaki S, Kimura Y, Kashi M, Kurito K, Yasumuro S, et al. Acute appendicitis in an incarcerated femoral hernia: a case of de Garengeot hernia. Case Rep Gastroenterol 2009;3:313–7.

Open Access

This article is published Open Access at sciencedirect.com. It is distributed under the IJSCR Supplemental terms and conditions, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original authors and source are credited.