CT and Ultrasound findings in a case of De Garengeot's hernia: A case report

Shareefa Abdulghaffar, MD*, Muna Almulla, MD, Priyank Gupta, MD, Ahmed Bedair Mohamed, MD

Rashid Hospital, Dubai, UAE

ABSTRACT

De Garengeot's hernia is a rare entity defined as the presence of the appendix within the femoral hernia sac. Although appendicitis is a common surgical emergency, appendix herniation into the groin results in a complex symptoms and signs, which make it difficult to diagnose clinically. We report a case of a 72-year-old male who had De Garengeot's hernia. Ultrasound and contrast-enhanced CT revealed a typical radiological feature of femoral hernia with the appendix herniating within femoral hernia sac. Surgical management of De Garengeot's hernia is controversial, and it is tailored according to the patient clinical situation and surgeon's preference. To the best of our knowledge, this is the first case that combines both CT and ultrasound findings with postoperative findings.

* Corresponding author.
E-mail addresses: sabdulghaffar@dha.gov.ae (S. Abdulghaffar), maaalmulla@dha.gov.ae (M. Almulla), Pgupta@dha.gov.ae (P. Gupta), ABMohamed@dha.gov.ae (A.B. Mohamed).

© 2019 The Authors. Published by Elsevier Inc. on behalf of University of Washington. This is an open access article under the CC BY-NC-ND license. (http://creativecommons.org/licenses/by-nc-nd/4.0/)

Introduction

Appendicitis is a common surgical emergency case which requires instant diagnosis and management; however atypical presentation is common, and its complications can be fatal.\(^1\)

De Garengeot's hernia is defined as the presence of the appendix within the femoral hernia sac \([8]\).

It is a rare entity with a right-sided preponderance for hernia due to the normal anatomical location of the appendix. Its underlying predisposing factors can be related to the abnormal position of the appendix, low lying cecum, and increased intra-abdominal pressure \([2,3]\).

Patients usually present with a painful right groin lump \([8]\). Ultrasound and CT are commonly performed and shows an inflamed appendix herniating through the femoral hernia \([6]\). Appendectomy is carried through the femoral hernia sac followed by herniorrhaphy with mesh \([1]\).

Case presentation

A 72 year-old male presented to emergency department with 5 days history of right groin swelling and a 1-day history of acute pain at that region. The patient had undergone
In 1980 for perforated duodenal ulcer. The patient had no other relevant previous medical or surgical history or history of trauma.

On examination, a 3 × 6 cm firm irreducible tender right groin swelling with no overlying skin changes noted. The patient was otherwise clinically stable with normal vitals. Abdominal examination revealed an upper midline scar and a 1 × 1 cm small reducible umbilical hernia. His lab findings (CBC, creatinine, and PT, PTT, and urea electrolyte) were within normal ranges. A provisional diagnosis of right femoral hernia was given and a bedside ultrasound followed by CT was done to confirm the content of the hernia and rule out any other abdominal pathology prior surgery.

**Imaging findings**

**US**

High-frequency linear array ultrasound probe (5-12 MHz) was used to scan the right groin and it showed a noncompressible...
blind ending tubular cystic mass with a diameter of 0.8 cm
seen herniating through right lower abdominal defect with
an adjacent hyperechoic omental fat (Fig. 1). The relation of
the herniating structures to the femoral vessels could not be
established due to probe tenderness and limited field of
view.

CT advised for further evaluation of intraabdominal and
pelvic structures, to rule out complications and for surgical
planning.

CT

Contrast-enhanced CT examination of the abdomen was
done using a 64-detector row scanner (GE optima 660) with
350 mg OMNIPAQUE/100 mL injection administered intra-
venously. Images revealed herniation of omental fat and a
blind ending tubular structure through a narrowed neck
defect, medial to the common femoral vessels. Careful eval-
uation in reformatted coronal and sagittal images showed
herniated edematous appendix with adjacent fat stranding.
The hernial sac was measuring 5.2 × 3.4 × 5 cm in the 3
orthogonal dimensions. The appendix tip was measuring 0.9
cm with no defect in its enhancing mucosa. Femoral vein
demonstrates subtle compression anteromedially due to the
hernia sac mass effect (Fig. 2).

An impression of acute appendicitis (herniating through
femoral defect) with necrotic omental fat were suggested.

The patient was admitted in the hospital with a diag-
nosis of right femoral hernia containing acutely inflamed
appendix and surgery was planned for appendicectomy and
herniorrhaphy.

In our patient; an infrainguinal incision was performed.
The femoral hernia was found out and was opened. An
inflamed congested appendix within the sac was reveled,
subsequently appendectomy performed and the hernia was
repairs via hernioplasty using McVay technique.

The postoperative course was uneventful and the patient
was discharged after 7 days. Afterward, the patient was fol-
lowed up after 4 weeks in the surgery clinic, the wound was
clean and healing as expected (Fig. 3).

Discussion and conclusion

Femoral hernia containing appendix accounts for only 0.9% of
all femoral hernias. De Garengeot’s hernia is defined as
the presence of the vermiform appendix within the femoral
hernia sac. It was first described by French surgeon, Rene
Jacques Croissant De Garengeot, in 1731 [3,4]. Female-to-
male incidence ratio equals 5:1 and a mean age of 70
years [3].

Two theories have been described as an etiological factors
predisposing to De Garengeot’s hernia; the first is that the ap-
pendix may be in an abnormal anatomical position. The sec-
ond theory suggests that an anatomically large caecum forces
the appendix into the pelvis [3,2]. The risk factors include in-
creased intra-abdominal pressure, smoking, age, and connec-
tive tissue disease [3].

Majority of patients present with tender groin lump similar
to our patient with less than 3% of them being painless [5].
Other symptoms include fever, abdominal pain, and vomiting
[2].

Laboratory tests often show leukocytosis and elevated CRP
[3]. However, these findings were absent in our case.

Abdominal radiograph is nonspecific but can be performed
initially to rule out bowel obstruction [3]. Sonography can
be performed in young and pregnant patient [6]. The best
diagnostic imaging modality is CT with sensitivity of 100%
and a specificity of 98.9% in the diagnosis of acute appen-
dicitis and identifying any associated complications such as
small bowel obstruction and strangulation [4,6]. CT can pro-
vide definite preoperative diagnosis and it remains the best
way to differentiate Amyand and De Garengeot hernia [2]
(Table 1).

The definitive treatment of De Garengeot’s hernia is sur-
geal appendectomy and femoral hernia repair performed
together [7]. Appendectomy can be achieved through the
hernial sac if technically feasible or via traditional McBur-
ney incision [8]. Simple herniorrhaphy and avoidance of
mesh utilization is preferred in the presence of infection or
inflammation [8].
Table 1 – The difference between De Garengeot's hernia and Amyand hernia

|                        | De Garengeot's hernia                                                                 | Amyand hernia                                                                 |
|------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Appendix is herniating as Femoral hernia | The appendix is herniating through the femoral ring just medial to the common femoral vein. | Inguinal hernia                                                                 |
| Appearance on CT       |                                                                                     | In direct inguinal hernia, the herniating appendix will be seen medial to the inferior epigastric vessels. |
|                        |                                                                                     | In indirect inguinal hernia, the herniating appendix will be seen lateral and superior to the inferior epigastric vessels. |
| Common in              | Females                                                                             | Males                                                                          |

Note [9].

REFERENCES

[1] Salkade PR, Chung AYF, Law YM. De Garengeot's hernia: an unusual right groin mass due to acute appendicitis in an incarcerated femoral hernia. Hong Kong Med J 2012;18:442. http://www.ncbi.nlm.nih.gov/pubmed/23018075.
[2] Ardeleanu V, Chicos S, Tutunaru D, Georgeacu C. A rare case of acute abdomen: Garengeot hernia. Chirurgia 2013;108:896. http://www.ncbi.nlm.nih.gov/pubmed/24331333.
[3] Garcia-Amador Cristina, De la Plaza Roberto, Arteaga Vladimir, Lopez-Marcano Aylhin, Ramia Jose. Garengeot's hernia: two case reports with CT diagnosis and literature review. Open Med 2016;11:343–9. http://www.degruyter.com/doi/10.1515/med-2016-0065. doi:10.1515/med-2016-0065.
[4] Leite TF, Chagas CA, Pires LA, Cisne R, Babinski MA. De Garengeot's hernia in an 82-year-old man: a case report and clinical significance. J Surg Case Rep 2016;2016(7). doi:10.1053/jscr/rjw120.
[5] Ahmed K, Bashar K, McHugh TJ, McHugh SM, Kavanagh E. Appendicitis in De Garengeot's hernia presenting as a nontender inguinal mass: case report and review of the literature. Case Rep Surg 2014;2014:932638. http://www.ncbi.nlm.nih.gov/pubmed/24716081.
[6] Allen BC, Kirsch J, Szymstein S. Case 187: De Garengeot hernia. Radiology 2012;265. doi:10.1148/radiol.12102051.
[7] Tanrıkul CS, Tanrıkul Y, Akkapulu N. De Garengeot's hernia: a case of acute appendicitis in a femoral hernia sac. Ulus Travma Acil Cerrahi Derg 2013;19:380. http://www.ncbi.nlm.nih.gov/pubmed/23884684.
[8] Erdas E, Sias L, Licheri S, et al. De Garengeot hernia with acute appendicitis. G Chir 2013;34:86. http://www.ncbi.nlm.nih.gov/pubmed/23578413.
[9] Burkhardt JH, Arshanskiy Y, Munson JL, Scholz FJ. Diagnosis of inguinal region hernias with axial CT: the lateral crescent sign and other key findings. Radiographics 2011;31:E12.